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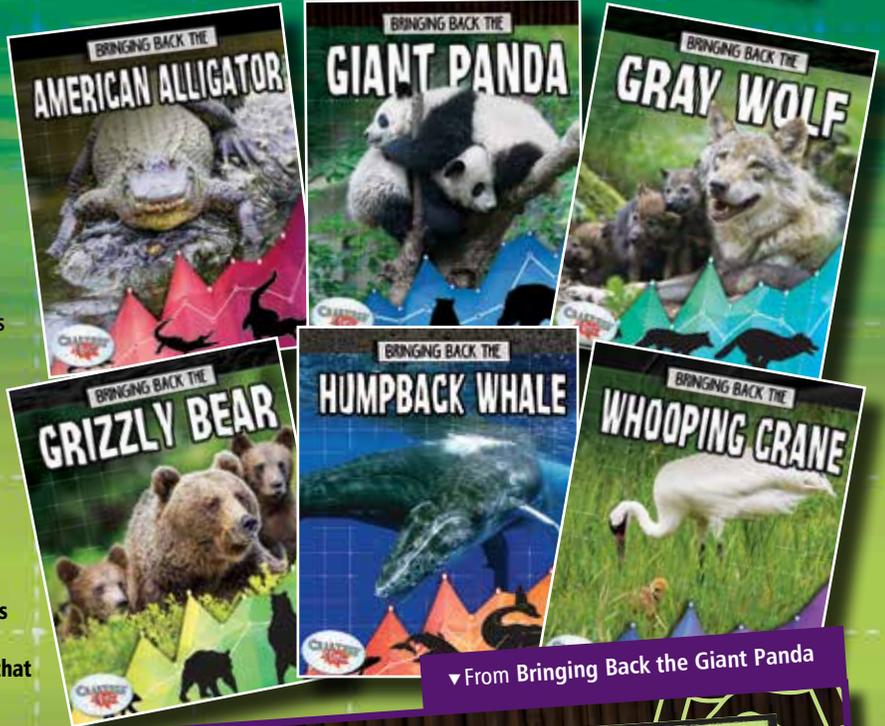


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On September 4, 2016 the IUCN released an updated Red List showing the giant panda's status had changed from "endangered" to "vulnerable." The panda's improved status is the result of different panda protection projects put in place by the Chinese government. The government has worked for many years to help protect giant pandas and increase their population. Their main focus includes restoring panda habitats by replanting large areas of bamboo and expanding panda reserves.

In early 2018, China announced plans to build a huge panda reserve. The new reserve will connect 67 separate reserves to create one giant conservation zone. This picture shows the Research Base of Giant Panda Breeding, a large panda reserve in Chengdu, China.



COLLABORATING FOR A CAUSE

The **World Wildlife Fund**, or **WWF**, is an organization that helps protect endangered species. They first began working with Chinese scientists to protect pandas in 1979. Since this time, one of their main jobs has been protecting the panda's shrinking habitat. Expanding highways and railroads cut through the panda habitat and divide it into tiny areas where only a small number of pandas can live. Many of these areas are cut off from one another, making it difficult for pandas living in one area to **mate** with pandas from another. The WWF helps link pandas living in different areas with **green corridors**. Green corridors are natural paths that allow pandas from one area to connect and mate with pandas from another. Green corridors help increase the panda population and are one example of how people working together can benefit endangered species.



A giant panda has been the WWF logo, or symbol, since the organization began in 1961. It was inspired by a giant panda named Chi-Chi, that was living at the London Zoo during that time.

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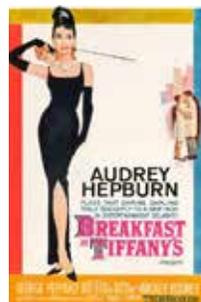
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Thomas Midbo
President, Canadian Association of Principals

The 2018/19 school year is in full swing! In preparation for this school year, school leaders have put in a tremendous amount of work with their staff, to ensure that students across this nation are delivered the highest quality learning opportunities possible.

Canadian Association of Principals (CAP) started as an organization in 1977-78. This means that CAP has been the Canadian national voice of school leadership for 40 years. It is an honor to be the 41st President of CAP. I look forward to working with President Elect Terry MacIsaac, Past President Kyran Dwyer, the Executive, and the Board. Over this year we will strive to advocate for school leaders and be a presence on the national stage through strong communication, connecting with our members, as well as reaching out to all of our partners in education.

The CAP National Conference in St. John's Newfoundland in May 2018, was a great opportunity for learning and networking. Thank you to the host committee for a tremendous job in planning the conference. Everyone is invited to Whitehorse, Yukon for this year's CAP conference. It takes place from April 30 to May 3rd, 2019. The theme, "Authentic education, focusing on experiential education and student engagement" will provide thought provoking speakers to challenge us as we continue to strive for excellence and be the best we can be.

To support professional growth of school leaders, we are very proud of our CAP Journal, edited by Christina Pike. It has been designed to provide you with educational articles from members across the country – these articles are reflective, current, and very valuable.

Through informed practice by Canadian school leaders, Canadian education will continue its highly regarded international reputation. I look forward to representing you on the national and international stages.

Respectfully yours,

Thomas Midbo
CAP President.





Christina Pike
Editor, CAP Journal

Fellow Administrators,

As you begin reading this journal, the school year has just begun and we are off to a running start. Preparations you began last year, are being taken to fruition and the excitement of a new year and fresh start is contagious. As an administrator, the ability to have multiple tasks ongoing simultaneously is paramount.

This journal's title is "Technology Leader or Leading Technology". This topic will explore the idea of administrators leading the use of technology in the instructional part of a school leader's work, and how they are supporting and being innovative, in supportive teachers in using technology for teaching and learning. There are also be some connection to this and the use of Social Media.

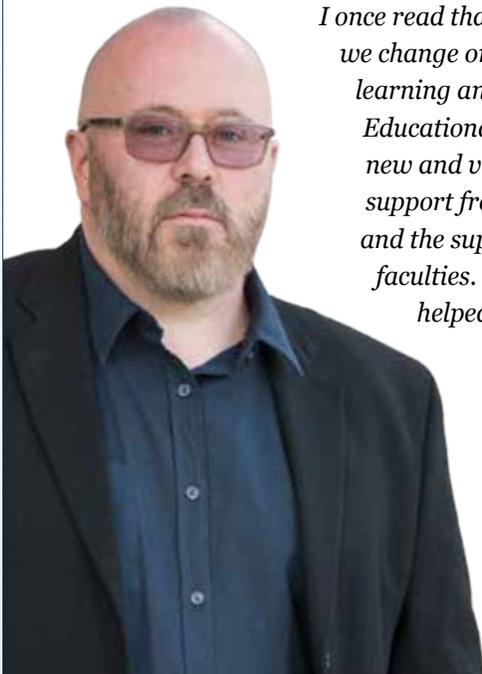
In spite of the break over the summer, there was certainly no shortage of articles submitted across our country. Although the expanse of our country is vast, our interests are similar. Given the popularity of the Spring issue, 'hot topics', a part of each journal will be dedicated to discuss some hot topics in Education. If you would like to submit a hot topic article, please send it to me.

I would like to once again thank all those that contributed to this edition of the CAP journal. It is fabulous to have a national perspective presented in this journal. I wish you all the best in this school year! Until our next journal!

Sincerely,

Christina

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The School Leader's Quandary: Technology as Disruption

By Lorayne Robertson, Laurie Corrigan, Kim Robertson, Sean Heuchert and Gerard Winn



School leaders who make decisions about the use of technology in schools face minefields of conflicting information. One popular book on technology leadership describes technology as disruptive but also finds that many schools have computers not in use¹. They claim that education leaders should anticipate two waves of disruptive technology; technology innovation that is disruptive in the present era, and technology that disrupts schools toward more student-centered learning in the future¹.

The province of Ontario is presently engaged in public debate over a proposed ban on cell phones in schools. One school featured in the media requires students to lock their phones in pouches that block social media and Wi-Fi access². Countries differ in approaches: France is banning mobile phones in schools³ while Estonia encourages students to bring their cell phones to school and use them for learning. Estonia reports higher than average tech-supported learning; here the cell phone is gradually replacing desktop and laptop use⁴. Other schools take the middle ground: permitting cell phones or 1-1 devices for learning but students access Wi-Fi through a central server that blocks social media sites. Here are some additional scenarios that illustrate how technology is disruptive for school leaders.

<p><i>A principal receives a heated phone call from a parent whose son had his cell phone confiscated at 3 pm on the Friday of a long weekend by a teacher who locked it in their desk before leaving.</i></p>	<p><i>A student takes covert pictures of fellow students and the teacher, alters them with text and symbols intended to humiliate, and then shares them with a group of friends.</i></p>
<p><i>A group of boys secretly “vape” in the senior elementary school washroom, record the event on a phone, and post it to Instagram. Fortunately, the school admin team also has an Instagram account.</i></p>	<p><i>Parents of a secondary student have no idea she has two social media accounts: one that she shows to them and the other that she shares with friends.</i></p>
<p><i>A secondary vice-principal reviews the digital footprint of new students and sees a different kind of student record.</i></p>	<p><i>A teacher tries to use the school district logins for a class but the logins are so complicated that the teacher gives up in frustration.</i></p>



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These scenarios illustrate the wide range of day-to-day encounters with technology in schools where the latest computer application arrives unregulated by privacy policy. Student responses to social media anonymity can be unpredictable and disruptive, resulting in a virtual 21st century version of Lord of the Flies. Students can demonstrate a lack of a mature social presence⁵ and they can act without the guidance of teachers to regulate their online activities. Because of suddenness and the level of disruption, responses that are reactive (such as cell phone confiscation) can have appeal to school leaders.

Policy responses lag behind these disruptive innovations. In the Ontario context, cyber behaviour has become more regulated and legislated in Ontario through the Safe Schools Act. There have been shifts in legislation that include restorative approaches to wrongdoing⁶. Teachers have received cautionary advice from their regulatory body to guide their participation in social media⁷.

Early disruptive technologies have seen many students ahead of school administrators on the digital learning curve. Students misappropriate technology for cyber-misbehaviour and teachers' early attempts to use technology have run into inadequate web connectivity. These elements can explain to some degree the cautious approach of teachers and school administrators to technology despite its wholesale adoption into the out-of-school lives of students.

In the year 2018, as technology becomes more ubiquitous, these earlier disruptive influences are gradually becoming more manageable through the development of updated safe school policies and standards for acceptable use, some of which are being developed at the school level. As school leaders navigate the one-to-one device per student terrain, new uses of technology have begun to emerge, prompted by innovative teacher practice and supported by school leaders.

Next, technology innovation is predicted to cause a second form of disruption; this time the disruption will be more closely connected to student learning¹. In the next section we describe some learning scenarios that illustrate the possibilities offered by the next disruption.

