

MAPPING **DIGITAL LITERACY** POLICY AND PRACTICE IN THE **CANADIAN EDUCATION** LANDSCAPE



CANADA'S CENTRE
FOR DIGITAL AND
MEDIA LITERACY

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The authors wish to acknowledge the **research** contributions of Melissa Keeshan, University of Toronto, Kate Watson, Chris Tomasini, Kim Vallee and Jason Lambert, all of Lakehead University, Orillia campus.

Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape was made possible by financial contributions from Google Canada.



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Recommended citation: Hoechsmann, Michael, DeWaard, Helen. (2015) *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape*: MediaSmarts. Available at <http://mediasmarts.ca/teacher-resources/digital-literacy-framework/mapping-digital-literacy-policy-practice-canadian-education-landscape>

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Introduction

There is no doubt that we live in a digital age. The idea of “literacy” as we once knew it only partially covers the communication capacities, competencies and comportments needed in the contemporary world. Digital tools and practices permeate our everyday activities and organize how we work, learn, shop, play, retrieve information, access services and stay in touch with one another. Digital technologies have not only replaced many ways of doing things, but have unlocked new potentials. Now anyone with the tools and know-how can access the world’s knowledge in multiple formats, with devices hardly bigger than a deck of cards, and can produce and disseminate written texts, audio files, videos, images and interactive video games. The dispositions and abilities required by traditional models of print literacy no longer capture the range of skills needed to be literate.

A well-rounded digital literacy incorporates print literacy but adds new capacities, competencies and comportments into the mix. Now included is the technical know-how to create a website, produce and upload a video, edit an image, design a functional information architecture for accessing or sharing knowledge – as well as many “soft skills” such as critical thinking and ethical behaviour. One of the primary transformations of the digital era in the 21st Century has been the introduction of end-users as actors in the world of communication, autonomous “prosumers” (producers and consumers of information) who can access and disseminate content in Web 2.0 domains without the regulatory controls of traditional filters and gatekeepers. Given this development, end-users now need greater critical thinking capacities to manage content: to decide what is valid and truthful and be able to incorporate multiple perspectives and voices into expanding worldviews. Additionally, exhibiting ethical behaviour in what may be said or posted online is essential to contemporary civic mindedness whether in a local context or the broader global village.

Education systems around the world are responding to new challenges posed in the digital era by putting considerable emphasis on the development of digital literacy capacities, competencies and comportments for children and youth. Canada is no exception. Canadian schools are a primary site for the cultivation of the critical thinking and practical skills students will need to thrive in a digital world. Given that the responsibility for setting education policy resides at the provincial and territorial levels in Canada, it is not surprising that there is

considerable variance between provinces and territories in terms of digital literacy policies and implementation programs and schedules.

The first goal of this working paper is to identify points of convergence and divergence along the landscape of provincial and territorial digital literacy policies in Canada.

When the practices of our everyday lives (how we communicate, work, learn, shop, play, retrieve information and access services) migrate online, they take place in *cyberspace*, the realm of the Internet. It is easy to lose track of the particular conditions of social and cultural contexts when we are participating in an online global village, but it is important to recognize the vital role of our *place* in cyberspace. In fact, our place is an important determinant in how we participate online. Policies and laws that determine how we can use the Internet are usually set within national borders and, in Canada, educational policies are set at the provincial or territorial levels. The telecommunications companies that provide Internet service operate within a given country and geography play a role in how communities will access broadband service, if at all. In particular, rural communities, and especially those in the North, have much less access to reliable high-speed Internet. Thus, there are digital divides¹ that distinguish access to some of the potentials of digital literacy and there are specific local approaches to organizing participation. In regards to this discussion paper on digital literacy and Canadian education, the local conditions that we will explore are the landscapes of provincial and territorial digital literacy and digital citizenship policies and the specific terrain of emerging digital literacy practices in Canadian schools.

One complicating factor of the digital landscape is the rapid and unsettling manner in which change has occurred and continues to occur. School systems everywhere are scrambling to catch up to the changes in the everyday ways of doing things that are predominant in workplaces, homes and community settings. In the first decade of the 21st Century, participatory social networking took hold. In the second decade, a whole new generation of mobile devices is

¹ Digital divides limit access to the circuits of communication increasingly vital to access to, and meaningful participation in, civic, educational, vocational and leisure spheres. These divides can be geographic and educational, as noted in this paragraph, but, more fundamentally and in global terms, digital divides are markers of economic and social inequality. On another register too, linguistic digital divides exist as English becomes increasingly the *lingua franca* of the Internet.

again transforming the digital landscape, providing new challenges and opportunities. In short, technology and the resulting changes to education, business and everyday culture rarely stand still long enough for us to take stock of what just happened, to catch a deep breath in order to respond adequately. Even as education systems plan their next moves, the technologies continue to evolve.

In this fast-paced environment of technological and cultural change, a second pressing challenge for Canadian education policy makers is how to develop models and practices of digital literacy instruction – to write curriculum, train teachers and make significant purchases of technology and software – at a time when the basic tools of computing and communicating are in a state of perpetual and rapid evolution.

The second goal of this working paper is to synthesize leading ideas and effective digital pedagogy from across the country in order to articulate and demarcate the broad landscape of Canada's fledgling digital literacy policy and practices.

The policy *landscape* allows us to describe the macro level of digital literacy education in Canadian provinces and territories, while the pedagogy *terrain* enables us to account for multiple initiatives and trends at the micro level of teachers, schools and school boards. In this discussion paper we will:

- map out the features and focal points of digital literacy and digital citizenship from across the country
- navigate ideas and practices for teaching and learning with digital technologies
- explore new vistas in schools where teaching and learning with digital technologies are taking place

For those reviewing the development of digital literacy education in Canada for the first time, this investigation should provide a broad overview. For others more familiar with the 'lay of the land,' this paper will provide some critical framing that situates the multiple component pieces of digital literacy policies and pedagogies into a complex topography.

The impetus towards integrating contemporary communications tools and practices into the mainstream of education has a strong tradition in Canada, as evidenced by the successful incorporation of teacher-led media literacy initiatives in to provincial curricula across Canada

(Pungente, Duncan, Andersen, 2005). The media literacy movement and its contribution to Canadian education is an important antecedent to contemporary digital literacy initiatives and the two are complementary in numerous ways. (For further information, see various sections of our website including: <http://mediasmarts.ca/digital-media-literacy/general-information/digital-media-literacy-fundamentals/intersection-digital-media-literacy>.) One of the key differences between the times and contexts of the grassroots teacher-led movements towards media and digital literacies is that the media literacy initiative of the 1970s – 1990s had much less initial support for, nor demands from, provincial Ministries of Education, whereas with digital literacy, we see a policies push from above (the *landscape*) and a pedagogies groundswell from below (the *terrain*).

1. Mapping Digital Literacy in Canada

At first glance, the concept of digital literacy seems straightforward, but, as in the case of literacy, there is tremendous variation between functional basic levels and complex advanced ones. Given the wide and evolving range of capacities, competencies and comportments that come into play when working, learning, communicating, consuming goods, accessing services, seeking data or just playing around with digital technologies, there is no single universal definition of digital literacy. To be digitally literate requires some combination of technological capacities, intellectual competencies and ethical/behavioural comportments. **Digital literacy is not a technical category that describes a minimum functional level of technological skills, but rather it is the broader capacity to participate in a society that uses digital communication technology in workplaces, government, education, cultural domains, civic spaces, homes and leisure spheres.** It encompasses the competencies and comportments needed to achieve the higher levels of “literacy” in a digital era that can enable viable work futures, engaging and participatory citizenship, expansive educational horizons, meaningful cultural and civic activity and ethical and fulfilling social relationships.

We at MediaSmarts, Canada’s Centre for Digital and Media Literacy, draw on a conceptualization of digital literacy that rests upon three building blocks: *the skills and ability to use* digital tools and applications; *the capacity to critically understand* digital media tools and content; and *the knowledge and expertise to create and communicate* with digital technology.

Use – is the necessary technical fluency needed to engage with computers and the Internet. Essential technical skills include the ability to use common and specialized technologies, software and platforms. In order to develop these skills, people must have access to, and be comfortable utilizing, equipment and knowledge resources such as computers and mobile devices, a range of software, platforms and online databases. This skill set enables participation in digital economy, society and culture and is the take off point for deeper digital literacy development.

Understand – is the ability to comprehend, contextualize and critically evaluate digital media. This critical understanding enables individuals to reap the benefits – and mitigate the risks – of living in a digital age. This includes an understanding of how digital media content and applications can reflect, shape, enhance or manipulate our perceptions, beliefs and feelings about the world around us, as well as an appreciation of one's rights and responsibilities in a digital society. This capacity also prepares us for a knowledge economy through development of individual and collective information management skills for finding, evaluating and effectively using information to communicate, collaborate and problem solve.

Create and communicate– is the ability to create content and effectively communicate using a variety of digital media tools. Creation with digital media means more than being able to use a word processing program or write an email, it includes the ability to: adapt communication to various contexts and audiences; create and communicate using rich media such as images, video and sound; and effectively and responsibly engage with Web 2.0 user-generated content such as blogs and discussion forums, video and photo sharing, social gaming and other forms of social media. The ability to create with digital media allows users to become active contributors to the digital economy, society and culture.

At minimum, the adoption of this framework should serve to ensure that digital literacy is not seen as a new learning program that can be hived off in a corner of a school as some innovative form of vocational or technical education. Rather, it should be positioned in the center of the schooling experience, not only as a distinct curriculum area but a cross-curricular knowledge and competence domain that is the 21st Century addition to the 3 Rs.

To a great extent, but to various degrees, Canadian curriculum policy makers recognize the significance of digital learning to 21st Century schooling and are developing digital literacy

programs that allow students to use, understand and create with digital tools. The Council of Ministers of Education, Canada recognizes the need to provide Canadians with essential skills for today and into the future (July 2014).

As the discourse on teaching and learning in a digital era evolves, we see an increasing shift in the language of provincial and territorial policy documents from the technical term of *ICT (information and communications technology) literacy* to a broader, more encompassing concept of *digital literacy*. As the vital processes of our economy, society and culture become increasingly digitalized, there is a growing understanding that ICT tools are not just discrete technologies. Rather, digital tools are dramatically changing and restructuring how we live, interact, work and learn and, in the process, transforming us as individuals and collectivities.

The concept of digital literacy incorporates and, to an extent, replaces traditional literacy as we know it and this signals a shift to something more transformative than what the term ICT literacy implies. In this overview, however, we have captured statements that make reference to either of these umbrella terms that have been used sometimes interchangeably in the creation of education policy over the past 15 years.

1.1 Digital Literacy Landscapes – Mapping Policy Across Provinces and Territories

Here we present snapshots of policy documents from across the country. We recognize that some of these are evolving positions and, hence, we present them with a view to showing the range of policies in development in Canada. Below this overview (page 10) is a graphic representation of the key capacities, competencies and comportments that emerge from this landscape.

British Columbia

Digital Literacy is “the interest, attitude and ability of individuals to use digital technology and communication tools appropriately to access, manage, integrate, analyze and evaluate information, construct new knowledge and create and communicate with others” (Framework for Digital Literacy (DRAFT), 1). “The study of information and communications technology is increasingly important in our society. Students need to be able to acquire and analyze information, to reason and communicate, to make informed decisions and to

understand and use information and communications technology for a variety of purposes. Development of these skills is important for students in their education, their future careers and their everyday lives” (English Language Arts 8 to 12, 15).

