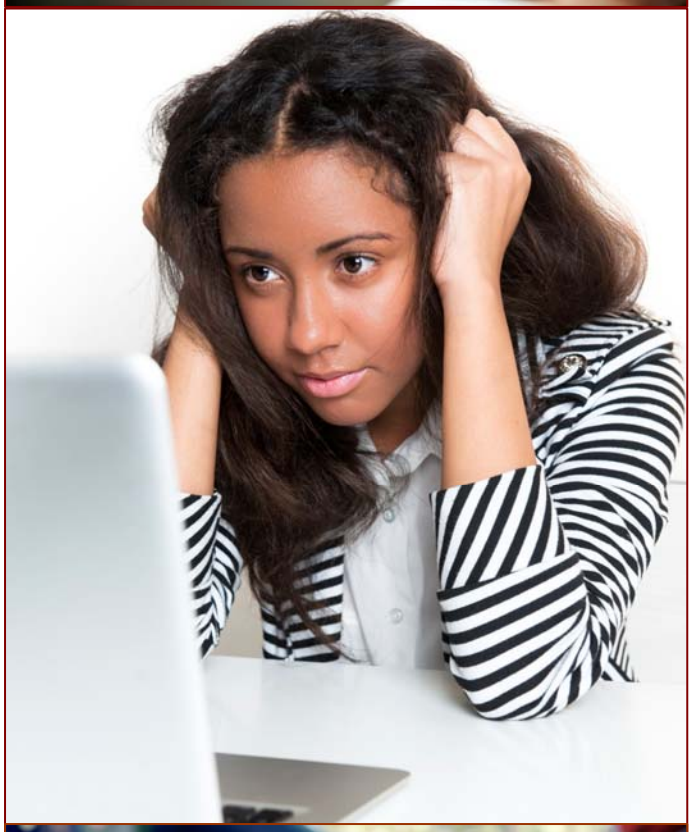

Young Canadians in a Wired World

Phase III

Teachers' Perspectives

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Young Canadians in a Wired World, Phase III

Teachers' Perspectives
Executive Summary

This report sets out the findings of an exploratory qualitative research study conducted with a purposive sample of teachers who are recognized by their peers for being successful in engaging their students positively and creating an excellent learning environment in the classroom. Using a semi-structured interview guide, we interviewed one elementary teacher and one high school teacher from each of five regions: the North; the West; Ontario; Quebec; and the Atlantic. Three of our informants were Francophone teachers teaching in French schools outside of Quebec, and seven were Anglophones teaching in English schools.

Not So Savvy Surfers

All of the teachers we talked to indicated that their students loved working – and playing – with smart phones, iPods, iPads, computers and networked devices of all kinds. But they also agreed that simple access to networked technologies has not made their students better learners. In spite of the fact that young people demonstrate a facility with online tools, many students lack the skills they need to use those tools effectively for learning. There is also a real propensity on the part of students to take what they find online as "given".

Identifying Problems and Solutions

The teachers we talked to identified five factors that work to limit students' proficiency with digital content, and provided solutions for each.

Teaching Tech vs. Using Tech to Teach

Many Canadian school boards continue to focus on training students how to use technology instead of providing students with learning opportunities that are enhanced through the use of technological tools. Instead, our informants spent little to no time teaching students *how* to use a particular piece of software or hardware; instead, they focused on teaching them *why* the technology would be useful to their learning.

"Drill and Kill" Experts vs. Facilitators and Co-Learners

The "drill and kill" approach to teaching, where the teacher is the classroom expert who talks at students from the front of the room and gives all students the same exercises at the same time, does not work well with networked learning tools because the technology entails a certain loss of control over what the students are doing at their desks. On the other hand, a teacher who is willing to share responsibility with the student, learn from students' technical proficiency, and facilitate the learning process is more likely to be comfortable with networked learning tools.

Younger Teachers vs. Older Teachers

Many teachers are cautious about tech because it can be disruptive. Networked devices can also easily distract students from the task at hand. Accordingly, strong classroom management skills are paramount to the effective use of technology in the classroom. This gives older teachers an advantage over younger teachers, primarily because they are more experienced and have stronger classroom management skills.

Tech Training vs. Curricular Training

There are few in-course and professional development training opportunities to help teachers, young and old, learn how to use technology to meet curriculum outcomes. Training tends to focus on how to use a particular piece of software or hardware, so teachers are largely on their own when it comes to figuring out how to use technology to support and enhance learning.

Online Filters vs. Letting Students Make Mistakes

School filters and policies that ban or restrict networked devices in the classroom make it difficult or impossible for teachers to use networked tools to enhance learning. They also imply that schools do not

trust their teachers to exercise good judgment, which is out of step with the fact that teachers are frequently required to teach students how to deal with offline content and conflict. Learning how to exercise good judgment and act as good citizens is central to the development of digital literacy skills. Ironically, however, restrictive policies designed to protect students from online content take away the very opportunities they need to acquire these skills.

Turning Technological Access into Enhanced Learning

Our informants identified four ways in which networked technologies can enrich students' learning.

A Wealth of Learning Resources

Networked technologies give teachers easy access to a world of learning resources that provide information in interesting or engaging ways. Online interactivity also provides an opportunity to interact with that information in order to test skills and apply new knowledge.