New disruption and new ways of learning

Thirty years ago, just prior to the advent of the internet, Lauren Resnick spoke passionately about the need for in-school learning to align with the world of work. She wanted learning to be more cooperative, more focused, and provided on a just-in-time basis⁸. Now, some of her cautions about learning are re-surfacing. Technology is showing a gap between how students learn outside of school and in school. Technology can bridge that gap and provide more personalized learning to groups of students who may not be able to attend regular classes or may not have access to specialized courses¹. Here are some representative but authentic scenarios.

Grade 12 students in a BYOD classroom decide that they want to investigate how First Nations Metis Inuit awareness is understood in other secondary schools. The students send emails to curriculum chairs in neighbouring schools asking about their participation prior to consulting with the principal. The culmination of the project is a seminar on indigenous cultures attended by interested students from 4 secondary schools and joined by an esteemed researcher who visits via a Google hangout from Mexico. As a result, the students gain significant understanding of issues that exist for marginalized populations, such as clean water scarcities. They tweet their learning in real time.

Preservice teachers in an online class share critical incidents involving equity that they encounter during field experience. Working together, they identify and investigate equity issues, locate resources, policies, and potential solutions, and prepare an equity scenario for their peers using multi-media. The instructor participates as a resource but the inquiry follows a fully student-driven model. Following a lively online discussion, the preservice teachers reflect on what they have been learning and how they have been learning. Most express gratitude for having equity resources readily available to use with future classes. Others express an interest in leading digital learning for future students.

The 8th grade uses an app for record-keeping. Each student has an account and a digital work portfolio to file photographs of their work and records of their assignments. Parents have access to their own child's account to see the learning expectations for the assignment, the grade earned, and the teacher's comments about the assignment relative to the learning skills. Parents can offer comments. The principal is supportive but cautions the teacher not to use 3rd party apps but only the apps approved by the school district, in order to protect students' digital privacy.

In a program designed to help college students bridge their work experience and college diploma for credit, a university offers a fully-online Baccalaureate. The adult students who enrol have competing priorities and busy lives. They log into their "live" classes that are offered at different times of the day (e.g., lunch hour, evenings). They come to class using any device that has an internet connection. It is not unusual for students to come into class online using tablets when they are on a break at work, or using cell phones when they are on public transit.

Disruptive technology in these examples allows learning to become more individualized and more student-driven. Students will use some of the same skills they use outside of school to search, retrieve, and communicate information.

Moving Forward with Big Tech Ideas for School Leaders

Principals and vice-principals are leading schools during this period of intense social media popularity and technological innovation. We offer a few “big ideas” for school leaders to consider.

1. In a landscape of trial and error, technology practices will shift without warning and might be disruptive. Policies will lag.
2. Technology will allow more equitable access to schooling both for marginalized populations and schools with limited course or program offerings.
3. One-to-one technology will continue but the safety of the school learning space and the climate will be instrumental.
4. Prompts for tech-enhanced learning are more likely to emerge from around and below and not necessarily from above (e.g., curriculum directives).
5. New apps and techniques will leapfrog over earlier assistive technologies (e.g., speech-to-text technology) and will provide more efficient ways for all students to learn.

We acknowledge that technology innovation has had disruptive effects on schools, and school leaders understandably want to put on the brakes sometimes. But as education becomes less about the hardware and the physical classroom, technology-supported learning has great potential to provide more equitable access to learning. School leaders who anticipate different types of technology disruptions will likely be better poised to meet these challenges. ■

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Gerard Winn is the Principal of St. Thomas Aquinas Secondary School in Lindsay, Ontario, which includes an e-learning program and 1-1 laptop learning programs.



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Online Professional Learning: *Ensuring Learning, Participation and Satisfaction*

By **Richard Snow**, BSc, BEd, MEd(IT)



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Living and working as an educator in Newfoundland and Labrador has been rewarding for me. I have had the pleasure to travel to the top of Labrador, to Gros Morne National Park and to historic St. John's with many stops in between. While having a deep love of and appreciation for the vast geography of our beautiful province, it comes as a challenge for me in my present role in Professional Learning for the Newfoundland and Labrador English School District. Herein lie the challenges.

In Newfoundland and Labrador, there are approximately 505,469 residents dispersed over 405,720 km² of land, yielding 1.2 people per km². Outside the main population area of the Avalon Peninsula, that number changes to 0.6 people per km² ("Statistics", n.d.). One can easily see that the population covers a large geographical area and schools would be affected by that same geographical spread. As such, there are both monetary and time costs associated with travel for teachers to attend professional learning sessions in centralized locations.

Herbert, Campbell, and Loong (2016) mention that professional learning for rural teachers is a problem when travel time, release time and large distances between the teacher and the professional learning are taken into consideration. Reading (2010) suggests that cost is a prohibitive factor for professional learning when teacher needs are in fact higher in those rural geographical areas.

Both studies (Herbert et al., 2016; Reading, 2010) suggested a resolution with moving professional learning to the online realm. Our own government has indicated it is looking at ways to reduce expenditures by restricting travel and by using online technologies in their Government Renewal Initiative (2016). Therefore you must be thinking that the challenges I have expressed here are easily rectified by the transition of professional learning online. Essentially let's go virtual and all will be okay? Not so fast!

Online Professional Learning

Holmes, Signer, and MacLeod (2010) suggest that professional learning “initiatives are most effective when informed by research, sustained over time, collaborative in nature, and focused on content and instruction in the context of learning” (p. 76). In a study on veteran teachers, Houston (2016) found that teachers clearly indicated a need for professional development to be relevant, to be applicable to and aligned with their needs as learners. As well, teachers need facilitators who they perceive to be credible while using interactive learning structures and collaboration to provide engaging learning experiences. These two studies (Holmes et al., 2010; Houston 2016) point out that professional learning, regardless of the medium in which it is delivered, can be successful from a learner perspective. The question then becomes how can this be done in the realm of online professional learning? Let’s explore three areas that will increase the likelihood of success.

First of all, any professional learning offering must have adult learning theory as its anchor. For those of us that have taught children and have now moved into leadership roles we know how adults learn is different from what we did in the classroom. Malinovski, Vasileva-Stojanovska, Jovevski, Vasileva, and Trajkovik (2015) define andragogy with the following five components:

- ✓ adults move from dependent to self-directed learners;
- ✓ experience is the guide for adults in their learning;
- ✓ adults are internally motivated to learn in areas that have immediate relevance to their professional or personal life;
- ✓ adults have an orientation which will, over time, shift from content-oriented to problem-centered learning; and
- ✓ motivation to learn in adults more internal than external.

What we are left with is that first of all, as leaders, we should expect teachers will start any professional learning looking for concrete ideas, resources, and activities to bring back to their classroom before they move into the more problem-based or theory-based discussion. Secondly, if the professional learning is aligned to the current environment and needs of a teacher, their motivation to learn as well as their participation will follow. The third point involves the realization that adults will move from a dependent to self-directed learner but that it takes time. But what about andragogy in the context of online learning? Blackley and Sheffield (2015) coined the term “digital andragogy” bringing andragogy and professional learning into the twenty-first century. Simply put digital andragogy is “the practice of educators to equip and encourage adult learners to choose and use the affordances of accessible digital technologies to personalise their learning and facilitate their interactions with peers and tutors” (Blackley and Sheffield, p. 408). Let’s think of online/virtual as the tool for delivery, but andragogy as the driver for the professional learning.

Peers and tutors... this leads us into our other two areas that guarantee success for online professional learning, namely teacher and social presence. Teacher presence in online professional learning is defined as the role of a teacher in learning when using instructional design and organization, facilitating discourse, and direct instruction while social presence involves the projection of an individual’s identity to a group within an online collaborative space (Giesbers, Rienties, Tempelaar, & Gijsselaers, 2014).

Teacher presence is so much more than simply information dissemination. In online professional learning, the role of the

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facilitator/mentor is to build both the community as a whole as well as enhance the professional learning of the individual (Prestridge & Tondeur, 2015). Miller, Hahs-Vaughn, & Zygouris-Coe (2014) found that “facilitators were valued most for being directors and leaders of the learning experience” (p. 24). Prestridge and Tondeur (2015) suggest it is the role of the mentor/facilitator to consciously interject the critical lens to professional learning discussion as teachers may only reflect on their professional learning online as a history or chronology of events and not the deeper analysis of what happened during those events.

When teacher presence is well established in online professional learning, social presence grows. Farris (2015) indicates that trust will develop if the appropriate feedback is given, participants are challenged through intentional questioning techniques and teacher successes are celebrated when they share concepts of their practice. When teachers are immersed in a trusting, caring environment where ideas can be discussed critically but professionally, deeper learning can occur. Once trust is established then, as Matzat (2013) positions, “blended communities tend to provide better learning outcomes than traditional face-to-face classes” (p. 42).

At the Newfoundland and Labrador English School District we have been incorporating andragogy, teacher presence and social presence into our online professional learning. Teachers are reacting to our sessions in an extremely positive way and we, as leaders, are observing shifts in both thinking and practice as a result. Those results just may be in a future publication here. We have found, and research is supportive of this: when developed and

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Online Professional Learning

delivered effectively, online professional learning is comparable to face-to-face professional learning (Fisher, Schumaker, Culbertson, & Deshler, 2010; Fishman et al., 2013; Powell, Diamond, Burchinal,

& Koehler, 2010). So while there may be challenges with professional learning delivery in Newfoundland and Labrador, online professional learning is helping us overcome them. ■

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AUTHOR BIO

Richard Snow currently works as a Program Specialist in the Newfoundland and Labrador English School District (NLESD). His role is in the area of teacher professional learning with a focus on synchronous and asynchronous learning. Richard is also a National Instructor with Texas Instruments as well as a Level 1 Certified Educator with Google.



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Technology and Student Engagement

By **Sunaina Sharma** and **Michelann Parr**



What Educational Leaders and Teachers Need to Know



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It is amazing to me how in all the hoopla and debate these days about the decline of education... we ignore the most fundamental of causes. Our students have changed radically. Today's students are no longer the people our educational system was designed to teach.

Today's students have not just changed incrementally from those of the past, nor simply changed their slang, clothes, body adornments, or styles, as has happened between generations previously. A really big discontinuity has taken place... an event which changes things so fundamentally that there is absolutely no going back... the arrival and rapid dissemination of digital technology. (Prensky, 2001, p. 14)

Prensky made this statement over seventeen years ago, and it is equally relevant today. Digital technology is ubiquitous in the lives of our students, both in and out of the classroom. In an effort to keep up with today's generation of learners, we bring technology into our classrooms and schools as a means to communicate, to share information, and even to attract student attention due to its perceived novelty and variety (Dietrich & Balli, 2014). We do our best to mirror technological "trends in youth activities, attitudes, and behaviours" (Mesch, 2009, p. 50), despite the fact that many students "have more technology in their bedrooms than they are often allowed to use in today's classrooms" (Dieker & Hines, 2014, p. 47).