Alberta

‘Digital and technological fluency’ requires “students [to] competently use information and communication technologies as tools in a variety of digital environments and media. . . to learn individually or with others, to communicate, to come to new understandings, to inform problem solving and support decision making. They are aware of current and emerging information and communication technologies and choose with confidence the appropriate technology for a defined purpose. Students can access, understand and manipulate digital information creatively and effectively for learning, for communication and for sharing and creation. They use technology critically and safely and in an ethically responsible manner” (Framework for Student Learning, 5).

Saskatchewan

‘Digital fluency’ is defined as “the ability to use digital technologies readily and strategically to learn, to work and to play” (Technology in Education Framework, 1). ‘Technological literacy’ is a term used to describe the competencies associated with digital literacy that include “the intellectual processes, abilities and dispositions needed for students to understand the link between technology, themselves and society in general” (Understanding the CEL: A Handbook for Teachers, 36).

Manitoba

Manitoba’s continuum model for literacy with ICT stresses the importance of students “choosing and using ICT, responsibly and ethically, to support critical and creative thinking about information and about communication” (A Continuum Model for Literacy with ICT Across the Curriculum, 8). Within this continuum, digital literacy is presented as *literacy with ICT*: “thinking critically and creatively, about information and about communication, as citizens of the global community, while using ICT responsibly and ethically.” 21st Century students need multiple literacies to be successful, both at school and, later, at work. These new literacies require students to “identify appropriate inquiry questions, navigate multiple information networks to locate relevant information, apply critical thinking skills to evaluate information sources and content, synthesize information and ideas from multiple sources and networks, credit and reference sources of information and intellectual property, communicate new understandings to others, both face-to-face and over distance” (A Continuum Model for Literacy with ICT Across the Curriculum, 18).

Ontario

Digital literacy outcomes are dispersed across the curriculum in subject areas, each of which has a section entitled “The Role of ICT in Curricular Area X” that is a variation on the following statement: “Information and communications technologies (ICT) provide a range

of tools that can significantly extend and enrich teachers' instructional strategies and support students' learning [in the curricular area]. ICT tools include multimedia resources, databases, Internet websites, digital cameras and word-processing programs. Tools such as these can help students to collect, organize and sort the data they gather and to write, edit and present reports on their findings. Information and communications technologies can also be used to connect students to other schools, at home and abroad, and to bring the global community into the local classroom."

Quebec

"Uses Information and Communications Technology" is one of the nine cross-curricular competencies taught throughout the education cycle. "The creation and imaginative use of tools is a fundamental characteristic of the human mind. From the invention of the pencil to that of the computer, this extraordinary ability to create tools characterizes all human activity. Among these products of human ingenuity are information and communications technologies (ICT), and they are the focus of a cross-curricular competency in the Quebec Education Program. This competency involves using ICT thoughtfully and effectively and diversifying their use, exercising critical judgment" (Cross-Curricular Competencies, 15). Other cross-curricular competencies, particularly "Uses Information," allow for instruction in digital literacy.

New Brunswick, Newfoundland, Nova Scotia and Prince Edward Island

The Atlantic provinces have developed some common policy documents that describe technological competencies and literacy. Technological literacy is defined as "the ability to use technological systems, manage technological activities and make informed decisions about technological issues" and includes the capacities to:

- understand the role and nature of technology
- understand how technological systems are designed, used and controlled
- critically examine technologies
- respond rationally to ethical dilemmas caused by technology
- (Foundation for the Atlantic Canada Technology Education Curriculum, pp.1-2)

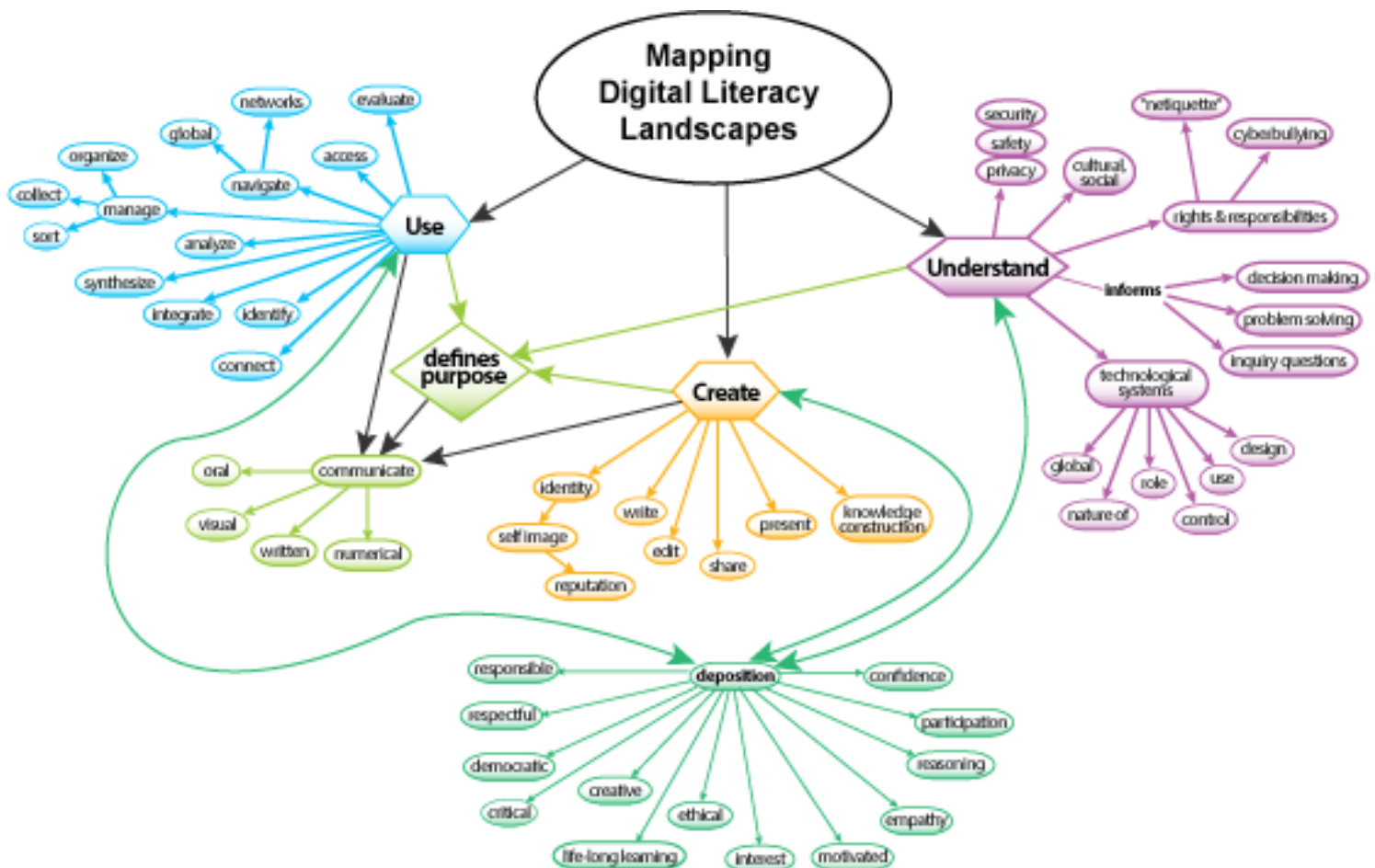
Northwest Territories and Nunavut

The Northwest Territories guide *Literacy with Information and Communications Technology* (LwICT) uses the term 'literacy with ICT' to describe "learning about and choosing ICT to critically, creatively and ethically use, produce and communicate meaning" (LwICT Infusion Guide, 22). The guide notes "literate students choose and use ICT, responsibly and ethically, to support their critical and creative thinking about textual, numerical, visual and aural information as citizens of the global community" (LwICT Infusion Guide, 23). *Literacy with Information and Communications Technology* is also followed in Nunavut.

Yukon

The Yukon Department of Education describes 21st Century literacy as “the ability to identify, comprehend and communicate in oral and written languages, and increasingly through the use of media technology” (Department’s Strategic Plan 2011-2016: Our Commitment to New Horizons, 28). Yukon follows the BC English Language Arts curriculum, which includes a component of ‘literacy in the area of information and communication technology’ that involves “the ability to obtain and share knowledge through investigation, study, instruction or transmission of information by means of media technology” (English Language Arts 8 to 12, 15).

Drawing on the preceding section, this concept map helps to visualize and bundle the various components of digital literacy policy in Canada. We have organized this framework to correspond to the MediaSmarts' digital literacy triad of Use, Understand, Create, and we have added the category of Disposition, which corresponds to the attitudes and worldviews necessary to the end-user (the student or teacher).



1.2 Digital Citizenship Landscapes – Mapping Policy Across Provinces and Territories

Digital citizenship initiatives are central to digital literacy curriculum across Canada. Given the role of schools historically in socialization, acculturation and citizenship education, it is not surprising that there is a broad societal expectation, and a clear sense of shouldered responsibility in the Education community, for a teaching and learning agenda that clearly sets out baselines governing the behaviours and comportments of students in their engagement with digital tools and environments. This, to a great extent, accounts for the twinning of digital citizenship initiatives with digital literacy programs in schools. Early concerns in schools about the hazards of cyberbullying, and growing concerns over digital piracy, are tangible results of this emphasis on setting boundaries and providing guidance to students for how to interact with others in the primarily unregulated spaces of online interaction on the Internet. The flip side to treating others ethically online is ensuring one's own Internet safety, knowing how to avoid being manipulated or tricked and also carefully managing one's digital footprint and reputation. Thus, another component of digital citizenship is empowering students to develop skills to safeguard their own privacy and reputation online so that they not overexpose themselves to commercial and other manipulative entreaties.

Below is an overview of digital citizenship policy across Canada. Again, we provide a concept map at the end of this section (page 14) to capture the broader picture of these initiatives.

British Columbia

Digital citizenship is one of six core digital literacy competencies adopted by BC from the ISTE Standards: "Students understand human, cultural and societal issues related to technology and practice legal and ethical behavior" ([Digital Literacy Competencies](#)). In the [Draft Digital Literacy Framework](#), this definition of digital citizenship is broken down into ten specific outcomes relating to: a) Internet safety; b) privacy and security; c) relationships and communication; d) cyberbullying; e) digital footprint and reputation; f) self-image and identity; g) creative credit and copyright; h) legal and ethical aspects; i) balanced attitudes towards technology; and j) understanding and awareness of the role of ICT in society.

Alberta

In Alberta, digital citizenship is treated as an extension of older forms of citizenship education that invoke the rights and responsibilities of living in a local community that is also part of national and global networks. Digital citizenship policy is guided by the Department of Education, but its implementation is left to individual school authorities.

The *Digital Citizenship Policy Development Guide* lists nine elements of digital citizenship that should be considered: digital access, digital commerce, digital communications, digital literacy, digital etiquette, digital law, digital security, digital health and wellness, digital rights and responsibilities. Two additional issues under consideration are cloud computing and bring your own device policies. (Digital Citizenship Policy Development Guide, 17-37).