Communicating with Others outside the Classroom

The ability to connect with the world outside the school in real time is the single most powerful benefit of technology enhanced learning. Communicating their own ideas and connecting with others down the street or around the world deepens students' engagement with their learning and helps them to think more critically about the world around them.

New Opportunities for Collaborative Learning

The ability to communicate with others brings new opportunities for collaborative learning. Students who discuss issues and share their knowledge with others online are able to learn from each other and participate in the kinds of public debates that are central to lifelong learning and the exercise of democratic citizenship. The technology also makes that collaboration visible, so students can see their own contribution to the group. This enhances their sense of connectedness, which deepens and enriches their learning by making it both more personal and more social. Collaborating with students from different cultural backgrounds help students develop compassion, understanding and appreciation for different cultures.

Working with Individualized Learning Styles

Networked devices help teachers provide learning materials matched to the various learning styles of their students. For example, podcasts and online auditory dictionaries are helpful for auditory learners, and iPads and touch-sensitive smart boards are helpful for visual, tactile and kinaesthetic learners. Networked technologies are also particularly helpful for special needs students; students who have difficulty concentrating often work better when they are listening to music on an iPod, and students

who have trouble sitting still respond well to tools that enable them to engage their bodies and move while they are learning. Technological tools can also provide special needs students with an opportunity to demonstrate their knowledge in new ways.

Managing Technologized Spaces

Technology can enhance learning when the focus is on pedagogy and the students' needs. However, networked devices can also complicate the learning experience when students use them to open up the privacy of the classroom for their own purposes. Not only does this interrupt the learning process, it also affects the social relationships that are at the core of learning by dissolving the boundary between the classroom and the outside world and making it more difficult to create the trust that is central to learning. The potential embarrassment of being exposed on the Net is enough to make many students disengage from the learning process itself, and teachers are more likely to censor fun activities with students in case their actions are taken out of context. The end result is that it is more difficult to build community and trust in the classroom because the learning and interaction that takes place in that private space is coaxed into the wider public sphere.

Maximizing the Benefits – Digital Literacy and Online Citizenship

Technology can only enhance learning if students are taught to think critically about online content and to evaluate their own behaviour against a set of shared social values. Digital literacy is not about technical proficiency, but about developing the critical thinking skills that are central to lifelong learning and citizenship. To meet the challenge, schools must focus on pedagogy, and provide training and support to help teachers incorporate technologies into all elements of the curriculum in ways that facilitate individualized learning and teach students how to collaborate with learners both within and outside the school community.

Young Canadians in a Wired World, Phase III

Teachers' Perspectives

Introduction

The government of Canada has been committed to providing young people with the online skills they need to succeed in the digital economy since the first report of the Information Highway Advisory Council in 1995. Canadian schools have been wired to the Internet since 1999, and Canada was one of the first countries to create an online space where Canadian teachers and students could share information and learn together.

As the earlier phases of the *Young Canadians in a Wired World* (YCWW) research project demonstrated, Canadian students were quick to follow the government's lead and use online technologies to help with their school work. When YCWW first went into the field in 2000, less than half (44%) of Canadian students told us that the Internet was their preferred source of information for school assignments[i]. By 2005, during Phase II of the project, that number has risen to 80 per cent of students in Grades 4-8 and 92 per cent of students in Grades 9-11. Half of students surveyed (47%) also told us that they wanted to learn more about using the Internet to find information and over two-thirds (68%) wanted to learn more about distinguishing true information from false information they find on the Net[ii].

Clearly, online technologies have become an integral part of education in Canada. However research in other countries, most notably the United Kingdom[iii], has indicated that mere access to technology does not necessarily translate into better learning. Accordingly, when we initiated Phase III of YCWW in 2011, we wanted to get a fuller picture of how online technologies are being used in Canadian classrooms and what affect they are having on students' learning. To help us do this, we decided to ask teachers whether or not, in their experience, having networked devices in the classroom has made it easier or harder for students to learn. We also explored the impact these technologies have had on the student-teacher relationship, and sought to identify best practices for technology-enhanced learning.

Method

We conducted exploratory qualitative research with a purposive sample of key informants in February and March of 2011. A semi-structured interview guide was created, and ethics approval was obtained from the University of Ottawa's Office of Research Ethics and Integrity.

Our partner, the Canadian Teachers' Federation, helped us obtain an appropriate sample by working with their provincial and territorial affiliates to identify teachers who have been successful in engaging their students positively and creating an excellent learning environment in the classroom; and approaching these teachers to see if they would be willing to be interviewed. In this way, we recruited one elementary school teacher and one high school teacher from each of five regions: the North; the West; Ontario; Quebec; and the Atlantic. Three of our teachers were Francophones teaching in French schools outside of Quebec, and seven were Anglophones teaching in English schools.

Ten interviews were conducted over the telephone. Interview times were set at the convenience of the participants. Each interview lasted approximately 60 minutes. The investigator used a semi-structured interview approach, to allow new questions to arise from the participant's responses.

With participant permission, the interviews were tape recorded and transcribed for analysis. All identifying information was removed from the transcripts, and participants are identified only by region and/or school level (e.g. Ontario elementary school teacher).