Technology & Student Engagement

As educators, we use technology because we believe that it gives our students a competitive edge. We rely on technology to prepare students for the future (Tucker, 2012), to increase opportunities for collaboration and communication (Dede, 2014; Sawang et al., 2017), to expose them to different perspectives and the global world (Bidwell, 2014; Dede, 2014), to enhance self-efficacy and student control over learning (Dietrich & Balli, 2014), and to create increasingly complex and dynamic learning environments (Callow & Orlando, 2015; Wright et al., 2013).

But is technology really worth all the hype? Or have its consequences been under-examined (Morozov, 2013). Some research indicates that technology results in increased cognitive load on students (Moreno, 2013), “‘infomania,’ a condition of reduced concentration and mental performance” (Rose, 2010, p. 42), perpetual interruption (Friedman, 2006), struggle to concentrate and contemplate (Carr, 2008), and the erosion of long-term attention (Marks, 2000).

The bottom-line? While technology is one of the most important resources available in the 21st century (Okwumabua, Walker, Hu, & Watson, 2010), the research literature is inconclusive about its consequences and its relationship to student engagement.

There is a “commonplace assumption . . . that all learners are excited” by the use of technology (Gibson, 2001, p. 38). To explore this assumption, we immersed ourselves in the culture and social dynamics of an Ontario Grade 11 English classroom, situated in a technologically-inclusive school, with an experienced teacher. We equipped ourselves with possible consequences, and as ethnographers, we deeply hung out (Coles & Knowles, 2001).

We asked about, observed, and reviewed the use of technology by students and teacher trying to understand the link between technology and student engagement (Wolcott, 1992).

What do we mean by student engagement?

Student engagement is an active process that permeates students’ experience of school (Oblinger, 2004). Engagement includes participating in class discussions and learning activities, asking questions, responding orally or in writing, emailing or posting responses or comments, bringing questions and problems to class, and probing deeply into research problems (Garrett, 2011). It requires that students know that they have been heard and that their voice matters (Wilms, 2011). Engagement happens when students are informed and empowered to speak their mind and give feedback on learning learning (Ontario Ministry of Education, 2018).

What does the research have to say about the role of the teacher in technologically-rich classrooms?

The role of the teacher is critical in any classroom (Wilms, 2011), but even moreso in a technologically-rich classroom (Yildirim & Kiraz, 1999). Teachers of 21st century learners need to be digitally resilient, willing to take risks alongside their students, recognizing that their students may have more expertise with technology than they do. They need to have effective leadership skills knowing when and how to let students take the lead in the use of technology; they need to effectively model appropriate and acceptable technology use. They need rich world experiences that allow them to understand that technology is not a quick fix, but



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simply a tool that supports the teaching-learning process. They need to have positive attitudes towards inclusion and the many ways that technology can support this goal while being wary of its potential to detract from it. Finally, they need to listen in to what students are saying in words and in action with regard to technology.

In particular, teachers in technologically-rich classrooms do the following things:

Recognize the link between their pedagogical beliefs and the use of technology in the classroom. In addition to designing instructional materials or delivering lessons, technology needs to be effectively and meaningfully integrated into teaching and learning (Gorder, 2008). Technology use needs to be guided by sound pedagogy and the overall purpose or goal of learning, not simply used for technology's sake (Bull & Bell, 2008). New technologies will require innovative pedagogies.

Use technology in ways that support constructivist pedagogies. Students engage with classroom technology when it allows them “to create meaning [and] make connections” (Singer, 2014, p. 173). Technology should be part of knowledge creation not simply provision of information (Lambropoulos, 2009). It should not isolate students but involve them in collaborative and constructive communication. If we want to truly engage our learners, we need to move beyond didactic toward more constructivist pedagogies (Taylor & Parsons, 2011) that allow them to “explore different applications for the knowledge and skills they have learned” (Scott, 2015, p. 4).

Negotiate effective and productive use of technology. Rather than “decid[ing] for our students; we must decide with them” (Prensky, 2001, p. 3); the voice of the learner should be part of the process of curriculum design and implementation (Jagersma & Parsons, 2011). Importantly, they need teachers who effectively model appropriate, acceptable, effective, and productive use of technology. Finally, students require a balance of unstructured, structured, and directed learning situations to develop functional technology skills that emerge from an understanding of what students want and need to engage in the classroom.

What do the students in this inquiry have to say about the use of technology, both theirs and that of their teacher?

Over the course of the semester, we attempted to figure out what motivates and engages students (Toshalis & Nakkula, 2012); students participated in focus groups, conversations, surveys, and ongoing classroom work. Engaging 21st century learners with, or without, digital technology is increasingly complex; there is no one-size-fits all approach. Students in this inquiry, however, offered the following insights about the use of technology:

Leave the teaching to the teacher. Students indicated that if they wanted to learn through technology, they would have taken an online course. In their opinion “teachers should be physically teaching” and technology should not be used to “giv[e] information to regurgitate and retain.” Some were in favour of excluding technology from lessons, preferring a talk and interact format, using it only for “fun activities” that allow for practice or reinforcement of a lesson.

Use technology in interactive and collaborative ways. In students’ opinion, technology is engaging “if it is used right,” and offers “two-way” opportunities to interact, collaborate, explore, understand, and

share ideas with each other and their teacher. Technology allows them to connect with their peers, the teacher, and the global world; this makes it “easier to recollect and retain information” and “say ‘here’s my idea, and here’s what I’ve put in to your work.’”

Use technology to support our learning styles. Students report that technology allows them to have “multiple things open side-by-side;” they like being able to research, work on assignments, and/or listen to music all at the same time. English language learners report that technology is helpful in understanding the text because it makes way more sense,” thus supporting their understanding of classroom concepts, texts, and ideas.

Take note of how and when technology distracts us. Students recognize that technology “is a distraction” that often gets “annoying,” but they are unwilling to give up the “privilege of constant access” to their personal technology. They would rather learn life strategies to manage their technology both in and outside of the classroom; these putting the phone “in [a] backpack,” ensuring it is “on silence,” and “turning [the phone] over and not looking at it.”

Recognize that inappropriate technology use might mean that we need help. Students report that playing with a cell phone might look like they do not want to do the work, but that is not a fair assumption; it might mean that they need help. Technology may act as a way to disengage when a task is too difficult or when they encounter a struggle or obstacle; the distraction is better than looking “dumb.”

Guide us to use technology appropriately and responsibly. Students know that living in a digital world means that they need to learn how to responsibly use technology, but they struggle with

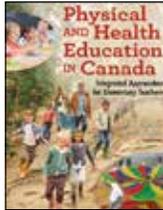
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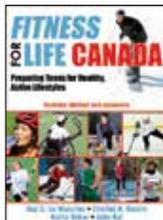
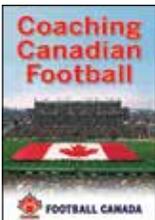
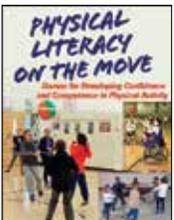
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unclear expectations and inconsistent rules. They realize that even in a school with policies, the teacher is the ultimate gatekeeper for what is appropriate and acceptable and what is not. They appreciate gentle guidance and redirects that help them “get back on track” and realize “how much time has been wasted.”

Plan for us to unplug. When students are offered legitimate opportunities for movement, talk, and collaboration, they resist the allure of technology and engage fully in classroom tasks. Tasks that require them to plan and brainstorm with pen and paper, allow them to “think more openly,” “see more clearly,” and develop “more complex ideas by drawing and making physical connections that tap into the creative part of their brains.” Some feel a great sense of accomplishment when producing work in writing.

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Concluding Remarks

There is no doubt that technology can be a tool to support engagement, but there is also no doubt that it has the potential to distract and detract from learning as well; it warrants careful and thoughtful use (Frazier & Bailey, 2012) and ongoing discussion with students. Technology alone does not give students a competitive edge, but it is instead the skilful integration and negotiation of technology with the teacher that makes the greatest difference. Setting our students up for success requires teachers who openly discuss preferences for learning, negotiate technology use for learning, and attend carefully to what students are saying and doing. Technology is not a panacea to education; it is simply one more tool that allows us to meet students where they are and enhance their overall learning experience (Saunders & Gale, 2011). ■

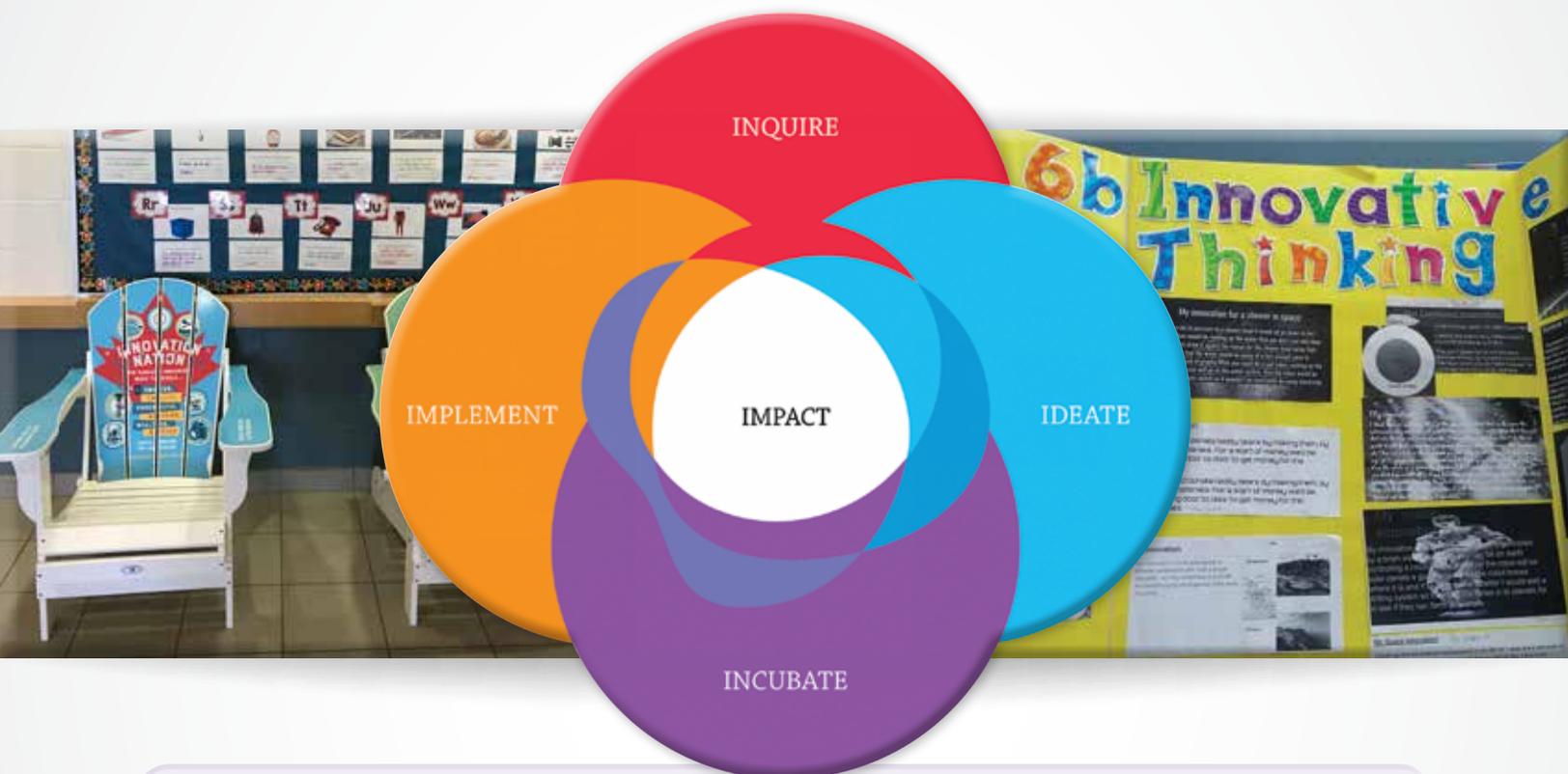
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Sunaina Sharma is a secondary English teacher and department head. She is a recent graduate of Nipissing University’s PhD in Education (Educational Sustainability) program. Her research explores how digital technologies engage and disengage students. By listening in to what students say and don’t say, she strives to cultivate a learning environment that engages, challenges, and informs her students.