Saskatchewan

According to *Understanding the Common Essential Learnings: A Handbook for Teachers*, one of the main purposes of technological literacy is to facilitate citizenship and democratically informed decision-making. The nature of the relationship between technology and society is seen as being very important and critical analysis is encouraged (Understanding the Common Essential Learnings: A Handbook for Teachers, 41). Under the outcomes and indicators in Saskatchewan's *Technology in Education Framework*, it is stated that both students and educators need to be able to use technology safely and effectively to communicate and collaborate with others in a global society (Technology in Education Framework: Teaching and Learning, Administrative Operations, Provincial Infrastructure, 4).

Manitoba

In Manitoba digital citizenship is a supporting principle of learning with ICT. Manitoba has adapted the ISTE Standard for digital citizenship: "students understand the ethical, cultural and societal issues related to technology, students practice responsible use of technology systems, information, and software, and students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits and productivity" (A Continuum Model for Literacy with ICT Across the Curriculum, 17). There are four Big Ideas that encompass digital citizenship which are presented as learning outcomes in the Affective Domain of the *Developmental Continuum for Literacy with ICT*: ethics and responsibility; social implications; collaboration; and motivation and confidence (A Continuum Model for Literacy with ICT Across the Curriculum, 22-23).

Ontario

In the Ontario curriculum, a general statement about ICT use is included in each of a subject area's curriculum document that states, "All students must be made aware of issues of Internet privacy, safety and responsible use, as well as of the potential for abuse of this technology, particularly when it is used to promote hatred" (The Ontario Curriculum, Grades 9 and 10: English, 35). Digital citizenship is included in the broader framework of citizenship education. The Citizen Education Framework identifies four main elements: active participation, identity, attributes and structures. Throughout, it seeks to develop citizenship knowledge, skills and attitudes, such as conflict resolution, collaboration, stewardship, perspective, interconnectedness and empathy and respect (The Ontario Curriculum: Social Studies, Grades 1 to 6; History and Geography, Grades 7 and 8, 189-190).

Quebec

The Quebec curriculum is structured into five Broad Areas of Learning, one of which is

Citizenship and Community Life. Individual boards have rolled out explicit digital citizenship agendas under this umbrella. More specific language pertaining to Digital Citizenship is found in another Broad Area of Learning, Media Literacy: Knowledge of and respect for individual and collective rights and responsibilities regarding the different media: intellectual property, freedom of expression, privacy and reputation (*Quebec Education Program: Broad Areas of Learning*, 27).

New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador

The Vision Statement of the Foundation for the Atlantic Canada Technology Education Curriculum directly ties together digital literacy and citizenship. It states: "Technology education for Atlantic Canada fosters the development of all learners as technologically literate and capable citizens who can develop, implement and communicate practical, innovative and responsible technological solutions to problems" (Foundation for the Atlantic Canada Technology Education Curriculum, v). In Nova Scotia, digital citizenship is situated as part of its larger provincial anti-bullying education initiative, with an emphasis on being a responsible digital citizen. This initiative encourages students to develop the ability to protect profiles and passwords, to be thoughtful about what is shared and posted online, to be respectful to others and to stand up and speak out for victims.

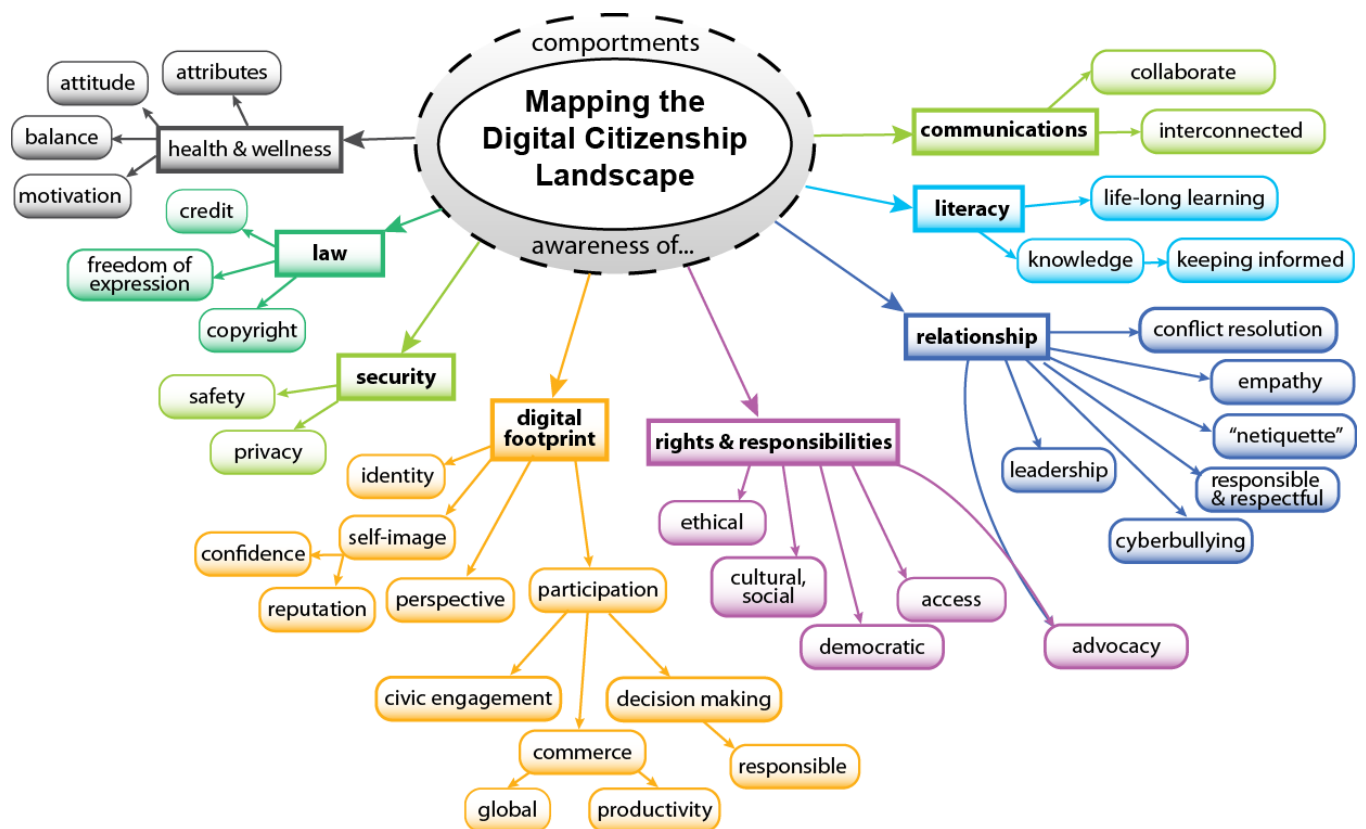
Northwest Territories and Nunavut

In the Northwest Territories' *Learning with Information and Communications Technologies (LwICT)*, the concept of digital citizenship is described as relating to the responsible, ethical and safe use of ICT by students as members of society and citizens of the global community (LwICT Infusion Guide, 34). In this guide, the Northwest Territories have adopted Standard 5 of ISTE Standards for Students as a model for digital citizenship: that students should "advocate and practice safe, legal and responsible use of information and technology; exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity; demonstrate personal responsibility for lifelong learning; and exhibit leadership for digital citizenship" (LwICT Infusion Guide, 35). The four learning components of the Affective Domain of the LwICT Continuum also encompass and support the development of digital citizenship (ethics and responsibility, social implications, collaboration and motivation and confidence).

Yukon

Outside resources for teachers and students are provided on the [YesNet](#) site and on a [digital literacy resource page](#) which features this quote: "Digital Citizenship prepares students to use digital media safely, confidently and wisely. It is the essential first step to Media Literacy" (from www.cyberwise.org).

The concept map below illustrates digital citizenship policy across Canada. In general, there is a focus on keeping Canadian students safe and responsible in their interactions online, as well as providing guidance to help them maintain healthy relationships and to develop civic responsibility.



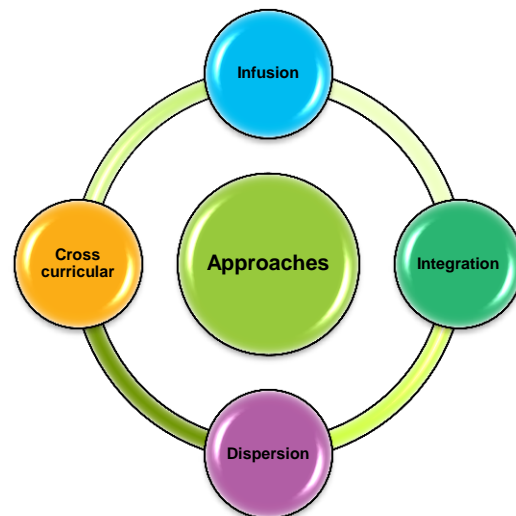
2. Digital Literacy and Digital Citizenship Policy in Canada: Navigating Convergences and Highlights

As with definitions, approaches to implementing digital literacy and digital citizenship education differ across the country. In general, we can identify four main approaches used in implementation strategies: Infusion, Cross-Curricular Competencies, Integration, and Dispersion. We will briefly touch upon each and subsequently highlight some compelling frameworks and initiatives from across the country.

2.1 Approaches to Digital Literacy Education

Infusion

Rather than conceptualizing digital literacy as a discrete set of skills, [Manitoba](#) and [Northwest Territories](#) have infused “literacy with ICT” across the curriculum through the inquiry process. The principle at play here is that 21st Century students cannot effectively gather information, produce, communicate or reflect on their learning without the use of digital tools. Literacy with ICT (LwICT) is a holistic and pedagogy-focused approach to integrating digital literacy into and across the curriculum that recognizes the fundamental shift that has occurred in



communication and learning with digital tools, but makes a very explicit connection between traditional and digital literacy practices. “The meaning of literacy evolves with the times. Literacy is not only about reading, writing, listening, speaking, viewing and representing. It is also about developing literacy with information and communication technology (ICT)... [which] means thinking critically and creatively, about information and about communication, as citizens of the

global community, while using ICT responsibly and ethically” ([Literacy with ICT Across the Curriculum](#): Definition and Purpose).

Cross-Curricular Competencies

In Quebec (and in British Columbia’s and Saskatchewan’s proposed new curricula), digital literacy education is situated in cross-curricular competencies. This approach is similar to infusion, as it situates digital literacy across the curriculum as fundamental to the thinking and learning process, but it requires a dedication and rigor in its implementation, lest the cross-curricular competencies fall to the wayside in a crowded curriculum.

The Quebec Education Program (QEP) contains nine cross-curricular competencies: 1) Uses information; 2) Solves problems; 3) Exercises critical judgment; 4) Uses creativity; 5) Adopts effective work methods; 6) Uses information and communications technologies (ICT); 7) Achieves his/her potential; 8) Cooperates with others; 9) Communicates appropriately (QEP, p. 33).

One of the cross-curricular competencies is “Uses ICT” but others are clearly applicable to digital literacy, particularly “Uses information” and “Communicates appropriately.” Cross-curricular competencies influence pedagogy in disciplinary subject areas and are assessed but not graded in a traditional sense. The QEP has eliminated grade levels and replaced them with five cycles (three in elementary school and two in secondary), so there is some room for differentiated learning, particularly in the cross-curricular competencies.