The following report summarizes our findings.

Not So Savvy Surfers

There is no doubt that young people enjoy engaging with networked media. All of the teachers we talked to indicated that their students loved working – and playing – with smart phones, iPods, iPads, computers and networked devices of all kinds. But they also agreed that simple access to networked technologies has not made their students better learners. In spite of the fact that young people demonstrate a facility with online tools, many students lack the skills they need to use those tools effectively for learning.

> "They don't really create a lot, necessarily. They know how to use Facebook or YouTube, those kind of spaces … I think a lot of students know how to chat, how to text, but they don't know how to use the learning experience."
> (Elementary teacher from the Atlantic)

Our secondary school teacher from the Atlantic summed up the feelings of the group: "I don't think students are all that Internet-savvy. I think they limit themselves to very few tools on the Internet and they don't think it's as expansive as it could be. They're locked into using it in particular ways and don't think outside the box." So although students know how to use texting, social networking, and online search engines, they don't know how to use them well: "… even in *Google*, when they're searching for something online, they really struggle about what to type in for a *Google* search, and I'm always surprised at the lack of knowledge that students have about how to search and navigate online."

There is also a real propensity on the part of students to take what they find online as "given". For example, our elementary teacher from the North recounted an experience he had when a group of his Grade five students were working on a project on Sasquatches. They had found some pictures of what purported to be a Sasquatch penis bone on a website and asked him if he thought it was appropriate for them to include the pictures in their science fair exhibit. He told us, "… so at that point I was like, holy mackerel, where are you getting this information from?! And I took a look and it was a totally bogus website. Now, these are A-level students who were totally fooled by this." He concluded, "They know more about, say, the nuts and bolts of getting someplace. They're clueless about how to use it and especially how to use it safely or appropriately. You know, to authenticate it. They can find Sasquatch penis bones all over the place."

Identifying Problems and Solutions

The vast majority of Canadian schools have had access to the Internet since 1999, and digital literacy continues to be a key policy priority for the federal government.[iv] Why then, given their exposure to online technologies both at school and at home, do students continue to lag when it comes to developing proficiency with digital content? The teachers we talked to identified five key factors, each with its own solution.

Teaching Tech vs. Using Tech to Teach

Our informants felt that many Canadian school boards continue to focus on training students how to use technology instead of providing students with learning opportunities that are enhanced through the use of technological tools. Our secondary school teacher from the West indicated that this approach leads to "shoehorning technology":

> … unfortunately what happens is, despite billions of dollars spent on technology … teachers end up using technology to facilitate the same kind of projects they've always done. And that's not good enough; we've got to aspire to something more than that. Tech doesn't mean 'do everything that we did yesterday, just flashier'. It's not about putting a piece of clip art on a cover and thinking that you've brought tech.

In fact, our informants told us that they spent little to no time teaching students *how* to use a particular piece of software or hardware; instead, they focused on teaching them *why* the technology would be useful to their learning. This was a highly effective strategy for students from Junior Kindergarten through Grade 12, as the following two examples illustrate.

Our secondary school teacher from the Atlantic wanted his students to learn about trans-mediation by converting the words of a poem into sounds that would convey the meaning of the poem. He discussed the various ways different texts (such as written text, video and audio) inter-relate, introduced the concept of a soundscape, and asked the students to use Audacity (a program for recording and editing sounds) to complete the assignment. Instead of teaching them how to use the software, he focused on helping them understand why it would help them explore the differences between various kinds of texts. As soon as they understood the purpose of the assignment, "it became interesting technology to them … They loved it; they really liked the challenge of representing something in a new way. But also, the use of the technology become secondary, as opposed to that's all you do, you just go and learn the software. Instead, it was why do you use the software." In fact, the students asked only two questions in regard to the technology. The first was how to spell Audacity so they could download the program from the Internet, and the second was whether or not the teacher wanted the finished product in an .mp3 file or a .wav file.

Our elementary teacher from the West had a similar experience when she introduced iPads to her Junior Kindergarten class. She put some apps on the iPads, gave them to her students, and told them "If you don't like where you end up, press the round button on the side." After virtually no instruction, the children were able to navigate and use the various apps. Rather than spending instructional time teaching them which buttons to press, she spent the time integrating the various apps into the curriculum in ways that matched the students' individual learning styles. The effectiveness of the iPad as a learning tool was directly related to its ability to enhance the students' learning opportunities in ways that reflected the desired curricular outcomes. She concluded:

> … technology is not a substitute for a real, hands-on learning experience. Kids, they need to touch, to experience, to taste those things. Technology is one more way to reach them, but I

> want people to understand that I would never use technology as a substitute for those experiences that are so essential to early childhood development. I think it's really easy to get swept away with it all, and I'm as guilty of doing that as anyone. But I try to bring it back to, what is it these kids need at this point in their development? … And also, making sure that we're using technology to meet curricular outcomes, not using technology and hoping it fits in somewhere. Using technology because it's fun and exciting isn't always the right match for learning.

Our key informants shared this belief that technology can be an effective learning tool when the focus is placed on pedagogy, not technology. Our secondary school teacher from the West summarized this well: "People can get drunk on tech, just on tech for tech's sake. And we have to start talking about pedagogy; what we're actually using the technology for. And how is that … bettering the learning? And if it doesn't, then heck, get rid of the tech. It's cheaper to do without it."