Michelann Parr is professor in the Schulich School of Education at Nipissing University. She currently teaches in the PhD program at Nipissing. Over the years, she has researched the inclusive use of technology in the classroom with a focus on text-to-speech and speech-to-text technologies; from students, she learned that the use of technology is about the right to choose when and where, the right to use without question, and the right to refuse.

Leading-Edge Administrators Using Technology to Promote *Innovation*

by Maria Cantalini-Williams, Glenda Black, Daniel Jarvis, Jenny Guibert



The term 'innovation' is very prevalent in the media, among entrepreneurs, in the realm of social and educational organizations and especially in relation to technology. Interestingly, innovation is integral to growth, success and well-being across all sectors of society and can be addressed in every subject of educational curriculum. The development of innovative thinking, attitudes and actions is central to learning in a range of educational settings. There is a current imperative to encourage a culture of innovation nationally and internationally and to integrate innovative thinking, processes and actions in educational systems, learning goals, curriculum resources and pedagogical approaches (OECD, 2016)

Canadian students are naturally inquisitive and collaborative, seeking to be agents of positive change. Curriculum expectations and teaching guidelines, across Canada and across grade levels, include varied references to Canadian innovations and to the achievement of learning skills related to innovation. Global competencies such as critical thinking, communication, creativity and collaboration are inherently integrated into innovation learning experiences.

The Rideau Hall Foundation (RHF) has initiated a recent national initiative to celebrate and cultivate innovation among Canadian youth, through the provision of educational guides for teachers from Kindergarten to Grade 12. The set of guides are titled *Education for Innovation (EAI)* and include resources for: Early Learning-Kindergarten; Grades 1-8 and; Grades 7-12. The education resources were developed in partnership with Nipissing University Schulich School of Education faculty and teacher candidates. They are free to download at <https://canadianinnovationspace.ca/resources/>.



Education for Innovation (EAI) resources are intended to encourage students to explore Canada's history as a nation of innovators and to become aware of the iterative and cyclical nature of innovation. Ultimately, the goal is to inspire our future generation with educational experiences that challenge them to celebrate the rewarding process of innovation. The Education for Innovation resources provide educators with a set of learning experiences which follow an Innovation Cycle and culminate in the completion of Innovation Projects. The Innovation Cycle is focused on making an intended Impact and challenges Innovation Teams to Inquire, Ideate, Incubate and Implement new innovations.

The impetus for developing the Education for Innovation resources was the release of two books co-authored by the former Governor General, the Right Honourable David Johnston and Tom Jenkins. The publications are *Innovation Nation: How Canadian Innovators Made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier, and Happier* (2017) written for emergent readers; and *Ingenious: How Canadian Innovators Made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier, and Happier* (2017) written for older/adult readers. The Education for Innovation resources are based on the content of the books *Innovation Nation* and *Ingenious* and provide a foundation for integrating innovation in any curriculum subject in elementary and secondary schools.

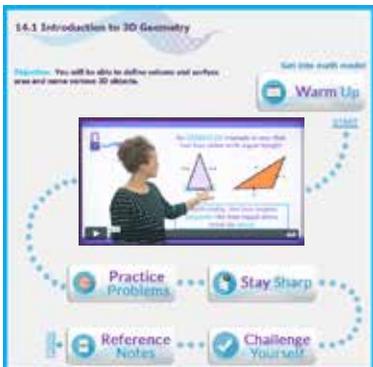
This article describes the successful efforts of John Sweeney Catholic School in Kitchener, Ontario (Waterloo Catholic District School Board) that participated in a pilot project to review and implement the first edition of the Education for Innovation resources. The principal and vice-principal of John Sweeney Catholic School, Paul Smith and Andrea Dafoe, respectively, were pivotal in enthusiastically promoting innovation through the use of technology in a variety of formats and platforms. The school staff embraced the concept of permeating the theme of innovation across the school from Junior Kindergarten to Grade 8. They were instrumental in collaborating with Nipissing University faculty and the Rideau Hall Foundation to pilot the draft Education for Innovation resources.



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The school administrators followed a series of steps to pilot the resources and used various forms of technology in the process. At the beginning of the school year, the administrators asked teachers if they would like to join an Innovation Team. The response was overwhelmingly positive and there was at least one teacher representative for each grade of the school who volunteered to serve on the Innovation Team. Nipissing University faculty then met with the Innovation Team members in a combination of release time and before/after school meetings to provide an overview of the EAI resources and the concept of innovation. The teachers received draft copies of the Education for Innovation resources and watched training videos. In addition, each teacher received a copy of the book *Innovation Nation* (Johnston & Jenkins, 2017) and the book called *If I Build a Car* by Chris Van Dusen. These resources and books were very helpful for teachers to stimulate connections between innovation and classroom curriculum. Principal, Paul Smith, capitalized on the school's D2L learning management system to create a site to post materials such as videos and encourage discussion among teachers. The Innovation Team members and school

administrators also had the privilege of presenting their school's innovation in an audience with His Excellency the Governor General in 2017. A series of school photos were inserted into an effective PowerPoint presentation depicting the school's activities. Throughout these exciting opportunities, the use of the school Twitter account was pertinent to create enthusiasm and positive energy about this initiative.

Over the 2017-18 year, each monthly assembly featured one classroom/division presenting their Innovation Projects to the school community. The presentations made by students included social innovations such as new school clubs (Peace Connect) and technological innovations such as safe sports equipment. The presentations were developed and shared using such programs as Prezi, Wix, Scratch, Powtoon, Google Slides and other readily available software programs.

The *Education for Innovation* pilot project was accelerated among staff members through the utilization of Google Classroom features. Again, the principal, Paul Smith, created and shared several Google Docs file documents on the school drive for teachers to allow for input and discussion. Nipissing University faculty members were invited to the related Google Docs documents and were able to interact with teachers. The use of Google Docs was critical for the planning of activities related to Innovation Week in May 2018. John Sweeney Catholic School staff decided to focus the theme of Education Week on innovation-related classroom projects. Thus, the teachers inserted their ideas for classroom-specific activities into the Google Doc file related to Innovation Week and the administrators were able to quickly discern the topics and presentations of each classroom. Innovation Week was a huge success at the school as each classroom showcased the cross-curricular and integrated Innovation Projects developed by Student Innovation Teams. Parents and community members were invited to view the student-led Innovation Projects. The projects ranged from innovative furniture pieces made of recycled materials, to solutions for homelessness, to an Innovation Alphabet developed by the Kindergarten class! A grade 7 class used Google Hangouts to communicate with a Grade 11 class of nearby St. Mary Secondary School. The students of these partner schools shared their Innovation Projects and discussed the challenges of being innovators. One of the most exciting activities was that the school library was transformed into

an Innovation Space with books featuring innovation, special custom chairs depicting the covers of the innovation books, materials for creating innovations and technology for inquiring and investigating. The Innovation Space became the hub of the school!

In addition, the Rideau Hall Foundation supported the production of two documentary videos featuring administrators, teachers, students and parents of John Sweeney Catholic School as found on CanadianInnovationSpace.ca. In the videos, testimonials are provided that attest to the relevance and authenticity of students engaging in real-life projects intended to make a positive impact on our world. The exciting journey of John Sweeney Catholic School is evidence that innovation is not only related to technology. Instead, the school community, led by administrators and the staff Innovation Team, was ignited by the use of technology to promote innovation across grades, sectors, disciplines and curriculum subjects! Innovation is now a commonly used term among students and an exciting reality at John Sweeney Catholic School in Kitchener, Ontario. ■

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Canada 2067

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1

"Netflix knows me better than my teacher."

Student from Calgary summit

2

"We learn best when we are involved in designing our own learning."

Student from Vancouver summit

3

"It's weird to use paper to learn advanced robotics."

Student from Toronto summit

5

"We want to ensure our students get the best open education they can possibly get with an open curriculum."

Student from St. John's summit

6

"Please help me decide what's good or bad for me."

Student from Montreal summit

4

"Teach students how to apply their knowledge and let them practice solving problems."

Student from Vancouver summit

7

"This new way of evaluation favours other types of intelligence and other definitions of success."

Student from Montreal summit

8

"We should have a specific class to focus mainly on our future. We should have a class that helps students choose a great possible job choice."

Student from St. John's summit

9

"We want a comprehensive education that makes us mentally/emotionally strong and academically prepared."

Student from Toronto summit

10

"A relaxing environment can make students more motivated to learn. Focus will improve when students are more comfortable."

Student from Toronto summit

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Students engaged in meaningful science, technology, engineering and math (STEM) learning opportunities develop the skills and abilities needed to become creative, critical thinkers, discoverers, entrepreneurs, problem solvers and informed citizens. Exploring what this means for the future of education is at the heart of Canada 2067.