Integration

New Brunswick and Prince Edward Island have integrated digital literacy into their curricula through the creation of an ICT curriculum. General and Specific Curriculum Outcomes govern the teaching of ICT, and students must master these outcomes by the end of the grade. Alberta and Nova Scotia followed a similar path, but their outcomes must be met by the end of a division, rather than year-to-year. In this approach, ICT can, and should, be used whenever appropriate to facilitate learning, as it is often difficult to teach it alone and it works best in conjunction with another subject area. Assignments often contain both ICT outcomes and those from other subject areas with separate rubrics evaluating the separate skills. Outcomes are assessed at the end of the year/division by evaluating whether a student has reached the

specific benchmarks expected of them.

Dispersion

Ontario and Yukon have adopted a more dispersed approach to digital literacy education. For example, in Ontario, digital literacy is taught in Business Studies with specific curriculum outcomes that must be met, but, as a result, it is also taught within the narrow lens of business issues and applications. In Language Arts, the definition of ‘text’ has been changed to include digital texts and media, and so aspects of digital literacy are included in Language and media literacy curriculum. The general statements given recommending ICT use in other subject areas, in both Ontario and Yukon, provide minimal specific direction for teachers and do not guarantee any consistency of digital literacy education. In Yukon, this is somewhat tempered by the Technology Assisted Learning Unit which provides direction and resources to students and teachers. Ontario, in its most recent Social Studies curriculum, is beginning to adopt elements of an infused approach by underscoring ICT’s usefulness in regards to the inquiry process.

2.2 Digital Literacy and Digital Citizenship Frameworks

The idea that digital literacy fits into a broader educational vision and program is prevalent across Canada. Whereas some of the first decade early adopter strategies in educational systems in Canada and internationally were ICT and technology-centric, second-decade 21st Century educational visions are broader and holistic. Models of 21st Century learning give educators an opportunity to re-view, re-envision and re-map the role of education in the lives of young people within the broader digital contexts while considering factors such as the changing conditions of work and life in an era of globalization and economic uncertainty. Across the Canadian landscape, education ministries and school systems establish directions and navigate toward best practices with digital technologies. A recent symposium of the Council of Ministers of Education, Canada (CMEC) focused on strategic directions, collaborative networks and future actions to ensure Canadians acquire essential skills to succeed in a global economy. (CMEC press release, July 2014).

A. In the North: 21st Century Learning in the Northwest Territories

A sophisticated example of this vision is the one developed in the Northwest Territories based on five core competencies drawn into a holistic circle that unites community, home, workplace

and school, and also individual life trajectories that include psychological (self), social (others) and spiritual dimensions as well as an acknowledgement of the physical context (the land). Below the circle is a brief explanation of each of the five core competencies which set the directions of this 21st Century curriculum.



1. Construct Identity in Multiple Contexts

The 21st Century citizen:

- is mindful of one's personal needs and surroundings in a manner that promotes emotional, physical and spiritual well-being;
- communicates and builds relationships;
- establishes a balance between online and offline lifestyles;
- understands one's knowledge, skills, attitudes, values, in comparison and contrast with the diverse contexts of others; and
- develops the dynamic ability to act on this understanding by learning, unlearning and relearning in a lifelong development of identity and meaning making.

2. Participate Actively in Collective Intelligence and Sustainable Common Good

The 21st Century citizen:

- develops the affective and communication-rich ability to flourish in groups of individuals with multiple-perspectives who care deeply about a topic and are empathetically responsive to each other's perspectives;
- develops the ability to focus deeply and sustain thought using tools when and where appropriate;
- develops the ability to participate in open discussion where certainty and ambiguity are inherent; and
- develops the ability to persist in constructing coherent positions from which to launch actions that bring about the greatest common good to all stakeholders and impacted contexts.

3. Develop Literacy and Think Critically

The 21st Century citizen:

- develops the ability to access and recognize contextual meaning in language, symbols and texts;
- flourishes in the selection, use and creation of meaning for diverse audiences;
- develops the ability to recognize and act on the difference between authentic voice and commercial interests;
- develops the ability to recognize and evaluate authority, perspective and relevance of meaning; and
- develops the ability to understand the difference between personal preferences, and developing and applying required qualities or criteria before making a selection or judgment.

4. Use, Synthesize and Create Information Products Ethically with Current and Emerging Tools

The 21st Century citizen:

- develops the ability to place one's use of information products in ethical relationship to the author's intended uses and licensing requirements;
- develops the ability to develop deeper understanding of a field before expanding, repurposing or connecting information in the field to other fields; and

- develops the ability to create and release primary data according to a variety of self-selected licensing agreements;
- develops the ability to manipulate digital tools while using and creating information products.

5. *Communicate Effectively with Diverse Audiences*

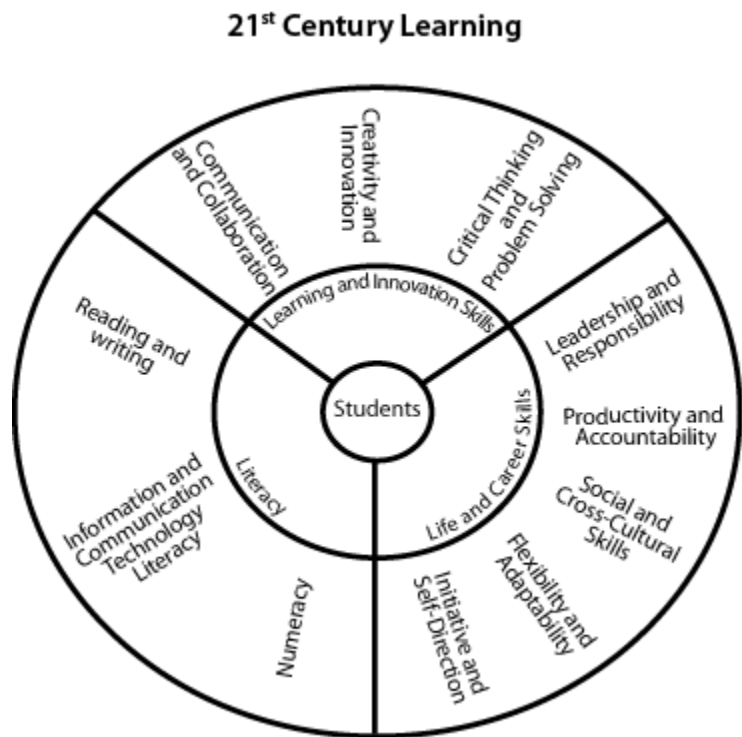
The 21st Century citizen:

- develops the ability to recognize and understand the contexts of the intended online or offline audience when constructing the meaning to be conveyed and the medium that will cast that meaning; and
- develops the ability to anticipate, welcome and respectfully respond to diverse feedback. ([Literacy with ICT Across the Curriculum, 16-18](#)).

The approach to the 21st Century learning model developed by the Northwest Territories is an ambitious one and may appear to go well beyond what is implied by digital literacy. Nonetheless, this educational model of schooling in the digital literacy era seizes the opportunity to map a direction for curricular re-envisioning that contributes to broader educational reform.

B. To the East: Newfoundland and Labrador – 21st Century Learners

In Newfoundland and Labrador, 21st Century learning is oriented towards a strong vocational focus based on changing work futures. This map, included in the curriculum document, incorporates three domains: literacy; life and career skills; and learning and innovations skills. Significantly, “literacy” combines the traditional “three Rs” with ICT literacy. But, again, the direction for digital skill sets and mindsets are holistic and oriented to students’ needs in the classroom,



community and future workplace.

1. Literacy – Given that 21st Century learners must be skilled consumers of information, critical readers, writers and creators and critically aware of the world in which they live, learning to read and write remains central to how students receive and communicate information. Though the ability to read and write is only the starting point for a robust concept of literacy, these abilities form the platform for success in education and work as well as for full social and cultural lives.

Numeracy, too, is a fundamental life skill. Numeracy is a combination of knowledge, conceptual problem-solving abilities and schematic, geometric and numeric capacities that enable an individual to function in society. A numerate individual has the ability to identify and understand the role mathematics plays in the world, to make well-founded calculations and to use mathematics in ways that meet the needs of that individual's life.

Added into the mix is ICT literacy. Students need to be prepared to understand, use and apply ICT in an effective, efficient and ethical manner. The learning objectives are typical of digital literacy programs across the country:

- understand the impact of technologies on daily life
- know how to determine which processes, tools and techniques to use and when to use them
- know how to use and apply a variety of information and communication technologies for problem solving, decision making, inquiry and research

2. Life and Career Skills – The one constant of the job market is transformation and change. Students will require skills that allow them to adapt, be self-reliant, deal with many cultures, be productive and show leadership. These are the new employability skills for the 21st Century:

- Flexibility and Adaptability – Ability to adapt to change, to continue to function in a variety of situations.
- Initiative and Self-Direction – Working without supervision, completing tasks that are not necessarily assigned but are required to be completed.
- Social and Cross-Cultural Skills – The ability to work well with others, being cognizant of cultural mores and differences.
- Productivity and Accountability – Completing work assigned in the time required, to the skill level required, and taking responsibility for your own actions and work.

- Leadership and Responsibility – Being able to enlist the aid of others in completion of a task and being dependable enough to complete that task.

3. Learning and Innovation Skills – Teachers are preparing students for the jobs of the future, some of which do not even exist yet. The one commonality for those job paths will be the ability to learn, create new ideas, problem solve and collaborate. These are learning and innovations skills.

- Creativity and Innovation – Developing, implementing and communicating new ideas to others. Being open and responsive to new and diverse perspectives within learning.
- Critical Thinking and Problem Solving – Understanding the interconnections among systems. Identifying and asking significant questions that clarify various points of view and lead to better solutions.
- Communication and Collaboration – Demonstrating ability to work effectively with diverse teams. Assuming shared responsibility for collaborative work.

Integrated teaching and learning occurs when connections are made among program areas. Students recognize the relevance and the interrelatedness of curricula. Skills in problem solving, organization, thinking and writing are transferable. Teams of teachers can design cross-curricular units based on concepts, issues or essential questions that are integrated across the curriculum and that involve skills and content from several academic areas. ([Grade 8 Production Technology Curriculum Guide](#) (2012), p. 16-19)

C. Central Canada: Quebec's Competency Based Learning

A growing trend in Canadian education is to move away from content knowledge curriculum outcomes in favour of competency-based outcomes. While this trend is not unique to Quebec (for example, Saskatchewan and BC have similar orientations), the [Quebec Education Program](#) (QEP) was the result of a major rethinking and reworking of the province's curriculum and teaching guidelines. The QEP is based on a three-pronged vision: to provide instruction in a knowledge-based world; to socialize students in a pluralistic world; and to provide qualifications in a changing world (p. 1: 5).

These aims respond to what educators believe students require in the 21st Century. Knowledge is increasingly more accessible, but only if a student has the right skills with which to retrieve it. Socialization exists along multiple fronts as borders, both tangible and digital, are becoming more permeable. Fostering a sense of community by focusing on a student's social and personal – not merely intellectual – development, is seen as essential to the promotion of democratic

values and civic participation. Additionally, the aim of inclusive socialization also seeks to prevent exclusion and the bullying/victimization through which it is expressed. The ability to engage in lifelong learning, partially as a result of the ever-changing nature of ICT, is a valuable skill in a knowledge-based economy and the QEP seeks to instill this quality in its graduates so that they can succeed in the future (p. 9).

The nine cross-curricular competencies that make up the QEP are arranged in four groups:

- intellectual (uses information, solves problems, exercises critical judgment and uses creativity);
- methodological (adopts effective work methods and uses information and communication technologies);
- personal and social (achieves his/her potential and cooperates with others);
- communication-related (communicates appropriately).