"Drill and Kill" Experts vs. Facilitators and Co-Learners

The focus on pedagogy reminds us that the student-teacher relationship continues to be central to the learning process. When we asked our elementary teacher from the North if the use of the Internet has improved the quality of his students' work, he responded, "I'd say good teaching improves the quality of their work." Our secondary teacher from the West agreed:

> "I think that's why we need to teachers, to provoke or bring the student to … the learning experience."
> (Elementary teacher from the Atlantic)

> Technology will never replace a teacher. Technology is no different than bricks and mortar – if the bricks and mortar of the school disappeared, learning could continue. At the heart of it is the student-teacher relationship. We can support that student-teacher relationship with bricks and mortar and with technology, but there is no replacing it. ... Being a good teacher is understanding how children learn, and then you use the technology as a tool.

However, all our informants pointed out that certain teaching styles do not work well in a wired classroom. Many spoke of the "drill and kill" teacher who typically talks at students from the front of the room, and gives all students the same exercises at the same time. That kind of teacher finds it difficult to use technology because doing so brings a certain loss of control over what the students are doing at their desks.

On the other hand, a teacher who is willing to share responsibility with the student and facilitate the learning process is more likely to be comfortable with networked learning tools. Our elementary teacher from the West put it this way:

> I think my role has shifted more from … I don't know, for lack of a better word, like on a stage…to almost more of a facilitator of learning experiences in my classroom. Everything isn't

as teacher-directed; I think things have become more student-direct, is kind of how I would see that shift in my teaching ... As a result, I have a lot more things in the classroom at once, when in the past, it was more like everyone was doing everything at the same time."

Our secondary school teacher from Ontario agreed: "the greatest thing is when they have computers in front of them, and I can walk around and actually connect with them. That helps a lot, instead of doing a lecture when you're just in front of the classroom talking. They're actually involved."

Having a comfort level as a facilitator was closely tied to being comfortable with not being the expert in the room. In fact, our informants told us they were successful in integrating technology-enhanced learning precisely because they were willing to admit that many of their students knew more about the technological bells and whistles than they did. However, they saw this gap as an opportunity.

First, it gives teachers an opportunity to learn from their students. In the words of our elementary teacher from Ontario, "That generation, they were born with computers in their hands. Sometimes I want to know, so I ask them, and usually they show me – after that, I'm okay." Our elementary teacher from the North took the same approach when he introduced some new video software in his class. He told his students, "'This is a brand new version; I'm not 100% sure how this is going to go but this is what we want to do and this is how we've done it in the past, so get in there, take a crack at it, and if you discover something really interesting, put your hands up.' Then I stop the whole class, I capture their screen, I project it up front, and they do a little demo … Within a week, I knew as much about that version of iMovie than I had with any of the previous ones, because I'd done it with them."

> "… hopefully the teacher realizes that education is a two-way street. I tell my students that there are 23 teachers in this classroom … With the way technology and science is changing today, it's impossible to keep up with it … and as a teacher you have to be comfortable with that."
> (Secondary school teacher from the North)

Second, it is an opportunity for students to feel proud of their skills. For example, our elementary teacher from Quebec wanted her students to participate in a corporate-sponsored fund raising event for children who were affected by the tsunami in Japan; the company agreed to send a piece of clothing to a child for every paper crane they received. "The thing is, I'm not very creative; I'm not very good at those things. So I put up a little video and showed them how to make a paper crane, and it was tough. I was so impressed, my kids went home, found an easier video, and said, 'We found a better video, use this one.' … They were so proud of themselves. We got the Grade fours to come to our classroom, they taught the Grade fours, and now we have 200 paper cranes to send ..." Our secondary school teacher from Ontario had a similar experience. He found that learning from his students not only cut down on the time he spent learning new software, it was a source of pride for them: " … they show me things and they're so happy about it … They're quite proud, showing you stuff."

Younger Teachers vs. Older Teachers

At the same time, technology in the classroom brings its own problems. Our informants indicated that many teachers are cautious about tech because it can be disruptive. As our elementary teacher from the West put it, "your class can get away from you very quickly when you're trying to troubleshoot a tech problem for 30 seconds." Networked devices can also easily distract students from the task at hand. As our secondary teacher from the West noted, "It's going to be messy and sometimes the kids are going to get on things that are inconvenient, like, maybe you're trying to get them to learn about algebra and all of a sudden the kid's reading about the tsunami in Japan." Accordingly, strong classroom management skills are paramount to the effective use of technology in the classroom.

> "… you can be as creative as you want, but without classroom management, forget about it."
> (Elementary teacher from Quebec)

Interestingly, almost all of our informants indicated that this gives older teachers an advantage over younger teachers, primarily because they are more experienced and have "been around the block." Our elementary teacher from the West, for example, "really thought that, you know, well, it would be teachers fresh out of university that would be eager to use technology in their teaching. I figured the older teaching populations would be reluctant. I was really proven wrong on that: some of the most cutting-edge teachers I've worked with have been in their 40s and 50s and the teachers that have been most difficult to get, you know, willing and motivated to use technology, have been newer teachers." In like vein, our elementary teacher from the Atlantic told us, "One of the girls from Young Teachers said they don't get any respect, using those technologies. If we use those technologies, we have to change our way of being captain of the course, and not talk for 60 minutes. I think that's what makes the younger teachers afraid."