In a time when most Canadian youth disengage from science, technology, engineering, and mathematics (STEM) studies before high school graduation, we need to better prepare them for a future where disruptive technologies and changes in the labour market will reward highly skilled workers. Thousands of Canadians contributed to the development of the Canada 2067 Learning Roadmap – a set of key recommendations to ensure Canadian youth will be prepared to contribute and thrive in an ever more complex and technologically intensive world.

“Together with our many partners and champions, Let’s Talk Science led the development of the first-ever national vision and roadmap that everyone can use to ensure Canadian youth are ready to participate in a rapidly changing world that is underpinned by STEM,” says Dr. Bonnie Schmidt, President of Let’s Talk Science. “The goal is for all students to develop a full range of skills needed to navigate an increasingly complex world and have equal opportunity and pursue diverse career paths.”

What started as an idea for a single conference, grew to include an international policy review, five youth summits, six millennial roundtable consultations, a national leadership conference, a youth-focused web series and documentary, and significant social media and outreach effort. Canada 2067 youth summits inspired, engaged and empowered more than 1,000 Grade 9 and 10 students across Canada who contributed to the development of a national vision for STEM education.

“I didn’t know that STEM was so vast, and that there is so much opportunity within it. I think that classes should have more demonstrations and that they should start teaching technology at a young age,” says a student from the Toronto summit. “I think it’s absolutely phenomenal for everyone who is here to learn, there are people here who are very inspired and inspire us.”

Canadian education is among the best in the world, but we cannot be complacent. In 2016, as Let’s Talk Science considered how it might celebrate Canada’s sesquicentennial, the organization chose to be more forward-thinking and catalyze the first significant national dialogue about STEM education, focusing on Kindergarten to Grade 12 (K-12). For inspiration, Let’s Talk Science focused on Canada’s bicentennial year (2067) when many of today’s high school students will be considering their retirement.

With a user-centric design, the Canada 2067 Youth Summits emphasized the importance of youth participation. Discussion topics were organized into five challenge areas to provide a discussion framework used by students to create their vision for a new school system. Challenge areas were specifically designed

to draw on students’ lived experiences, providing insight to their current wants and needs, as well as opportunities they see for creating a more engaging education system that aligns with their values, motivations and aspirations.

Students understand the world is changing at an unprecedented rate and realize adults don’t have all the answers – but they aren’t scared! Today, youth are enthusiastic about the opportunity for school to be a learning environment for everyone, including teachers, administrators and students.

Thousands of ideas and hundreds of unique concepts from 125 student teams across Canada synthesized into ten unique themes. These ten insights were consistent across all youth summits.

10 Key insights gathered from 1,000 youth across Canada

1. Personalized learning

The future of STEM education doesn’t look the same for every student.

2. Student collaboration

Students work and learn from each other and play a key role in shaping their education.

3. Technology in the classroom

Technology is critical to improving the learning process.

4. Changing the education curriculum

Engage students in STEM early in their education.

5. Experiential learning

Connect STEM learning to real life problems in a hands-on way.

6. Mentorship

Students seek meaningful relationships with caring and trustworthy adults.

7. Critical thinking & problem solving

Resiliency and flexibility are essential for today’s education and tomorrow’s jobs.

8. Self-awareness & counselling

STEM education and self-awareness are connected and help students develop the skills to manage their own improvement and move towards new directions.

9. Well-being

Students wish for a school culture that is supportive, encouraging and inspiring; a place where diversity and inclusion are practiced and cultivated.

10. Comfortable spaces

Learning spaces must be safe, clean, bright and inspiring.

Students are urging us to imagine the future of STEM education as integrally connected to the arts and humanities. In fact, they want to collapse disciplines and teach subjects in an interdisciplinary, inquiry-based

way. Using real problems to teach concepts would allow students to deepen their understanding of foundational theories through application.

The Canada 2067 Youth Summit results highlight the value of students' ideas as well as the surprising uniformity of their wants and needs for education transformation. The thoughtful recommendations from students demonstrate creative and hopeful thinking with intended impact and results that can inform our nation's decision makers' next steps.

"Most surprising of all, perhaps, was the alignment of thinking across audiences. Educators, students, parents, policy-makers—everyone agreed that we must move towards inter-disciplinary learning that focuses on building skills rather than content knowledge," says Schmidt. "There is alignment regarding the critical role of educators as well as the importance of having parents and the community even more involved in education."

Key recommendations include:

How we teach:

- Teachers have the opportunity to participate in professional development at least once per year in areas related to STEM.
- Teachers and community partners across regions are linked together, forming dynamic professional learning communities
- Implement competency and inquiry-based curricula and initiatives to help teachers develop the necessary skills to instruct STEM and encourage critical inquiry.

How we learn:

- Take advantage of new information and communications technologies (ICTs) to transform teaching and learning into an interactive and student-centred experience.
- Provide appropriate training, support and resources for teachers to implement these approaches.
- Evolve post-secondary education entry requirements to recognize and value students who have engaged in innovative approaches to learning.

What we learn:

- All students graduate high school with at least one senior level interdisciplinary STEM course.
- All students engage in hands-on learning opportunities with partners outside the school at least once per year.
- Number of students enrolled in STEM-related fields in post-secondary education increases each year.

Who's involved:

- STEM learning community partners align their programs with the Canada 2067 recommendations and work together to provide hands-on learning opportunities that are accessible to all students.
- Industry aligns 20% of community investment goals in education to support the achievement of Canada 2067 recommendations.
- Governments commit at least 1% of STEM research budgets to support the achievement of Canada 2067 recommendations.

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Students participating in a discussion at the Toronto youth summit.

Where education leads:

- Students access information about STEM education and future careers in daily school curriculum and hands-on learning opportunities in the community.
- Links between STEM learning in the classroom and experiential learning in the community are improved.
- All parents have access to information and support about STEM education and future careers.

Equity and inclusivity:

- Improve student participation in STEM courses by gender, culture, socio-economic background and region.
- STEM education evolves to address the specific needs of Indigenous students and to incorporate other world views.

The vision of Canada 2067 is to enable students to graduate with doors open to diverse careers, with the capacity to be active and informed citizens, and with the full range of skills needed to navigate an increasingly complex and demanding world. Together, we can keep the momentum going and ensure the future is bright and prosperous for Canadian youth. ■



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Coding & Computational Thinking:

By **Melissa Lee**

THE PRINCIPAL'S ROLE IN SUPPORTING TEACHER LEADERS



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Across Canada, computational thinking (CT) and coding have been gaining momentum in curriculum areas beyond Technology Education. More schools and teachers are recognizing the benefits of including CT and coding within many areas of the prescribed curriculum. Computational thinking can often be misinterpreted as computation, but CT in and out of the classroom refers to the way in which we approach everyday situations, break tasks into steps and problem decomposition (Buitrago Flórez et al., 2017). The skills gained from the inclusion of coding and CT in the day to day learning of students from K-12, such as problem solving, collaboration, critical thinking, questioning and communication, will be vital to the success of our students in the future. School leaders play an important role in supporting teachers who are leading the way in the use of coding and CT in student learning.

My experience with Coding and Computational Thinking

I first started using CT and coding in my Grade 5 Early French Immersion classroom through a lot of my own research, interest and trial and error. I came to learn that trial and error is one of the big ideas behind coding and CT. The successes of making mistakes were something that my students and I were learning to appreciate and celebrate, rather than hide and dismiss. One of the reasons that I felt as though I could make mistakes and explore beyond the traditional idea of teaching and learning, was because I had an extremely supportive administration team on my side. I was not a designated technology teacher but I was encouraged to take on an informal teacher leader role within my school focusing on the potential uses of technology within the prescribed curriculum. Along with a supportive administrative team, the successes, engagement and confidence growth from my students encouraged me to forge a new and innovative teaching and learning path and invite others along on the way.

School Culture

School leaders have a large role in helping to create a school culture. This not only affects students in the school, but also plays a large role in how teachers participate in the school community. Incorporating coding and computational thinking into the classroom requires a school culture that promotes making mistakes, hands on learning, collaboration, open communication and thinking outside of the box to problem solve. This may look different than the traditional view on learning, but it allows teachers and students to be open to new ideas and willing to try new things, which helps foster a positive learning environment. Teachers who are new to coding and CT benefit greatly from collaboration with colleagues to support one another. School leaders have a vital role in modelling and demonstrating effective collaboration and communication with teachers within the school. This will help to create a collaborative culture across the school with all staff members, including emerging teacher leaders (Viczo, 2014). This type of structure then helps build capacity within the school. As well, a positive school culture will promote sharing from teachers which can help pass on strengths and problem solve around weaknesses. Johnson and Donaldson (2007), found that schools in which teachers remained quiet, keeping their strengths and weaknesses to themselves, were not able to grow and remained static. This leaves a great pool of knowledge, innovation and experience untapped. It is important for administration to encourage sharing to allow teachers to work smarter, not harder.

Teacher Leaders

Exploring new ways of learning through CT and coding requires teacher leaders who are willing to take on the task of trying something new and paving the way for other teachers and their students. A positive school culture set forth by school leaders can help encourage teacher leaders to emerge and support overall school goals. "Although the importance of teacher leaders is recognized, teacher leaders are seldom effective in their roles without the support and encouragement of their administrator" (Virginia, Shelton & Headley, 2006, p.89). A supportive administrative team can encourage teacher leaders to lead with innovative practices, that they may have otherwise been apprehensive to try. Building leadership roles into the structure of the school will help encourage the emergence of teacher leaders and build a positive support for them with other staff. Teachers who become leaders have opportunities for more varied responsibilities and a greater influence on school operations. Teachers must feel as though they can collaborate in these areas to have the drive to take

on lead roles. Stifling this type of teacher involvement can limit the possibilities for the bigger picture of school operations and student success. (Johnson & Donaldson, 2007). Overall, teachers will be more likely to take on leadership roles if they feel as though there is a mutual respect between school leaders and teacher leaders. In establishing this, administrators expand the opportunity for innovative ideas and solutions which ultimately focus on student achievement (Virginia, Shelton & Headley, 2006).

Support for Teacher Learning

Computational thinking and coding can be overwhelming for teachers who are new to this approach to learning. It is important for administrators to remember this when encouraging teachers to take on the adventure of incorporating CT and coding in their teaching and learning. Support for teachers can be vital to creating a positive outlook on bringing CT and coding into the classroom. Principals can provide professional learning opportunities for teachers that are practical and allow them to see the connections between CT and coding and their specific teaching areas (Yadav, Hong, Stephenson, 2016). As well, teacher collaboration and sharing will help develop connections within the curriculum and create a culture of sharing and collaboration. Johnson and Donaldson's research (2007), found that the "principal can make or break the role of the teacher leader" (p.13). Support from the principal in areas such as; professional learning, providing necessary resources, planning time, and support and guidance in building relationships with colleagues can encourage teacher leaders to innovate and persevere through obstacles.