‘Uses Information and Communication Technologies’ (ICTs) is a cross-curricular methodological competency. ICTs are recognized as being extremely useful for research, information processing, creation and communication (p. 15). ICTs, when used effectively, can help accelerate the development of other cross-curricular and subject-specific competencies and are beneficial to a student’s intellectual, social and personal education. The ethical ramifications of ICT use must also be addressed in a “thoughtful” manner. The competency has three stages: a student masters the technologies (meaning the technical basics); uses the technologies to learn; and then evaluates the use of the technologies (p. 16). The evaluation of use is largely focused upon technical efficacy, such as choosing the right technology for the assignment and improving performance after review. The competency is evaluated by observing the “appropriateness of the use; degree of respect for the rules of ethics; effectiveness of interaction and troubleshooting strategies; quality of the analysis of successes and difficulties; and appropriateness of adjustments made” (p. 16). Evaluation is based upon observation, communication with students and parents and collaboration. As this is a methodological competency, it is oriented towards a more functional approach to ICT use.

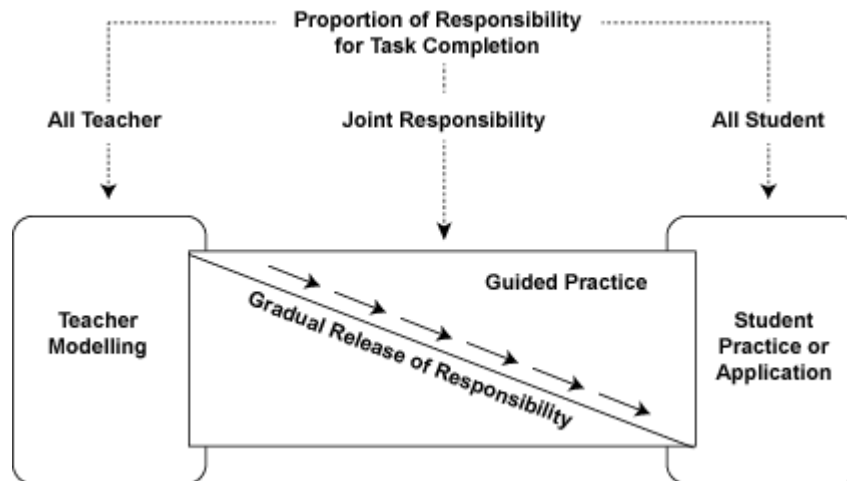
Cross-curricular competencies do not exist in a vacuum, as they build upon each other and relate to the broad areas of learning. The intellectual cross-curricular competency of ‘Uses Information’ involves finding information, evaluating its relevance and value and then organizing it (p. 3: 5). It specifically mentions that, in the 21st Century, information is frequently located in electronic and digital forms, and thus technical skills, such as how to properly use a

search engine, are necessary to facilitate expression of the competency. Problem-solving and critical judgment, also two cross-curricular competencies, are invaluable skills for literacy, be it media or digital. Facility with ICT also greatly aids problem solving and analysis. The communication-related competency, 'Communicates Appropriately', is reciprocally connected to 'Uses ICT' as well, as ICT helps facilitate communication and choose the appropriate method of communication for a given situation, and communicating appropriately is an important aspect of digital citizenship and respectful relationships.

D. Out West: Manitoba's Literacy with ICT

Literacy with ICT (LwICT) is a holistic and pedagogy-focused approach to integrating digital literacy into and across the curriculum that recognizes the fundamental shift that has occurred in communication and learning with digital tools, but makes a very explicit connection between traditional and digital literacy practices. "The meaning of literacy evolves with the times. Literacy is not only about reading, writing, listening, speaking, viewing and representing. It is also about developing literacy with information and communication technology (ICT)... [which] means thinking critically and creatively, about information and about communication, as citizens of the global community, while using ICT responsibly and ethically" ([Literacy with ICT Across the Curriculum: Definition and Purpose](#)).

There is no separate curriculum for LwICT. It is taught across the curriculum through "Inquiry" as students plan and question, gather and make sense, produce to show understanding, communicate and reflect on their learning (metacognition) (A Continuum Model for Literacy with ICT Across the Curriculum, 11-12). The pedagogy of LwICT is structured and assessed through the [Developmental Continuum for LwICT](#), which acts as both an assessment tool and a planning aid for teachers. A student-friendly version of the Continuum encourages [self-assessment and active participation in the learning process](#). Assessment is intended to aid in learning as well as evaluating it. This is consistent with the principle of "gradual release of responsibility", a supporting principle of LwICT.



The *Developmental Continuum for LwICT* is split into two domains, cognitive and affective:

- The Cognitive Domain is structured around five 'Big Ideas': plan and question; gather and make sense; produce to show understanding; communicate; and reflect.
- The Affective Domain is structured around four 'Big Ideas': ethics and responsibility; social implications; collaboration; and motivation and confidence.

There are three stages of development on the Continuum:

Stage 1: Knows-Comprehends-Becomes Aware

Stage 2: Analyses-Applies-Believes

Stage 3: Synthesizes-Evaluates-Values

Four 'snapshots' are provided as examples for different stages of learning: the emerging learner (K-3); the developing learner (2-5); the transitioning learner (4-7); and the expanding learner (6-12). Snapshot targets are meant to function as illustrations of capacities rather than as grade-by-grade requirements, which is why the grade range of each snapshot overlaps with the one before and after it. Students can display skill levels coinciding with varying snapshots depending on which Big Idea is being assessed and their proficiency level therein. However, teachers are encouraged to help their students develop at a rate compatible with the appropriate snapshot(s) (p. 26).

The Continuum provides examples and lists supporting skills required for the development of each Big Idea to aid teachers in planning tasks and incorporating LwICT into every subject area.

Teachers should ensure that students possess certain skills, but the program is designed with the assumption that the majority of students already have a degree of aptitude with ICT. Thus, the focus is on encouraging students to develop a deeper understanding of technology's uses and effects, rather than merely teaching technical skills.

LwICT is not assessed as a letter or percentage grade and it is not reported as a separate category on report cards. Instead, the assessment process is used to help keep an eye on a student's abilities and proficiencies as they progress based on observation and self-assessment. Students must achieve the curricular outcomes in subject areas, and in doing so will demonstrate LwICT skills, but these are not viewed as separate outcomes. This approach focuses on what a student can do and positions the student along the Continuum in order to assess what the student knows and to guide the student to the next stage along the Continuum. While examples and sample activities are provided to help to guide teachers, there are no general or specific curricular outcomes specified by the Ministry. As a result, individual teachers and administrators assume a great deal of the responsibility, and have a high degree of autonomy, in implementing LwICT.

E. On the Pacific British Columbia's Digital Literacy Framework

Adopted from the six competencies articulated in the 2007 ISTE Standards for Students, BC's Digital Literacy Framework provides another model for the development of a digital literacy curriculum that is comprehensive and concise. It includes:

1. Research and Information Literacy – *Students apply digital tools to gather, evaluate and use information.*
2. Critical Thinking, Problem Solving and Decision Making – *Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources.*
3. Creativity and Innovation – *Students demonstrate creative thinking, construct knowledge and develop innovative products and processes using technology.*
4. Digital Citizenship – *Students understand human, cultural and societal issues related to technology and practice legal and ethical behaviour.*
5. Communication and Collaboration – *Students use digital media and environments to*

communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

6. Technology Operations and Concepts – *Students demonstrate a sound understanding of technology concepts, systems and operations.*

It is important to note that only one of these six suggested areas of study, *Technology operations and concepts*, is uniquely focused on what would be narrowly construed as technical expertise. Thus, while it is important to learn how to **use** a range of digital tools that are rapidly introduced in to our economy, society and culture, it is equally or more important to learn to **understand** how to use these same tools in practical, thoughtful and ethical ways. This understanding empowers and enables users to **create** knowledge and media, and participate and communicate in digital spaces.

2.3 Further Highlights of Digital Literacy Education across Canada

A. Alberta – Bring Your Own Device (BYOD)

The Alberta Bring Your Own Device (BYOD) program is premised on the idea that “learning is complex work and like other forms of skilled and technical work it requires that the person performing the job understand and be comfortable with his or her tool set”.

The BYOD Guide provides examples of, and models for, the implementation of BYOD policies in Albertan schools. BYOD bridges the gap between school and play, which can allow students to be relaxed and experimental in the classroom given they are working with their play devices. Because teachers provide supervision and guidance while students navigate between home and school, there is an opportunity to engage in discussions about appropriate use and the importance of judgment skills. Collaboration and collective intelligence is emphasized in the BYOD program, partially because not all students may own or be able to afford devices.

Given that this approach bridges student cultures of everyday life with that of the school, BYOD also helps foster digital citizenship, netiquette and fair play. If digital citizenship is the “appropriate and responsible behaviour with regard to technology use” (p. 19), then allowing personal devices into schools initiates a dialogue between teachers, administrators and students as to what constitutes this type of behaviour. In more traditional computer lab models, students understand that certain behaviour is not acceptable in school, but may fail to extend that

reasoning to social media use outside of the school.

BYOD policy and implementation is left up to individual school authorities in Alberta, thus the success of the program can vary from school to school or district to district. For example, a school can decide to limit personally owned devices to a single brand or type, or may accept all devices as long as they can access the Internet (p. 11). Due to this variance in implementation, students' experiences will vary also, as all will learn the basic technical skills and required competencies, but some will have a far more immersive and well-rounded experience.

B. Ontario – Information Literacy and the Learning Commons

Information literacy is a key component of digital literacy programs and initiatives across the country. One of the most dramatic cultural shifts associated with the new communications technologies has been the relative decline of the role of traditional gatekeepers of knowledge and information and a corresponding glut of unfiltered information on the Internet.

We are living now in what Richard Lanham calls an “attention economy” where the scarce resource is not expertise (as it was in the era when university presses, major newspapers and library microfiche indexes controlled information flow), but attention. Thus, instead of a rationally organized taxonomy of knowledge controlled largely by highly trained personnel, there is a competition between stakeholders in the new knowledge folksonomies where commercial, institutional and grassroots groups increasingly clutter the Internet with data alongside the DIY (Do It Yourself) sector of hobbyists who launch websites. While there is cause for concern about the quality of information we encounter online, there are also boundless new opportunities to access perspectives and points of view that were previously unavailable and to experience knowledge through the senses (using sight, sound and simulation).

Not surprisingly, the library sector has made some of the strongest advances in this area and is involved in a dramatic review and reform of how it contributes to changing literacies.

For example, there is work in progress to transform school libraries into resource hubs, or learning commons, as the Ontario School Library Association (OSLA) is doing (Together for

One of the key digital literacy skills of 21st Century learners is exercising critical judgment capacities over the quality of information encountered on the Internet, and improving Internet search skills in order to yield better and more credible information, two competencies at the heart of what is called *Information Literacy*.

Learning: School Libraries and the Emergence of the Learning Commons, 2010). The *Together for Learning* report states that the information gathering environment has changed, but that there remain significant continuities to the past that need to be nurtured. “For those younger than 25, a technologically-rich environment is a natural part of everyday life. The interactive and social nature of digital technologies is woven seamlessly into their lives. To them, the online world is a reflection and extension of the offline world. For this generation, it is not about the technology, it is about life” (p. 4). Further, “the skills needed to be successful in life, technology notwithstanding, remain largely the same. As much as ever, a learner must be able to attain the ability to think critically. But the tools to carry out decision-making are expanding and merging with remarkable speed and subtlety. What a student will need to be able to do in a school, in a workplace, or at home is experiencing radical change” (p. 5).