Tech Training vs. Curricular Training

Given the gap in classroom management skills between the generations, a number of our informants talked about the importance of mentorship. However, many were frustrated by a lack of support for this within their schools. They also told us that there was a dearth of in-course and professional development training to help teachers, young and old, learn how to use technology to meet curriculum outcomes. They were aware of courses designed to help teachers learn how to use a particular piece of software, and one indicated that he had taken a course on how to authenticate online information in teacher's college, but as a whole they were largely on their own when it came to figuring out how to use technology to support and enhance learning.

> "Teachers have to do all these things but they've done very little in training."
> (Elementary teacher from Quebec)

One of our informants had attempted to rectify this by providing information technology training and support to other elementary teachers. But he found it hard to translate that investment in training into real change in the classroom:

> It's difficult to make inroads amongst my peers ... we were always getting the same few people out. They were the keeners; they were the ones who were doing the great online projects with kids. You wanted to get the other people out … The workshops we got the biggest turnout for were the ones that really didn't seem like they had much to do with school. Things like using iPhoto; photographers would show up, interested in learning how to use iPhoto. And partway through I would try to subvert to ways you can be using it in your classroom. But it seems that people would come out to the ones that they could use personally (Elementary teacher from the North).

The exception to the trend was our elementary teacher from the West. Her school board provides a great deal of support to teachers, including 30 minute software training sessions, an annual technology conference, and teaching releases for teachers who want to work with a mentor on technology-related projects. However, even with this support, it can be difficult to convince teachers to change their teaching styles:

> I think it gives them enough, but what it can't give them is the desire or motivation. If you bring a horse to water, you can't make it thirsty. It's true, because you either are a self-starter or you're not.

Part of the problem is that many teachers don't think of technology as a learning tool. So whenever our elementary teacher from the West makes a presentation on collaborative learning, she *Skypes* her Kindergarten class and has the students teach the teachers how – and why – to use *Skype*: "… that's more powerful than anything I could ever say … they say stuff like, 'We like using *Skype* to call our friends,' and 'Did you know we have iPads in our room? We use them for letters and number stuff!' They're pretty funny. It's really powerful."

Online Filters vs. Letting Students Make Mistakes

The most common problem our informants identified was the inability to access networked technologies because of school filters and policies that ban networked devices in the classroom. For example, our Atlantic elementary teacher's students could not use *Twitter* to work collaboratively on math problems because the school refused to unblock the account creation page even after he explained why they were using it; and our teachers from Quebec and Ontario could not use videos in class because *YouTube* was

> School policies around technology are very frustrating for me ... it's about access to the outside world beyond the school ... connecting with others beyond your school ... I think it's one of the biggest benefits of having Internet in our classrooms or in our projectors, is being able to connect with others in a real-time situation, but in fact we can't use Skype.
> (Elementary teacher from the Atlantic)

blocked. Even teachers who were experiencing interruptions in class because of texting felt that the policies banning cell phones were ineffective: "… we take the phone away and they get it right back – what have we really done?" (secondary school teacher from Quebec).

The consensus was strong that these kinds of policies have to be rethought because they decrease learning opportunities. It was also a matter of trust: "For me it would be so much easier if it were just unblocked and the Board trusted the teachers to show the kids how to actually use this material. That's how I'd prefer to teach" (Ontario secondary school teacher). Our elementary teacher from Quebec acknowledged that younger children should not have "free rein" but agreed that restricting access was not the answer; instead administrators needed to trust teachers to guide the students so they can learn how to be good digital citizens.

Certainly schools that did have open access quite clearly trusted their teachers to exercise good judgment and created a policy environment which facilitated that. Our elementary teacher from the West indicated that:

> My school department is very forward-thinking; we have really reasonable policies that do give teachers a lot of freedom and power when it comes to decision making regarding education in our classrooms. We have all parents sign Internet acceptable use forms at the beginning of the school year, when their child registers in Kindergarten. We also get permission to share digital work samples, photos, artwork, that kind of thing. As well, we have a very reasonable cell phone policy, where cell phones can be used for educational purposes at the discretion of the teachers. So I have a lot of support on that.

Interestingly, the teachers in schools where access was restricted reminded us that teachers are frequently required to teach students how to deal with offline content and conflict. For example, our secondary school teacher from Ontario teaches visual arts; she told us she often talks to her students about appropriate and inappropriate representations of the nude body. Ironically, her school blocks images and *YouTube*, making it harder for her to expose her students to good art. She concluded, "instead of blocking it, [we should be] finding a way to talk about it and then actually having an open discussion and figuring out what's right and what's wrong, what's appropriate and what's not".

All our informants told us that learning how to exercise good judgment and act as good citizens is central to the development of digital literacy skills. Ironically, however, restrictive policies designed to protect students from online content take away the very opportunities they need to acquire these skills. Our secondary school teacher from the West put it this way:

> It's not like all of a sudden you hit 18, and now you can have autonomy. I mean, children do not learn to make good choices by being told what to do and follow instructions. And, unfortunately, they have to be given the opportunity to make bad choices as often as good choices. And they need adults to be the saving, caring allies that we need to be to help them make [good choices], to learn from their mistakes.