Incorporating coding and computational thinking into my own teaching has made my classroom a more exciting place where my students are eager to learn and are engaged. They have become creators rather than consumers of content. Colleagues have followed my lead after seeing success in my classroom and the school is building capacity for CT and coding in all grade levels. With existing challenges, it is unrealistic to add CT and coding as separate areas into a growing list of responsibilities for teachers. Instead, it is important that we support teachers in incorporating CT and coding within the pre-existing curriculum. (Yadav, Hong, Stephenson, 2016). Instead of an additional thing to teach, CT and coding is just a different way of to engage students in learning or for students to express what they have learned. I encourage principals to support teachers to take on CT and coding, start small and start somewhere, make many mistakes along the way and become learners along with the students. ■

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AUTHOR BIO

Melissa Lee is an Itinerant Teacher for Coding with the NL English School District. Her B.Ed and M.Ed degrees have focused on Early French Immersion and Information Technology. She has also worked as a Grade 5 EFI teacher.



PUT THOSE BOOKS AWAY. TAKE OUT YOUR CELL PHONES!

By **Scott Linehan**

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On April 2, 1965 TIME Magazine published a story about the prevalence of computers which included a provocative 50-year prediction about society. Education was not immune from the list. Among many of its predictions, TIME suggested people would be working less. A lot less. In fact 50% less, requiring citizens to adjust to a new world order of “leisurely nonfunctional lives.” Of course, we all now know this not to be true. Because of computers, people are actually working more. And phones have become absolute indispensable appendages in young people’s lives which TIME correctly foresaw as being “as close to everyday life as the telephone.” However, technology has led education down a scary, but also exciting, new path with limitless possibilities for teaching and learning.

Holy Spirit High School is nestled in the heart of beautiful Conception Bay South which is located on the northeastern portion of the Avalon Peninsula of Newfoundland. It has a staff of 54 educators and nearly 900 students. It is the third largest school in the entire province. It welcomes a diverse and inclusive student body with a warm culture of acceptance, responsibility, and innovation whose mission is high standards and where “performance is continuously evaluated” not only for students, but staff. And at Holy Spirit’s core is the vision of running to technology, not running from it. And it’s captain? Dave Locke.

Take Out Your Cell Phones

Dave is a 20 year education veteran, 12 of which in leadership, and 6 years as principal at Holy Spirit. He is a national Principal of the Year award winner. Dave is also a visionary. And, like most leaders, he is humble and shirks the spotlight, rather redirecting the limelight to the everyday warriors – his teachers. Nevertheless, he quickly, and perceptively, observed that fighting students over their cell phones was a losing battle. So, he did what all progressive and innovative leaders do, he saw an opportunity. Instead of a nuisance to education, Dave saw technology as an ally in learning. He invested the necessary resources and upgraded the school infrastructure so that every student had Wifi access throughout the entire building. Then, he led the school to embrace Google Classroom as a new way to view instruction. Throw away the pencil and paper. Let students work in a way they want to, not the way teachers traditionally wanted them to. And, through team-building, consensus, vision, values, and trust, the entire team were on their way.

“Thoughtful educators have recognized there are a number of important kinds of student learning not measured most appropriately by paper-and-pencil tests.”

Astutely, this line of thinking was completely congruent with research where “thoughtful educators have recognized there are a number of important kinds of student learning not measured

most appropriately by paper-and-pencil tests” (Popham, 2008, p. 6). According to Dave “curriculum is everything, but technology is a part of that.” Of course, none of this navigational journey is possible without an agreeable and supportive crew. Dave is insistent that the successes at Holy Spirit were not due to him, but his team.

As Dave observes, successful schools are not the result of administrators but “buy-in from staff.” Teams win group championships, not individuals.

One member of that team is Mark Goulding. Mark is a seasoned teacher and English Department Head. He is also a risk-taker and not error-averse in new pedagogy. Mark has converted his classroom from textbook-centred learning to paperless ideology. Cell phones are not welcomed, but indispensable. Without a cell phone, or school-provided Chromebook, then learning is impossible. Students do all their work in Google Classroom. This has meant a tremendous increase in student motivation

and engagement. Instant feedback. Formative assessment. Mark attributes this new era in learning to the administration’s commitment and “vision to integrate technology into curriculum.” However, has this vision had an effect on student learning? Let’s let the data be the judge.

The most recently available data published by the ministry in 2018 compares all schools on the compulsory standardized Exit/Diploma Exams. In Mark’s English Department, the school average on the English 3201 public examination was 69.7% compared to the provincial average of 67.2%. This may not seem significant but consider this fact; the percentage of students enrolled in a non-academic program in Newfoundland and Labrador was 27.0% and at Holy Spirit it was 3.7%. That means there are over 23% more students challenging a higher academic course than the rest of the province. The philosophy of the school being one that trading off lower scores on standardized tests is more important than trading off post-secondary opportunities. Yet, the school still outperformed the province in academic results when by every other metric they should not. And this is just English. The same narrative can be told in any discipline. Physical Education. Mathematics. Science. Take your pick.

Is technology alone the reason? Of course not. Over the past half century technology has been touted as the panacea for all educational woes. There can be little doubt that technology has revolutionized our world and our classrooms. There can also be little doubt that technology is only as good as its user. It comes down to the teacher. In fact, the preeminent educational researcher John Hattie (2009) reported that the use of technology in a classroom “does not show major effects on learning if there is no teacher involvement” (p. 236).

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So, what is the secret? Leadership. Hattie argues that there are generally two types of leaders in education: instructional and transformational, with the evidence supporting “the former over the latter in terms of the effects on student outcomes” (Hattie, 2009, p. 83). Dave leads a large staff. Being an instructional leader is hard work. It is hard work for the administrator and the teacher. But, Holy Spirit possesses that all important collective teacher efficacy, the #1 predictor of student success based on Hattie’s 252 influences on student achievement (2018). “Collective.” Therefore, it is leading a staff of believers. In fact, of the 54 staff, with multiple opportunities for transfer, only one teacher sought a transfer last year (to be closer to home). It is because of Dave’s philosophy to promote a “culture of feeling valued.” Again, looking to the English Department, or any department, we see that philosophy at work. When Mark migrated to a paperless classroom through the Google platform, he opined that it would not have been possible without the forward-thinking administration who viewed learning with technology “through the vision it was imagined.” This thinking also applies to any and all departments at Holy Spirit. Dave was very insistent on this point. While English serves as just one example, it is a microcosm of an entire staff where there is a view of administration that is visible, authentic, and connected. Dave could not be clearer that successes at Holy Spirit have little to do about him and everything to do about the staff.

While TIME Magazine may have gotten its predictions wrong on many far-reaching implications of computers in society, it certainly did not understate its prevalence. However 50 years later, Holy Spirit has viewed technology not as stifling students’ brains, but stimulating them. As a technology leader, Dave has embraced and championed

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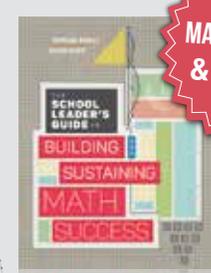
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the opportunity to grow young minds. Carol Dweck (2016) stated that "growth mindset is based on the belief of change" (p. 223), evidenced no more than in Holy Spirit. In modern classrooms with high and low achievers, effective teachers "preached and practiced a growth mindset" (p. 66) where all differences disappear. And, at Holy Spirit, what has disappeared is traditional instruction replaced with cutting-edge facilitation and increased student learning. A formula for success for any school. Stephen Covey once said; "What you do has far greater impact than what you say." The next time you visit The Rock, swing by Holy Spirit and have a chat with Dave Locke, you will be glad you did – but make sure you bring your cell phone with your Google Classroom app. ■

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Scott Linehan has been an educator in Newfoundland and Labrador for nearly 25 years. His current position is English Program Specialist for the Newfoundland and Labrador English School District. His Ph.D. is in Educational Leadership and his primary research interests include; student achievement and multigrade education.



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*The concepts of **risk** and **risk-taking**, and the development of young people as **risk-takers**, are featured prominently in curriculum documents and whitepapers calling for educational change.*

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But in a very real way, teachers are also becoming 21st century learners who, through their learning, model resilience, perseverance, confidence in ambiguity, failure, and risk-taking. Brooks & Holmes (2014) put it this way,

Schools empower both students and teachers, encouraging them to experiment with new ideas and fail safely, so that they develop the confidence to take risks ... (p. 7)

An international summit on the teaching profession held in Banff, Canada determined a key theme for future development will be "... a focus on the profession itself having twenty-first-century skills." (Steward, 2015, p. 6)

The Risk of Shifting Identities. Just as 21st century education initiatives shift the goals of learning for students, so too do they propose a different vision for the traditional role of the teacher. Teachers are described as creatives and learning designers, activators, co-learners, learning partners, coaches, mentors, artists and innovators. (Brook & Holmes, 2014; IDEO, 2016; Ananiandou, 2009)

Perhaps no where does this shift become apparent as it does in relation to technology experimentation, uptake, and integration. Research has been conducted to explore teachers' experience of risk in integrating technology. It concludes that teacher's may have; negative perceptions of technology, a skeptical attitude about the value of technology in teaching, and a general aversion to risk-taking in teaching (Howard, 2013; Howard & Gigliotti, 2016). Each of these provides barriers to technology integration and teachers becoming models of 21st century teaching and learning.

Other research concludes that to support teachers it is important to understand the experience of risk-taking in teaching. Understanding more deeply the experience of teacher creative risk-taking has educational significance. (Howard, Becker, Carter, Wiebe, Gouzouasis, McLarnon, Ricketts & Schuman, 2018) Notwithstanding the repeated calls for the development of risk-taking students through the example and modeling of risk-taking teachers, the experience of risk in the classroom is an important pedagogical question as it relates to educational change and transformative teaching and learning. Curriculum documents, whitepapers, and summit do not meaningfully take up what is meant by teacher risk-taking.

Orienting to Risk. The psychology of risk examines how individuals think and feel about risk and how they act, as well as analyzing institutional and societal assessments and reactions to risk. (Breakwell, 2014) Thrill seeking and adventurous behaviour is highly recognized. The derring-do of Silicon Valley start-up entrepreneurs and those who exhibit an affinity for living on the edge is often celebrated in our culture. The dispositions of 21st century learning are in many ways reflective of the goal to instill in the young the same courage, resilience, perseverance, and the same embrace of failure and the entrepreneurial mindset displayed by the most successful in society. (Ontario Ministry of Education, 2016; Fullan and Langworthy, 2014) But is this the kind of risk-taking teachers are generally called upon to take in the classroom?