The OSLA initiative suggests that the structure and operations of schools are due for an overhaul. “The structure of school learning was built more than a century before digital communication was developed, and since then the structure has not changed significantly. It is no wonder there is a growing disconnect between the way students live with technology outside school, and the far more restricted use of technology they experience inside a school” (p. 5). The school Learning Commons, or digital hub, will be at the center of this “whole-school approach” for information access and sharing “that is based on a cross-curricular perspective that recognizes literacy, numeracy, knowledge, thinking, communication, and application as foundations for learning how to learn” (p. 3).

C. Atlantic Provinces: Information Literacy and Language Arts

Like other provinces, the Atlantic Provinces have infused information literacy into the Language Arts curriculum. Described as “the ability to access, interpret, evaluate, organize, select, produce and communicate information in and through a variety of media technologies and contexts to meet diverse learning needs and purposes” (Atlantic Canada English Language Arts Curriculum, 105), information literacy plays an important role in their English Language Arts curriculums in grades K – 12.

Within the primary curriculum, information literacy is part of the program’s design and components. Information literacy is part of the research process because it encourages students to “revise their understandings, perceive weaknesses in information, and make better sense of their world” (p. 60). Thus, students are expected to learn and use interrelated processes, skills and strategies, such as thinking processes (i.e., problem solving), communication processes

(i.e., writing), scientific processes (i.e., experimenting), research and traditional library skills, media literacy skills and technological skills to critically assess information literacy (p. 241).

The Grade 4 and Grade 5 Language Arts curriculums continue to develop students' information literacy by teaching them "how to define a question and how to locate, access, and evaluate information from a variety of sources" (p.13). Gradually, students are shown how to synthesize the information gathered, helping them become information literate. Information literacy is mentioned again in the grades 7, 8, and 9 Language Arts curriculums. It involves "recognizing text validity and [understanding] that the elements of informational texts impact their creation and interpretation" (p. 229). Throughout the curricular documents, teachers are encouraged to enrich students' active learning experiences by encouraging and enabling independent inquiry and problem solving. By Grade 9, information literacy is understood as "a process in which the learner needs to find, understand, evaluate, and use information in various forms to create for personal, social, and global purposes. It involves the ability to judge whether the information is meaningful and how best to communicate the knowledge" (p. 11). Although similar to the primary curriculum, intermediate students are now expected to synthesize informational literacy on a larger scale (personal, social, and global purposes). By grades 10 – 12, students are empowered to develop the judgment abilities "through the research process of critically questioning ideas, points of view, and cultural perspectives," that will give them the confidence to "revise their understandings, perceive weaknesses in information, and make better sense of the world" (p. 81).

D. Nova Scotia – Respectful and Responsible Relationships: There's no App for That

An ongoing problem confronting young people and schools is that of cyberbullying, the use of digital communications to taunt, harass or otherwise stigmatize fellow students and school authorities (mainly teachers). For a number of reasons, cyberbullying emerged as a prominent threat early in the process of the adoption of digital communications technologies into society at large and schools in particular.

After a series of suicides by Nova Scotia teens, a Task Force on Bullying and Cyberbullying was established. In February 2012, the Task Force released its final report, *Respectful and Responsible Relationships: There's no App for That*. According to the report, cyberbullying "occurs through the use of technology and includes spreading rumours, making harmful comments and posting or circulating pictures or videos without permission. This can include sexting (sending nude or suggestive photos) and other less dramatic invasions of privacy.

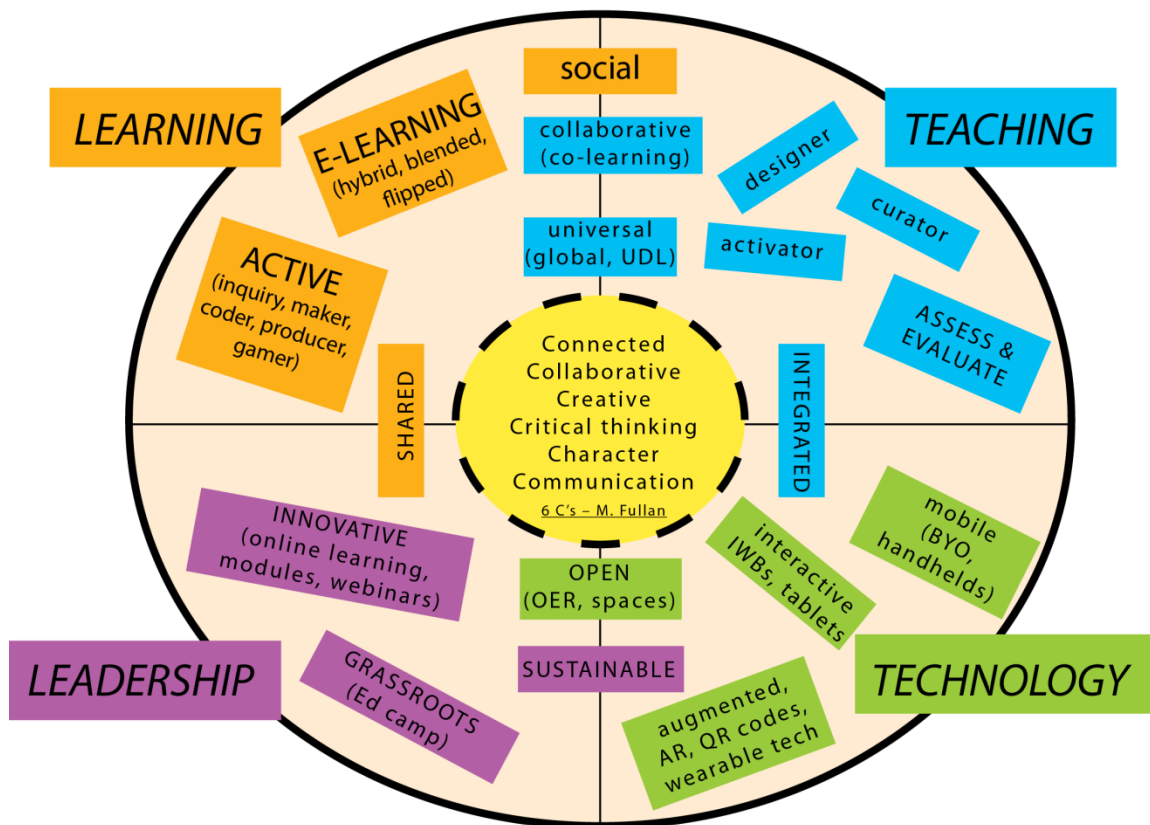
Cyberbullying can be done by means of a variety of forms of technology using social networks, text messaging, instant messaging, websites, email or other electronic media” (p. 39).

Cyberbullying can be difficult to counteract within the school system as it can begin or continue outside of the traditional dominion of the school, rendering disciplinary action jurisdictionally complicated (p. 12). It can also be the result of a single act (or post) that is then re-posted and sent across the Internet by hundreds of other people, making culpability hard to establish. Further complicating matters, digital communication tools are changing the manner in which students communicate and interact or, as the report puts it, they are “changing who we are” (p. 1). One of the cultural outputs of the new communications technologies is the exponential growth of communication acts (messages) between people and an enormous resulting digital footprint of deliberate or off-hand texts and social media postings that are open for misinterpretation.

The goal of the task force was not to create a punitive model, but instead to develop a restorative and cooperative approach to bullying that emphasizes unity and respect (p. 57). As a result, social and emotional learning, which is vital for the development of positive relationships and already a focus in schools, is extended to the digital realm (p. 5). The report identifies a need for targeted and specific digital literacy and digital citizenship education within the curriculum that would focus on facilitating and preserving healthy relationships (p. 83).

3. Exploring the Terrain of Digital Literacy in Canada: Trends and Best Practices in Schools

Teaching and Learning in the Digital Terrain



As this investigation has outlined, the teaching of digital literacy in Canada is infused, integrated and/or dispersed throughout school environments and across curricular subject areas. While the *macro* level of provincial and territorial policies and initiatives show us the landscape of digital literacy in Canada, it is in examining the *micro* terrain of teaching and learning in Canadian schools that leading ideas, best practices and prevailing trends can be found. It is less fruitful to localize these trends and best practices in provinces and territories, but rather to draw from the rich and growing expanse of digital literacy practices across the

country that are transforming student learning, impacting the roles of teachers, creating the need for in-service professional development and shifting the physical terrain of learning spaces. As is often the case when new curriculum and pedagogy is directed from above by Ministries of Education, at the grassroots level teachers, educational consultants and education professors become involved in the micro strategies of implementation. In general, pockets of innovation conceived by early adopters will become the trends that evolve into common practices.

3.1 Learning

The implementation of digital literacy comes at an opportune time for educators who have been already trending towards greater involvement of students in the learning process. Models that were



dependent on the “sage on the stage” of teacher-directed learning, have for years been ceding to the “guide on the side” model. Increasingly, we have come to understand that learning occurs on a continuum starting from explicit and directed, with support and modelling, leading to implicit and self-directed experiences. This fits well with digital learning tasks that are flexible, social, meaningful, graphic and personalized. Best practices show that digital literacies, skills and strategies are taught and/or learned on a continuum controlled by student readiness, need and interests.

Learning in today’s digitally enriched learning spaces is an active, inquiry-based process.

New and trending technologies allow for specialized, personalized and project-oriented learning to occur within the classroom and external places. Some leading examples of trends and best practices in current and emerging teaching *strategies* include the maker movement, teaching students how to write computer code, gaming in the classroom and producing digital content using a variety of technologies. Trends in delivery *models* include a continuum of hybrid, flipped and blended learning.

A. Strategies

Given that the opportunity has been opened for *prosumers* to use digital technologies to produce creative artifacts for audiences, educators are harnessing this potential to make learning activities more meaningful and exciting. Underlying many of the activities listed below is the pursuit of authentic learning experiences that allow students to conduct meaningful activities that have genuine outcomes resulting in the creation and often dissemination of their *work*. The other key element is that of *play*, both as learning to play (in school) and playing to learn. Digital literacy tasks can unite work and play into a holistic process.

Producing Media

Within educational spaces, a range of digital learning strategies is available for students across Canada to produce digital content depending on personal interest, opportunity and infrastructure. Students become producers of their own digital content for particular purposes and audiences from their own cultural perspectives, as they connect their productions to classroom topics and expectations or complete a culminating task for an inquiry-learning module.

Through the production of digital artefacts, learning occurs. Transactional negotiation (Kolb, 1984) with a variety of digital tools and processes engages learners in knowledge creation where they test new situations within concrete experiences, as they engage with abstract concepts through a process of observing and reflecting. Becoming owners and authors of digital content creates opportunities for students to become engaged in authentic and personalized learning.

The New Media Consortium [Horizon Report: 2014 K-12 Edition](#) identifies two solvable challenges impacting technological integration in educational spaces: providing opportunities for authentic learning and incorporating personalized learning (p. 20). When students become agents of their own stories, creating content for a global audience and sharing their author's voice, these challenges are answered. When producing digital content within complex tasks requiring analysis and reflection, students become empowered within their personal learning space and at their own pace, as [exemplified in Saskatchewan](#). With current digital tools accessible through cloud-based platforms, students can engage in learning anytime and anywhere.