Our informants with access had developed a number of ways to do just this. To help her students learn about online privacy, our elementary teacher from the West took her students on *WebKinz* and discussed why they shouldn't use their real names or give people their phone numbers when they're playing. Our elementary teacher from Quebec used instant messaging to help students learn about cyberbullying and online etiquette. Our secondary school teacher from the West set up a chat room in his classroom and used it to teach his students how to deal with spam and rude or insulting conversations. Our elementary teacher from the Atlantic had his students create blogs so they could learn about global audiences and the importance of publishing high quality material.

Two examples in particular illustrate the power of letting students use online tools and providing them with face-to-face guidance so they can learn how to manage the pitfalls. When our secondary teacher from the West was doing online research with his students, one of the students came across a hate site. Instead of blocking the site, the teacher used this as a teachable moment:

> … it even took me a few minutes before I realized I was on a website that was sympathetic to the Nazis. It was phenomenally written, in evil ways. It cloaked the true racist and hatred messages under prose. You know, using language. And so, I actually had the kids look at it – when my light bulb went off theirs hadn't yet. They didn't know what they were looking at. I asked them to look a little closer, and some of them started to see it and others still couldn't. And that interested them, because I could see something they couldn't. That was a way for them to see, for them to get interested in the idea that somebody was actually preaching hatred and it didn't even feel like it.

Interestingly, young children also acquire digital literacy skills through a combination of experiential learning and teacher guidance. Our elementary teacher from the West has her Kindergarten students blog daily:

> That's been a great way of teaching a variety of ethics and responsibility online. And I was really impressed – one day my coordinator of curriculum came into this classroom, just spontaneously for a visit, and she was asking the kids about their blogs. And they were able to really explain to her, "Well, we can't tell anyone our password; the only person we tell our password to is Mrs. Pillsbury; we want to be safe on line; we can only use our first names; we can't use our last names or our ages or our phone numbers; we have to be careful that when we use pictures online, they're our pictures, because we can't use other people's things." So I've definitely seen that growth in the ethics and responsibility side of it.

Turning Technological Access into Enhanced Learning

Our informants were successful in integrating technology into the classroom precisely because they focused on pedagogy, were comfortable with not being the tech expert in the room, had strong classroom management skills and saw online pitfalls as teachable moments. And they enthusiastically reported a number of ways in which networked technologies have enriched their students' learning.

A Wealth of Learning Resources

All our informants agreed that networked technologies give teachers easy access to a world of learning resources. Many of these resources provide information in interesting or engaging ways. For example, one of our informants used a *YouTube* video of a teacher singing about division in her elementary classroom to reinforce math skills. Her students like these kinds of resources because they are innovative and fun.

However, the networked environment does not just provide access to a library of information; it also provides an opportunity to interact with that information in order to test skills and apply new knowledge. For example, another informant took his elementary students on an online scavenger hunt from Parliament Hill to the Canadian Rockies. At each virtual location, they were given visual and textual information about the site they were visiting, but the primary purpose of the unit was to give them an opportunity to learn how to use longitude and latitude to orient between various locations.

Communicating with Others outside the Classroom

Again, students enjoy online resources because they are interactive and fun. But our informants agreed that the most exciting learning resources are the ones that connect students with the real world. One elementary teacher told us that her class paid daily visits to a webcam focused on an African watering hole. She found this to be a highly effective way to teach students about ecology and animal behaviour because they were able to apply their knowledge immediately to their own observations of the animals in their natural habitat.

This ability to connect with the world outside the school in real time was identified as the single most powerful benefit of technology enhanced learning. Our secondary school teacher from the Atlantic, for example, had his students record class discussions and create podcasts on a variety of issues: "That's a really interesting way of using technology, to create broadcasts to generate awareness … they can share and reflect with other groups of students about a common text." This enhances the students' engagement with the material, particularly when others outside the school begin to communicate back. A conversation the class had with members of First Nations living in the other side of the country "led to an entirely different kind of project where the class was determined to go and meet the woman on the other end." They also used online conversations with people with real world experience to deepen their understanding of topics as varied as the Holocaust and Afghani literature.

Our elementary teacher in the North had similar success when his students shared their knowledge of wolves with students who lived in four southern schools. The students were so excited that they put a map on the wall and put pins in it every time they communicated with a different school. He also hooked them up to a live feed of citizens from Cairo during the Arab Spring. He told us, "… kids were just huddled around and discussing it, and they were excited for the people of Egypt. I swear to God, most of them wouldn't have known the capital of Egypt before this started."

The power of communication can also enrich younger students learning. Our elementary teacher from the West had her students make digital Christmas cards so they could exchange them with classes from all over the world; they then used *Google Maps* to see where the other children lived, and talked to some of them over *Skype*. When they were learning about the Olympics, they followed *Twitter* accounts to keep abreast of the latest news. In the same school, the Grade eight world history students took turns summarizing the three most important elements of the daily lesson and posting them on their class blog. They then followed up with other classes and encouraged other students to read the blog and leave comments. The ability to communicate their own ideas and connect with others down the street or around the world deepened their engagement with their learning and helped them to think more critically about the world around them.