The type of risk-taking called for from teachers is not normally associated with a perceived harm or hazard. The emotional, intellectual, relational, and creative risks associated with trying new ideas, novel approaches, experimentation and discovery are not often associated with the “running into danger” connected to physical and financial risks. But this may not always be the case in the experience of the classroom teacher as demonstrated here,

When a teacher tries something new, they are scared that if it doesn't work a parent will call and complain. That teacher needs to know that they will have someone at their back. (Kelli Etheridge, 10th Grade teacher in Fullan & Langworthy, 2014, p. 66)



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Having someone at their back and finding safety in a supportive environment is a key finding in teacher risk-taking research and in dealing with risk aversion as it relates to technology integration.

Supporting Creative Risk-taking.

Teachers require on-going support and encouragement to take creative pedagogical risks and that includes experimenting with and integrating technology. The struggle and anxiety characteristic of some teachers' risk aversion as it relates to technology can be understood as an opportunity and used as a space for growth and learning. It is this “in-between realm of learning” English (2013) that is the space of struggle, discomfort, frustration and potential negativity, yet teachers can make important break-throughs in learning when they openly embrace the risk and feel supported in a space that values creativity, discovery, experimentation, creative collaboration, and the possibility to fail safely. (Howard, et al 2018)

Research shows teachers fear the risk of “being seen” in their perceived lack of technological skill and knowledge. The teacher experiences a sense of being exposed. A teacher fears ‘being seen’ by her students, by other teachers, by the administration and the risk is physically discernible; “my cheeks flushed, and my voice cracked, I was sure I was going to cry” was how one teacher described the experience. The risk is embodied in a fear reaction.

Risk aversion can be overcome by thoughtful attention to the nature of risk in the lives of teachers. The risk may be perceived in adopting new classroom identities,

creating new pedagogical strategies, or taking up innovative technological applications to enhance teaching and learning. Open communication about anxiety and developing professional training that incorporates “... conscious risk communication about technology integration...that includes appropriate coping strategies such as managing technology failure” (Howard, 2013, p. 369) are necessary to create open, honest dialogue about the nature of risk and the fear it often engenders.



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Providing a safe environment for teachers to experiment and achieve success, communicating clear goals and objectives for aligning curriculum with new approaches are examples of ongoing approaches that support teachers. School leaders who understand the meaning of risk, the potential that risk and anxiety provide for deep and meaningful learning in a safe, supportive environment

can have a lasting impact on not only the professional development but the emotional well-being of teachers. Risk, fear and anxiety are a part of the human condition; they are not problems to be solved once and for all, but an ongoing challenge to school leaders to deepen professional learning and human relations in an environment of open dialogue and mutual support. ■

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Technology without Modern Technology Infrastructure

By E. D. Woodford



Mitchell, Cambridge Bay, Nunavut

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When thinking about leading educational technology in schools, we often think about computers, devices and wifi. What about technology in schools that do not have the technology infrastructure to support what many believe is standard 21st century technology in schools?

Across Canada, in the arctic and northern provinces, the northwest regions of British Columbia and fly-in communities of Alberta and Saskatchewan, there are schools with a different definition of technology. In these schools technology infrastructure is still emerging and sporadic and even non-existent. For principals, teachers and students, technology takes on an entirely different meaning. Technology is relevant and skill building and often based on survival and food procurement.

Technology Without Infrastructure

What is technology? We might think this means the technology systems that support learning which can include:

- Internet in schools
- Computer, laptops, mobile tablets and other devices
- Digital content and tools for learning and research

The Merriam-Webster dictionary defines technology as “a manner of accomplishing a task especially using technical process, method, or knowledge.” Thus, many schools across Canada without educational technology systems are in fact innovative in providing technological learning experiences for students, but in contrast to sitting in front of laptop or other digital device, the learners are experience technology and innovation in a hands-on approach. Through this experiential approach, students accomplish tasks through process, method and knowledge.

In the Arctic, students are exposed to many traditional learning experiences not only in school but in their communities as well. As part of the Inuit Societal Values, learners are guided by principals that are innovative yet traditional and foster a path towards the future. Of note, the Pilimmaksarniq principle describes the “development of skills through observation, mentoring, practice and effort.” The principle relates to the experiential learning opportunities students experience in their day to day life in the north.

In Inuit Qaujimagatuqangit: Education Framework for Nunavut Curriculum (2007), key features of the Pilimmaksarniq principle include:

- To gather information
- To understand information
- To use information for different purposes in order to improve society
- To use information and communication technologies
- To adopt effective work methods in order to develop excellence
- To analyze one’s work and procedures in order to demonstrate mastery and skilled independence (p.47)

What better way to learn these skills than through mentoring by community and Elders. Prominently skill acquisition for northern students revolves around food procurement: hunting and fishing. Food is expensive in the north. It has to be shipped from southern Canada and not without added costs. Learning the traditional ways of hunting and fishing is important in order to put caribou, seal and whale meat, arctic whitefish, atlantic cod, and arctic char on the tables of far north families. This “country food” not only helps provide a foundation of food for families, but also helps with bringing students learning experience and knowledge acquisition of a different technological variety learned through mentoring, living on the land, and using traditional technology of hunting and fishing.

When thinking about how technology is used in schools, experiential learning opportunities and life skill acquisition experiences are essential components in a school’s technological framework beyond the computer classroom or the wifi centered learning experience. Rather than focusing on what can be Googled, a lack of technology infrastructure allows for a continued learning of traditional ways that are relevant and skill building. ■

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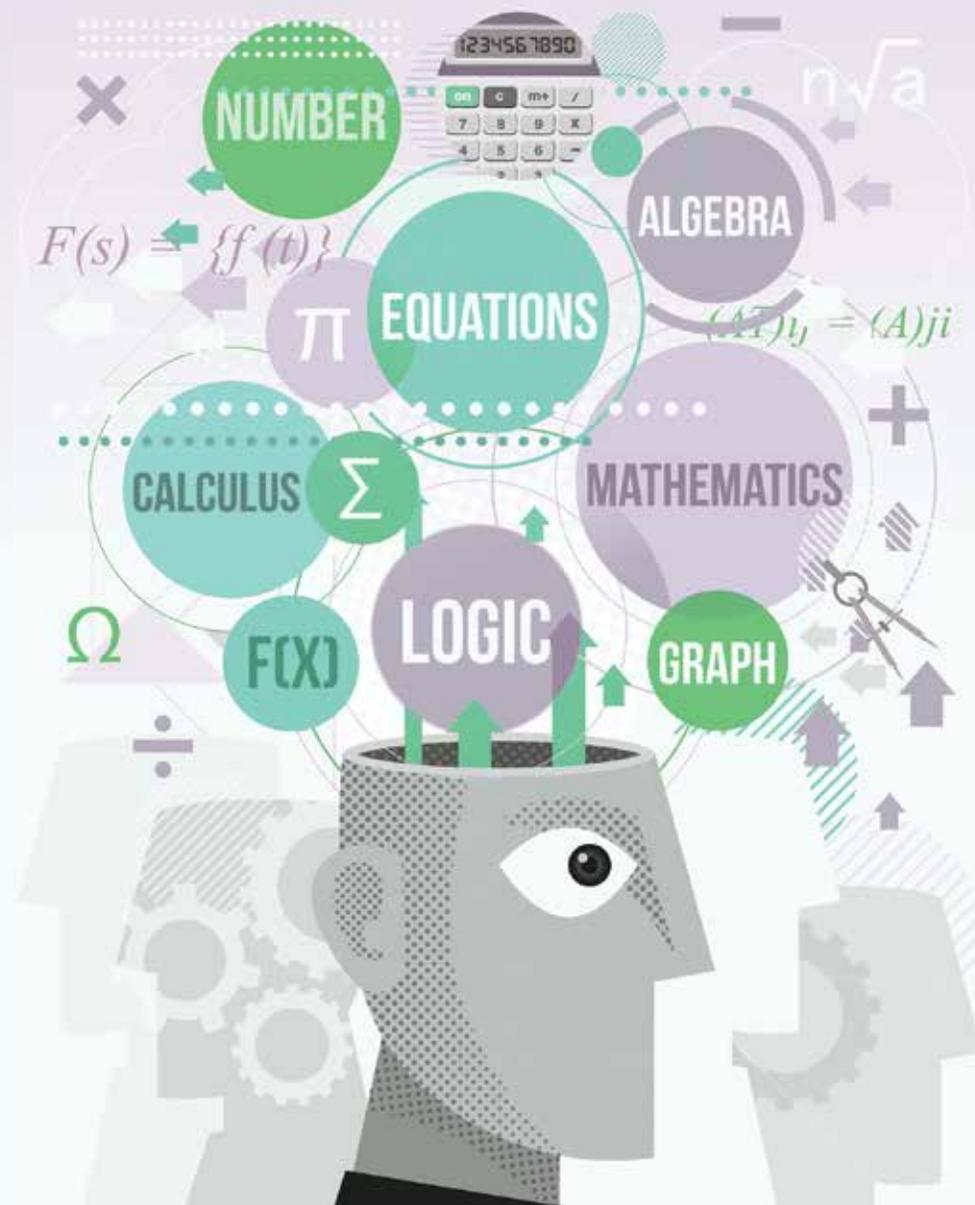
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The Math Pod - Learning Mathematics, One Podcast at a Time

By Debbie Donsky and Dragana Martinovic



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In this paper we describe how the Ontario Ministry of Education personnel (most of whom were previously in the leadership and administrative positions in their districts) led the use of technology for the purpose of educators' professional learning of mathematics.

Building on the ideas of “learning and knowing as situated, social, and distributed” (Putnam & Borko, 2000, p.5) and using advantages of Social Media (e.g., on-line radio program, project Website, and Twitter; Brown, 2012), these instructional leaders created opportunities for Ontario (and beyond) teachers to become accustomed to use technology for learning within a community of peers and experts. The examples we present, utilized online environment and multimedia materials to provide educators with a shared context suitable for the exploration of carefully selected ideas for teaching mathematics. In each round of this work, the facilitators moved closer to addressing the complexity of the learning and teaching mathematics. We found that this experience provided us with working understanding of the potential that these technologies have in organizing ongoing professional learning at distance (Holmes et al., 2013).

Before...

In addition to regular professional development programs, social media present a valuable opportunity for independent teacher learning (Jones & Dexter, 2014). The Math Pod was based on a project that began the year before, by the name of, Not a Book Study with Cathy Fosnot. This innovative project was created to support a mathematics leadership and learning network in the Northeast region of Ontario. Partnering with Cathy Fosnot and Stephen Hurley at VoicEd Radio, the educators in the network participated in a group book study using Cathy Fosnot's *Young Mathematicians at Work: Constructing Multiplication and Division*, supported by face-to-face sessions as well as a weekly podcast that ran over a 10-week period.