With applications such as blogging and micro blogging, video blogging, podcasting, writing graphic novels or comic strips and digital storytelling, students engage with new digital tools and experience new genres of communication.

Blogging

Blogging is a distinct style of writing that draws on the conventions of first person op/ed (opinion/editorial) journalism. It allows students to experiment with informed thoughts, ideas and opinions from a first person perspective. Blogs can open windows to diverse views on a variety of topics and interests. They are also ideally suited for dialogue and creating a classroom community. Commenting on another's blog post can contribute to a digital conversation on issues or insights presented from a variety of perspectives. RSS (Really Simple Syndication/Rich Site Summary) allows students to 'follow' writers which can give them exposure to diverse writing styles and points of view.

Classroom teachers begin the blogging process and engage students in this work through links to topics and curriculum expectations as seen in these two examples – [a K/1/2/3 class blog](#) from a small island in British Columbia or [a central Ontario class blog](#). Students bring their classroom experiences to larger audiences when their actions are shared and become a larger conversation about learning. [Quad blogging](#) is one way to connect with larger audiences. Through these models, students begin to produce their own blogs using safe, secure and supported blogging sites where they can incorporate digital citizenship skills.

Micro blogging

Micro blogging, using short, simple statements or images, can be done using digital tools such as Twitter, Tumblr, Snapchat or Instagram. This form of digital conversation is rapidly becoming the standard in how we 'talk' to one another. Sharing events and actions using text, image or video changes the way messages are heard or understood. Students engage in the unplugged and interactive versions of Twitter in classrooms such as [Learning and Sharing with Twitter](#), which shares some experiences using Twitter in a primary classroom. This [Beginner's Guide to Tumblr](#) shares insights and experiences with Tumblr in the classroom. Teachers and school leaders initiate and model creating content in these digital spaces and can communicate student learning to larger audiences such as in [Twitter from the Principal](#). Micro blogging has the potential to create engaging dialogues with a variety of voices in digital spaces with the proviso that filtering and verifying messages and meanings can be an enormous challenge in the

classroom. Ensuring safety, privacy and security of information is of great concern to educators at all levels of the system, as well as parents and policy makers.

Video blogging (vlog)

Similar to blogs, vlogs are usually oral speeches captured in video format that allow demonstration of tasks and various forms of visual data or artifacts. Drawing from the journalism genre of news reporting, vlogs can be produced to inform, instruct or demonstrate. Through vlogs, students are able to model or demonstrate a skill that has been mastered or present a culminating task. Student produced videos can enhance self-assessment practices when they review their own learning and are required to explain their thinking. Screen capture videos can be produced to demonstrate proficiency using digital tools or processes. Writing with visual and moving images changes how students think in terms of the sequence and flow of the message produced. Vlogs can be constructed with or without the student being visible on screen. Here is one example from [a teacher's blog](#) post: [Worksheets are NOT Part of How My Students Show Their Learning](#). Vlogs have terrific potential for differentiated learning as they allow for classroom presentations that are taped rather than live.

Podcasting

Also, like blogging and vlogging, podcasting draws from genres of news reporting, using the audio modalities of radio. Thus, podcasts allow students to experiment with oral narrative and to add sound effects and other background sounds. Due to the fact that virtually all schools have audio announcement (PA) systems, podcasts can be broadcast in schools. Creating digital voice recordings to communicate ideas and reflect on learning provides opportunities for students to practice, perfect and reflect on a message for a specific purpose and audience. This means of producing content focuses on student 'voice' and oral communication. The process is explored in this '[Podcast Production](#)' video found on the Curriculum Services Canada (CSC) website. The production of a polished audio recording integrates digital literacies and citizenship skills throughout the process and product.

Graphic novels and comic strips

By adopting graphic novels and comic strips in teaching and learning, we are scaffolding home literacies into the classroom. Most children are familiar with, and fond of, comic strips as narrative forms and they hold great potential, not only as an alternative form of writing, but also as a vehicle to promote the love of reading. In *Media Literacy in the K-12 Classroom*, Frank

Baker (2012) states that graphic novels “offer many of our students a new avenue to reading by combining words and images in a format that is appealing, attractive, and fun” (p. 68). Creating digital content using comic creators such as [Bitstrips](#) or [Pixton](#) (both created in Canada) allows students and teachers to merge text and image in the creation of stories or reports. Students can become ‘actors’ in their own stories, published for an open, online audience. Wilson (2013), in [Serious Comix](#), emphasizes the potential of applying comic creation in the classroom because it “instils a new level of agency in learners—a personal ownership of learning” (p. 19).



Digital storytelling

Digital storytelling can involve one of the four genres of digital composition discussed above or some combination of genres. Digital storytelling is a growing phenomenon that allows students to “project their authority, to expand their sense of being celebrated, of becoming at whatever level, a celebrity within their own community” (Lambert, p. 2). Weaving the age-old genre of storytelling into digital spaces allows students to produce unique stories that celebrate authorship and can be shared with global audiences. Digital storytelling applies visual, moving images, text, graphic features and audio components to produce a multimedia product for new or remixed versions of stories. This form of production can include the application of [green-screen technology](#) (also called chromakey) and [stop motion animation](#) (where the [National Film Board](#) provides extensive resources). Lambert (2013) outlines the process, steps, design and distribution of digital stories to connect this genre to other forms of student writing, thus working from a traditional writing process and moving into storyboards to create an integrated digital production. Incorporating digital storytelling often occurs with support from a variety of organizations and associations – projects in [British Columbia](#), [Alberta](#), [Ontario](#), [Quebec](#), [Nova Scotia](#) are a few examples.

Gaming

Increasingly, video gaming is seen as a new literacy in its own right. This includes not just playing video games, but the underlying theory that playing these games can prompt learning, and hence the “gamification” of learning where principles derived from video gaming are adopted into classroom-based instruction.

Playing video games allows students to engage in an activity that takes a long time, is challenging and involves complex tasks. Gee (2007) outlines sixteen principles of good learning that are incorporated into game design: identity, interaction, production, risk taking, customization, agency, well-ordered problems, challenge and consolidation, ‘just in time’ learning, situated meaning, pleasantly frustrating, system thinking, explore and rethink goals, distributed knowledge, cross-functional teams and performance before competence. Bringing electronic games into the classroom provides new opportunities for students to engage with digital literacies by learning through play, for example learning [physics with Angry Birds](#) or [mapping with Minecraft](#). When games are integrated into schooling, learners scaffold out of school literacies in the classroom and can become engaged in collaboration, communication, critical thinking and creative activities beyond the games themselves (for example, [connecting Minecraft to learning](#)).

To fully explore digital literacies, students should be given time to play with technologies in a variety of ways. Jenkins (2011) defines play “as a disposition - a way of seeing oneself and the world through new creative lenses which depend on suspending real world consequences and encouraging a process of innovation and creativity”. Further, he outlines six core principles of play – permission, process, passion, productivity, participation and pleasure. These principles can be applied when infusing game-based experiences into the learning terrain. Game-based learning, according to Henry Jenkins (2011), harnesses the “power of games” that “provide such clarity in defining the roles and goals, that they help us to know what to do and how to do it, and as such, they motivate deeper forms of learning.” Game-based learning further encourages the principle of learning through play and is seen by many to be one of the answers to engaging young boys in classroom activities that require concentration. Game-based learning in schools also encourages girls to break the gender-based digital divide and to become more engaged not only in video gaming but digital exploration in general.

Coding

In the early days of the World Wide Web, anything and everything produced for online viewing was created through the use of coding languages such as HTML and Java. With the emergence of Web 2.0 in the early years of the 21st Century, user-friendly interfaces have been employed to enable mass participation in social media with minimal learning curves required. Many educators around the world are re-engaging students in the language and practices of coding.

Learning how to build simple programs and games from the ground up is the objective of the coding movement, but the outcomes can be much more profound as students are engaged with elaborate and complex coding tasks that provide intense motivation because they produce actionable results. Leading students through a variety of coding activities within art, science or math is a form of meta-learning and can certainly encourage an active interest in the fields of computer science and software development.

In an attempt to introduce coding at earlier ages and stages, a variety of coding tools have been created – [Scratch](#), [Hopscotch](#) and [Tynker](#) – and experiences ([Code.org](#)) are organized. Opportunities to engage and connect with other coders through online forums and blogs exist in a variety of locations through [Code for Kids](#) and [Code Kids](#).

The worldwide Hour of Code event scheduled each year from December 8-14 provides an opportunity for students to learn from and work with real-world coders and digital entrepreneurs. Engaging and collaborating with mentors can be done locally or nationally through [Canada Learns Coding](#). Girls can learn from models and be encouraged to learn to code through [Girls Learning Code](#) workshops and events.

Making – the ‘Maker Movement’

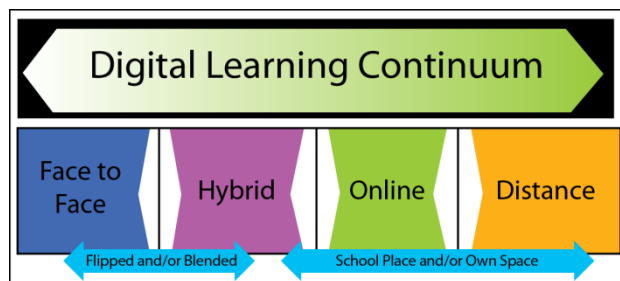
Playing to learn and learning to play by *making things* underlie the philosophy of the maker movement that tries to restructure the classroom to resemble the sandbox or the work place. Closely affiliated to *making* is the concept of *tinkering*, which [John Seely Brown](#) suggests is a way to construct knowledge in a digital age. With students and teachers actively engaging in making ‘things’ that work for a specific purpose and audience, the so-called maker *faire*, maker space and construction labs are all promising domains of learning.

Prompted by this groundswell of creativity, a network of educational entrepreneurs are structuring open and inviting learning places to warehouse the multitude of tools and machines needed for student learning (e.g. [SimCoLab, Barrie](#) and [Maker Kids, Toronto](#)). Additionally, the [HIVE](#) learning network, funded by Mozilla, maintains space, provides programs and organizes events to engage children and parents in making, creating and connecting with dedicated spaces in [Vancouver](#), [Toronto](#) and [Waterloo](#). Also, from this movement comes an interest in partnerships between learning institutions and businesses investing in innovation funding events for robotics, cardboard box creation, cardboard boat building and rubber band powered creations.

The obstacle for school based ‘making’ projects involves securing sufficient funding and developing skills through professional development. Funding, storage and management of tools and technologies such as robotics kits, 3-d printers, and assorted gadgets and gizmos are primary concerns. Attending and participating in events can be rewarding experiences but require funding and focus. If *making* becomes accepted as the way students can demonstrate higher order thinking with complex tasks while integrating digital literacies and skills, schools will need tools and mechanisms to provide active learning opportunities for students and to support teachers willing to ‘make’ a difference. Teachers will need to acquire technical proficiency and skills with the hardware and software for *making* (e.g. 3D printers) in order to integrate these practices into their pedagogy. Without specific and strategic professional development, the *maker* movement will be relegated to the back corner or outside of classroom spaces.