New Opportunities for Collaborative Learning

As the above examples illustrate, the ability to communicate with others is closely tied to new opportunities for collaborative learning. Students who discuss issues and share their knowledge with others online are able to learn from each other and participate in the kinds of public debates that are central to lifelong learning and the exercise of democratic citizenship.

Networked technologies make this kind of collaboration more convenient, but they also make the results of collaboration more visible. Accordingly, the platform not only provides opportunities for shared learning – our elementary teacher from the West called *Twitter* the perfect Kindergarten shared writing activity precisely because it is limited to 140 characters – but the visibility the platform enables also reinforces each student's sense of his or her own contribution to the group. As our secondary school teacher from the North noted, his students liked working on shared writing projects on *Wiki* or *Google Docs* "because they got to see … this is my contribution. Here it is … It's a belonging; I think that's why *Facebook* is so popular. That need to be connected. I see it. There it is, right there."

This connectedness can deepen and enrich learning by making it both more personal and more social. For example, our elementary teacher in the West works with a colleague who teaches Grade 12 in another town. The Kindergarten students will often draw pictures and send them to the high school students, who write stories based on the drawings. Then the two groups will connect by *Skype* for a virtual story time during which the older students read their stories to the younger students. The two teachers have found it an excellent way to build oral language and early literacy skills for the younger students and interpretive and expressive skills for the older students. One day, they decided to use a similar method to introduce the Kindergarten students to Shakespeare. The Grade 12 students recorded some soliloquies and emailed them to the Kindergarten students who then drew pictures to illustrate what they heard. Amazingly, the younger students were able to pick up much of the meaning of the plays.

> "Even though we're a kindergarten class, we send a lot of time collaborating with other classrooms and people around the world." (Elementary teacher from the West)

A number of informants also talked about the power of collaborating with students from different cultural backgrounds. *Skype* in particular was seen as a way to help students connect with others and begin to appreciate a variety of life experiences and perspectives: "in terms of diversity education, it's doing wonders for my kids and their abilities to have compassion, understanding and appreciation for different cultures" (elementary teacher from the West).

Working with Individualized Learning Styles

The same technology that allows for increased collaboration can also make it easier for teachers to provide learning opportunities specifically tailored to individual learning styles. Our informants talked about creating podcasts so auditory learners could work on phonetics, and linking dictation podcasts to online auditory dictionaries. iPads and touch-sensitive smart boards are helpful for visual, tactile and kinaesthetic learners of all ages. Our elementary teacher from Quebec, for example, told us she uses a smart board to teach students about angles by creating a virtual protractor: "I have kids that really, really struggle with math … I can say, just go to the Board and use … the protractor there … you can manipulate it, move it around, see through it … The ones that are more paper-and-pencil oriented, they're over with me using the paper and pencil. It's addressing all the different learning styles."

Networked technologies are also particularly helpful for special needs students. A number of informants told us that students who have difficulty concentrating often work better when they are listening to music on an iPod, and students who have trouble sitting still respond well to tools that enable them to engage their bodies and move while they are learning. Technological tools can also provide special needs students with an opportunity to demonstrate their knowledge in new ways. Our secondary school teacher from the West told us that he was working with a high functioning autistic boy who was having a great deal of difficulty with written assignments: "Writing was almost impossible for him, you know, and he hated it, and honestly, he wasn't very good at it." So the teacher loaded *Dragon Dictation* on an iPad; as the student spoke into the iPad, the software would transcribe his words for him. Although he continued to work on improving his own writing, the student was able to "show his learning [in a way] that is not so painful for him." This enabled him to demonstrate his knowledge of other parts of the curriculum and helped reinforce his own sense of competency.

Managing Technologized Spaces

Our informants agreed that technology can enhance learning when the focus is on pedagogy and the students' needs. However, networked devices can also complicate the learning experience by opening up the boundaries of the classroom in new and unexpected ways. To date, Canadian schools have focused on protecting students from access to offensive content, often, as noted above, in ways that constrain the teacher's ability to provide students with digital literacy skills. However, networked devices also allow students to open up the privacy of the classroom for their own purposes, and this can affect the social relationships that are at the core of learning.

Our secondary school teacher from the Atlantic summarized the thoughts of many of our informants when he said:

> … it takes a lot of energy to create a moment of learning, for individuals and a collective group of people. Learning is a series of connections, I believe. Learning is about connecting what you don't know to what you do know and making a new connection, and that connection has to be reinforced. It's a teacher's job to help students see and make those connections.

He went on to say that those connections flourish in a private space where students feel comfortable expressing themselves and trying on new ideas. Simple technological intrusions, like a call over the public address system or a student stopping in the middle of gym class to answer a text, can disrupt the learning process. However the interruption is magnified when others in the room can surreptitiously record a video and then post it on *YouTube*. The resultant loss of boundaries not only interrupts the learning process; it profoundly reconfigures the relationships of trust that are so central to learning:

> … in a classroom there's a lot of trust that would be broken if the students were knowingly recording the conversations of their peers and posting that online. When the conversation was intended to provoke intellectual curiosity and you're expected to take intellectual risks and really share and expose your thoughts about a particular text or event, to have that trust, that collaboration, that safe learning environment sort of ruined from access to technology or a recording device or posting online, I don't know if you could overcome that to build that kind of classroom.