The purpose of this activity was to:

1. Strengthen a constructivist approach to teaching mathematics at the classroom level by providing educators with:
 - a. Access to high quality self-directed and reflective learning;
 - b. Differentiated entry into mathematics concepts and tasks.
2. Provide professional learning opportunities to geographically widely scattered educators, that offer:
 - a. Choice of a learning format (e.g., real time, asynchronous);
 - b. Choice of platforms for conversations and discussions (e.g., Twitter, blog, vlog).
3. Begin to build a network of educators across the Northeastern region and around Ontario, by:
 - a. Opening opportunities for online conversations on multiple platforms;
 - b. Documenting learning shared openly in multiple formats;
 - c. Providing access to artefacts of learning through a single open access point (project website).

More than 500 educators were registered in Not a Book Study activity and 35 educators answered the call to give feedback to the team. From this feedback, we learned that this activity provided a rich learning experience, mainly based on the reading of Cathy Fosnot's book, listening to the podcasts, and engaging in the online discussions. The participants were able to deepen their understandings and knowledge regarding mathematical content and pedagogy, especially in the multiplication and division curriculum area. This deeper comprehension of mathematical concepts appeared to be, in part, the result of the online, and sometimes the follow-up, face-to-face discussions with peers in their learning networks. Educators had the opportunity to share their ideas and thoughts and provide diverse perspectives that contributed to further enriching the conversations and, therefore, the learning process.

Regarding the digital skills they learned, the respondents mentioned being new to some features, such as blogging, but because of the intensity of communication and the number of options, they felt intimidated to use these new features. Building on the momentum from the first iteration of this project and taking the lessons learned, Not A Book Study was recreated as "The Math Pod"!

And then...

The Math Pod was a multimodal professional learning opportunity for educators across Ontario which was sponsored by the Ontario Ministry of Education in the 2017-2018 school year (all podcasts are available at <https://themathpod.ca/podcasts/>). Using Twitter, the VoicEd Radio website and our own website supported through blogging and sketchnotes, we were able to gain a significant following with over 800 followers on the website and Twitter. The learning incorporated a podcast, Twitter chats, blog and vlog creation, and a website that connected educators across Ontario, throughout Canada, as well as internationally.

Converts [to Twitter] include new teachers as well as hardened veterans from affluent private schools, struggling inner-city schools and everywhere in between. ...teachers who go out of their way to collaborate online tend to be creative, motivated people with high standards for their own performance — the type who would rather try something new than pull out the yellowed lesson plans they've been using for years. (Brown, 2012)

Working with Cathy Fosnot was an incredible honour. Each week she would guide the audience through the pedagogical issues around teaching specific mathematics concepts. The first phase of the Math Pod was organized in October-November 2017 and lasted four weeks. For this round, Cathy focused on

conferring with students, inviting educators to choose one of the three selected units of study to guide their learning:

1. Groceries, Stamps, and Measuring Sticks – Grade 2/3 – transition from addition to multiplication;
2. The Big Dinner – Grade 4 – emergence of use of a ratio table;
3. Muffles Truffles' – Grade 4 – emergence of use of an open array.

Overall, the educators positively evaluated contribution of The Math Pod to their learning, especially to their understanding of how to learn and teach mathematics. On average they agreed with the statement, "I feel that the Math Pod activities made me more 'intentional' in my teaching and/or leadership of mathematics."

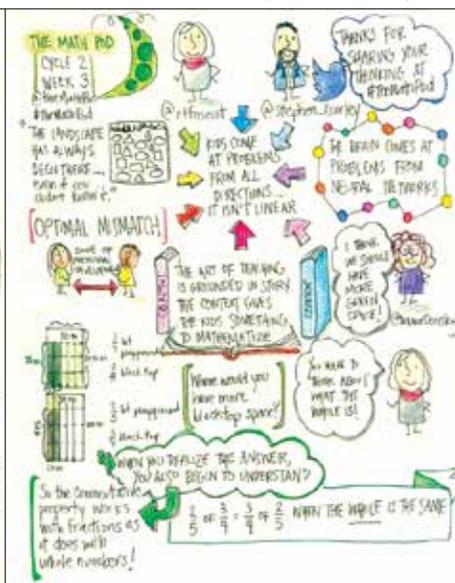
When asked to rate how valuable different components of The Math Pod were (evaluating only those in which they played a part), the participants most highly ranked listening podcast recordings of the radio show. Apparently, the option to listen to podcast at a convenient time during the day, was attractive to busy professionals. The respondents spent between 1 and 4 hours per week on The Math Pod activities (on average 2 hours).

The data from the first stage of The Math Pod presents it as a successful professional learning activity. The radio shows proved to be a very efficient and popular self-learning tool for educators. We hoped that such activities would promote the multimedia use by educators, such as sharing of resources over the Twitter, writing blog posts and recording video testimonials.

The Math Pod Cycle 2 with Cathy Fosnot started in January 2018 and lasted four weeks. A couple of days before the live broadcast, the listeners were given a problem on fractions to try it with their classes or on their own. This was a novel feature of The Math Pod 2, as it allowed educators to more easily make connection between online learning and their everyday practice.



TheMathPod Cycle 1 - Episode 4



TheMathPod Cycle 2 - Episode 3



TheMathPod Cycle 3 - Episode 4

We added an additional podcast on Sunday nights where we were joined by an expert teacher and math coach in one school board and a relatively new teacher in another board. They would share the instructional experiences they had implementing the learning from the podcast and reflect on how their students responded, including both their learning and discoveries, as well as challenges. This added a deeper component of teacher voice, which we felt was essential, given the feedback from the first cycle whereby teachers wanted to hear from those implementing the work and hear more about the process and decisions they made. Both of these teachers provided insight and guidance for our final cycle which took place in April.

During the four weeks of April 2018, educators participated in the third round/cycle of The Math Pod. Except for the new

topic—moving from arithmetic to algebra—the novelty was in educators having the opportunity to register for free onto Cathy Fosnot’s online platform, New Perspectives Online: A Personalized Professional Support System™ (P2S2), where they could participate in the online professional learning community and access the resources. On the P2S2, educators could access for free videos of children and teachers, Cathy’s screencasts, and assignments/investigations built into the platform. As a community, they could participate in online discussions.

I think [The Math Pod has] an excellent format for teachers to participate in at the level they are comfortable. Even if not contributing to the Twitter chat, reading it is still stretching thinking and engaging in a conversation. (Central Board Staff)

Reflecting on these online professional learning opportunities, the facilitators were satisfied with the outcomes. The participants’ feedback was positive and each round built upon the previous one, both by extending the mathematical content and by using the lessons learned through the facilitation. ■

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Dragana Martinovic is a professor at University of Windsor. As a co-lead of the *Mathematics Leadership Community of Practice* of the *Math Knowledge Network*, Dragana supports activities and groups which work towards enhancing educators’ capacity to lead mathematics learning among students and peers.

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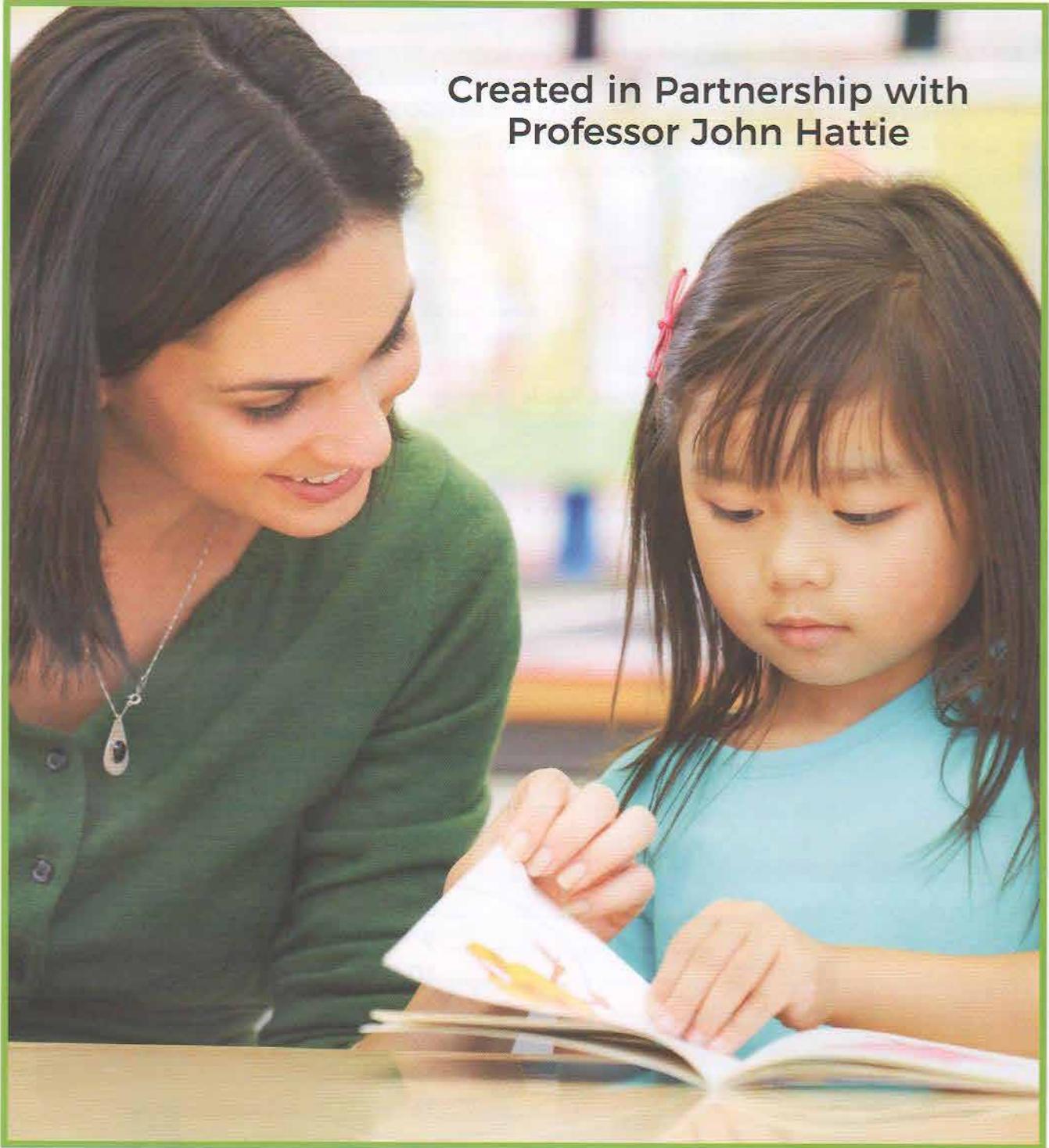


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