Our secondary school teacher from Ontario echoed this conclusion. He told us that the most important thing a teacher does is create a sense of "community where everyone can feel comfortable in the classroom." When technological devices are used to dissolve the boundary between the classroom and the outside world, it is more difficult to create the trust that is central to this sense of community. Our secondary school teacher from the North expressed the same sentiment: "…they need to trust you in order to take risks ... being able to answer questions and know that if I get a wrong answer, that's okay, they won't laugh or make fun of me. That's risk taking for some students. That's a big risk." The potential embarrassment of being exposed on the Net is enough to make many students disengage from the learning process itself.

A loss of control over the boundary between the classroom and the outside world also constrains the teacher's ability to interact with students in an authentic way. None of our informants argued that they should not be held accountable for what happens in the privacy of their own classroom; they all took the position that they were professionals and accordingly comfortable with being observed in the classroom. However, opening up the private

> "I don't walk into my own classroom thinking I'm powerless now because they're going to film me and put me on YouTube. I behave in a certain way every day and I maintain my professionalism, so I'm not concerned with it. But I can see how this is a problem … There are personal boundaries that are not to be crossed."
> (Secondary school teacher from Quebec)

space of the classroom to public scrutiny encourages teachers to self-censor in ways that restructure their behaviour.

Our secondary school teacher from the Atlantic told a story that illustrates this well. While he was chaperoning the Grade 12 graduation party, a number of the chaperones decided to dance. However, as soon as they did, the students pulled out their cell phones and starting videotaping them. Our informant "instantly stopped dancing, and I was really disappointed that that was my reaction. But I had no interest in being posted on *YouTube* and not having control over how others view me through this sort of context, having a good time dancing with the graduating class." He concluded that these kinds of incidents create "a constant sort of awareness of what is for the community, the classroom, or within a school, and what is open to anyone. I have no problems with the surveillance of schools or the monitoring of what's going on; that's not my issue. My issue is more around the sense that it's difficult to build community and trust within a small space if it's constantly being coaxed into a wider public domain." Our elementary teacher from Quebec put it this way: "A lot of people are on guard because they find devices to be detrimental … it makes you be not real in your classroom, and you have to be real in your classroom."

There was also strong agreement that sites like *Facebook* are very problematic for teachers. Many of our informants chose not to create a *Facebook* account to avoid the pitfalls of not being able to control the boundary between their professional lives and their personal lives; the rest used high privacy control settings and refused to accept friend requests from current students.

> "[Facebook] is really personal and we really inform teachers to be really careful when they use Facebook at home. They are teachers 24 hours a day, 365 days a year." (Elementary teacher from the Atlantic)

Once again, this crossing of boundaries creates teachable moments. Our elementary teacher from the West asked her students to google themselves because it was an excellent way to illustrate the loss of privacy when information about oneself shows up unexpectedly. However, when one of the students googled the school, the first hit was for a *Facebook* page entitled "[Name of School] Sucks". The page had been created by a former student and a number of current students had posted negative comments about other students. The class was dismayed because this would also be the first page a *Skype* friend would see if they googled the school, and they felt it presented a very bad image of their community.

Two of our informants told similar stories about students posting embarrassing pictures of other teachers at their schools. Even though the pictures were not compromising in and of themselves, the teachers felt that their privacy had been invaded by the students and that this disrupted the trust that is central to the student-teacher relationship. Our secondary school teacher from the North explained, "The teacher was very upset about it. I think there was probably a lack of trust there; it happened without the teacher's consent … It's a privacy issue … you're doing something behind my back without me knowing about it and you're putting me on display for others to see. And I don't want that. I feel exposed or betrayed or violated." Our secondary school teacher in Quebec indicated that the incident

was why the school banned all smart phones and networked devices from the classroom; teachers were so upset that they rejected the learning opportunities that come with networked technologies in order to re-establish a respectful community environment in the school.

Maximizing the Benefits – Digital Literacy and Online Citizenship

Our informants concluded that technology can only enhance learning if students are taught to think critically about online content and to evaluate their own behaviour against a set of shared social values. Our elementary teacher from the North told us, "the biggest skill they need is a moral compass … and an immediate reaction of, 'Oh, that's bad.'" Our elementary teacher from the West tied this to broader curricular outcomes for citizenship and community-building:

> One of the big mission statements and themes of our school is building character today for communities of tomorrow. So we are always tying things back into good character and how we want to be perceived by others, and how we want to treat others how others treat us … technology provides one more way to teach it, one more way to make it relevant to students.

Digital literacy, then, is not about technical proficiency, but about developing the critical thinking skills that are central to lifelong learning and citizenship. To meet the challenge, schools must focus on pedagogy, and provide training and support to help teachers incorporate technologies into all elements of the curriculum in ways that facilitate individualized learning and teach students how to collaborate with learners both within and outside the school community.

> "As much as we dislike it, we have to understand that there's a whole new literacy out there that we have to be teaching, and a lot of it revolves around … citizenship."
> (Elementary teacher from the North)

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