B. Models of delivery in e-learning spaces

Digital literacy learning is applied within along a continuum of models – face-to-face, hybrid, blended, flipped, online and distance. Here we adapt the e-learning continuum (M. Bullen, 2013)



where learning with technology and electronic tools ranges from face-to-face to fully online, distance learning spaces.

Within this adapted model, in the hybrid learning space is a range of strategies that include blended and flipped models.

Blended

The model for blended learning integrates the mobility of digital and online technologies within bricks and mortar learning spaces. This model enables networked student learning and collaboration, as well as ongoing access to learning materials for personalized learning. This manner of utilizing digital technologies strategically allows learners to access, use and create curricular content in a supported environment. Blended

J. Stommel (2012) states “When people talk about “blended learning” they are usually referring to the place where learning happens, a combination of the classroom and online.”

learning facilitates greater personalization of time, location, pace and learning pathways.

Alongside the digital technologies being integrated and infused into brick and mortar classrooms, education ministries are providing digital spaces for learners through access to learning management systems (e.g. Desire 2 Learn (D2L), Blackboard, Moodle). In BC, a consortium of school boards produces digital content, maintains a learning management system (LMS), and provides online learning opportunities for students – see [BC Learning Network](#). In [Manitoba, web-based courses](#) allow students from remote locations to access distance learning course offerings. [Blended learning in Ontario](#) includes services for K-12 students to support learning in classroom settings and an educational resource bank ([OERB](#)) integrating a variety of digital technologies and resources. Online courses are offered through a D2L learning management system at the [e-Learning Ontario](#) website.

The challenge in the Canadian context relates to funding models and jurisdiction over educational matters. In order for learning to be blended, online components and digital content need to be available and accessible. Barbour (2013) indicates that “not a lot has changed in the state of K-12 online and blended learning in Canada” (p. 7). The creation of the Canadian e-learning network ([CANeLearn](#)) will focus on sharing and supporting resources and foster professional development for blended and online learning (Barbour, 2013, p. 19). Finding ways to engage all students across diverse contexts in blended learning spaces will further the equitable spread of learning opportunities in digital spaces.

Flipped

Flipped learning, as defined by the [Flipped Learning Network](#) (FLN), brings direct instruction to the individual learning space (home) and changes classroom learning to an interactive learning environment. The FLN includes four pillars – flexible environment, learning culture, intentional content and professional educator. Because some or all of the content learning is done outside of class hours, in a flipped classroom learning focuses on student engagement in an active learning environment.

Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter.

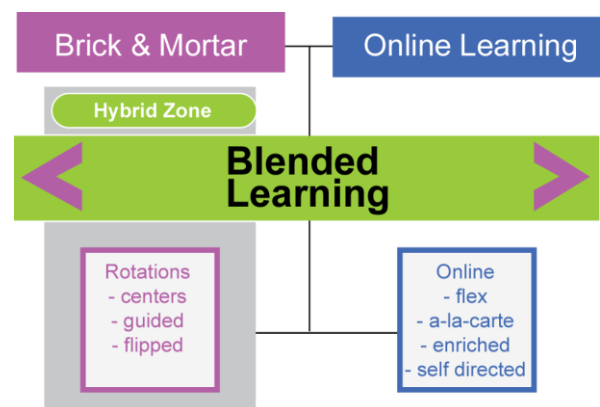
Flipped Learning Network

Flipped learning provides in-class time for students and teachers to engage in curiosity, content and relationship (Bergman & Sams, 2014). With a focus on higher-order thinking skills, flipped learning allows for traditional learning environments to transform into spaces focused on analysis, evaluation and creation. Throughout the flipped learning experience, digital technologies are integrated and digital literacies are developed.

Flipped learning models are not without their problems, however. For one, they can over burden students by radically increasing out-of-school workloads. More importantly, they can exacerbate digital divides for economically disadvantaged students who have limited technology access or support in the home. Nonetheless, the impetus behind flipped classroom initiatives is to create pro-social learning spaces in schools and hence some of the disadvantages can be overcome with necessary supports in place.

Hybrid

Hybrid learning models integrate components of face-to-face, blended and flipped learning. Christensen, Horn & Staker (2013) define hybrid models as a “combination of the new, disruptive technology with the old technology [that] represents a sustaining innovation relative to the old technology” (p. 2). The *NMC Horizon Report: 2014 K-12* describes hybrid models that “enable students to use the school day for group work and project-based activities, while using the network to access readings, videos and other learning materials on their own time, leveraging the best of both environments” (p. 12). Hybrid learning allows face-to-face time to focus on peer and teacher communication and collaboration while digital content on the Internet is consumed individually. While educators often use the terms hybrid learning and blended learning interchangeably, there are subtle differences, primarily associated with the ratio of time spent in the physical classroom.



Adapted from Is. K-12 Blended Learning Disruptive. p. 29

As governments are actively funding hybrid-learning models, more hybrid opportunities for learning will become integrated into the learning landscape. Learning will extend beyond the classroom into diverse spaces and places. With Canada’s diverse and remote locations, issues of

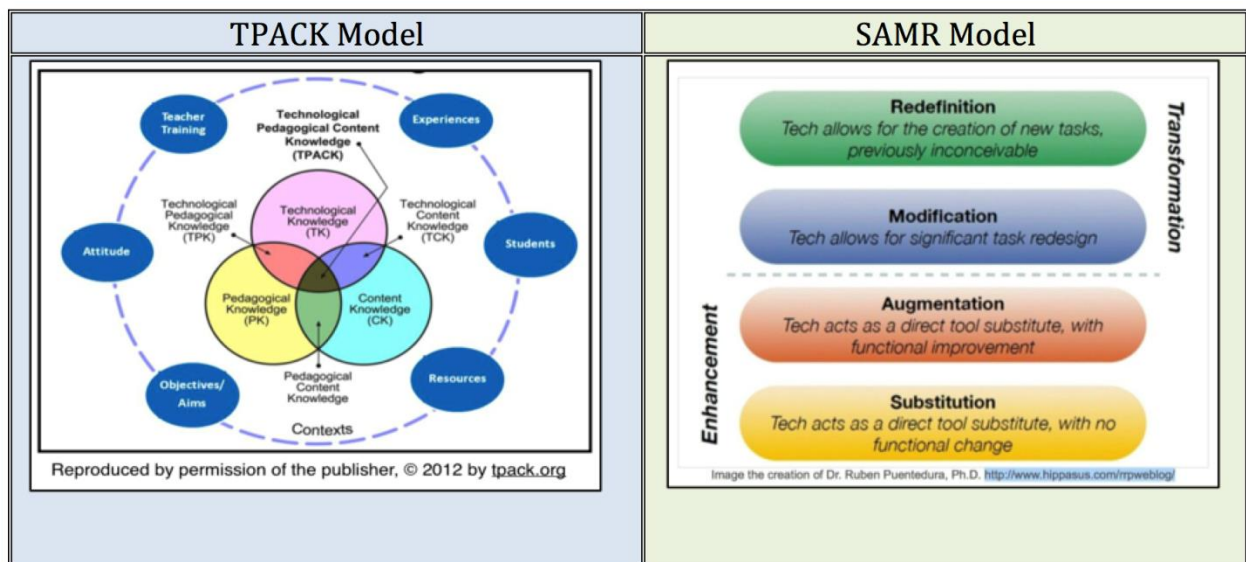
equity and access will continue to impact student learning and the dispersion of the hybrid-learning model, hence overcoming digital divides is crucial to these developments.

Traditional classroom models will continue to change and adapt to digital technologies. Christensen et. al. (2013) predict that hybrid models “that are more disruptive – – Flex, A La Carte, Enriched Virtual, and Individual Rotation – – are positioned to transform the classroom model and become engines of change” (p. 4) particularly in secondary schools. Ensuring that all learners can benefit from deeper learning when engaged with digital technologies will continue to transform educational systems into the future.

3.2 Teaching with Digital Technologies

Teaching with a focus on digital literacies is a complex and challenging task. Research has proven that “the quality of teaching is the single most important in-school factor shaping learning outcomes” (Fullan & Langworthy, 2013, p. 10). It is not surprising that teacher training and professional development is essential for educators interested in developing skills with Web and digital technologies.

As technology becomes infused into the complex task of teaching and learning, the role of the teacher is shifting and how teachers continue to learn has changed. Frameworks such as TPACK (technological, pedagogical, content, and knowledge) and SAMR (substitution, augmentation, modification and redefinition) provide teachers with some structure for their work and goals for their endeavours.



The changing roles of teachers will be discussed here in relation to teachers as designers, curators and activators of learning. Teachers are becoming designers of learning events, applying universal design for learning principles (UDL) while integrating a continuum of digital and e-learning resources they have curated and shared.

Teacher as DESIGNER

Laurillard (2012) states that teaching is like a design science “because it uses what is known about teaching to attain the goal of student learning, and the implementation of its designs to keep improving them” (p. 1). Further to this concept, Fullan and Langworthy (2013) identify three emerging roles – “teacher as designer, teacher as source of human, social and decisional capital, and teacher as partner in learning as accelerated with technology” (p. 11). Teachers using digital technologies can design personalized and modular learning objects drawing on a variety of Web 2.0, open and accessible resources. With digital technologies, teachers are becoming designers:

- of learning spaces, places and activities;
- by applying universal design principles;
- when creating learning events that are modular, granular and scalable; and
- within learning spaces that are flipped, blended and flexible.

Given evolving roles in the classroom, teachers are working within complex and challenging spaces. Defining structures and establishing models helps to clarify expectations and frame the complicated task of designing learning with technology. Teachers who design learning “apply context knowledge, creatively prepare learning experiences, and model learning attitudes through partnerships with student learners” (Fullan & Langworthy, 2013, p. 12).

Efforts are underway to establish what teaching by design looks like. Canadian educator [Michele Jacobsen](#) emphasises that “the most powerful thing teachers do to engage students is to design engaging, meaningful and authentic work and technology-enhanced learning experiences” (weblog post). Teachers are beginning to recognize that fluency with digital technologies “are not a new layer to add to what we typically do, but we need to replace what many of us tend to do” (Beggs, Shield, Teffler & Bernard, p. 20). As teachers assimilate digital innovations, they will introduce new classroom routines and scaffold learning differently to accommodate the affordances and complexity of teaching with technology (Beggs et.al., p. 22).

Teacher as CURATOR

“A curator is an expert learner. Instead of dispensing knowledge, [s/he] creates spaces in which knowledge can be created, explored, and connected” (Siemens & Tittenberger, p. 31).

The role of the teacher as curator changes with digital technology – collections are shared and co-created using a variety of digital tools such as [Pinterest](#), [LiveBinders](#), [Storify](#) or [Symbaloo](#). Collections of resources, materials and learning events become digitally catalogued on blogs or wikis, making them modular, granular, driven by choice and connected to expectations or topics. The gatekeepers of the past (libraries and publishers) are supporting this changing role by creating open and accessible learning commons in digital spaces. Teachers are creating their own digital collections to support classroom spaces e.g. [Digital Human Library](#)

“A curator balances the freedom of individual learners with the thoughtful interpretation of the subject being explored. While learners are free to explore, they encounter displays, concepts, and artefacts representative of the discipline. Their freedom to explore is unbounded. But when they engage with subject matter, the key concepts of a discipline are transparently reflected through the curatorial actions of the teacher.” (Siemens & Tittenberger, p. 31)

Curating and managing collections takes time. Working with a network of other teachers in social and professional digital spaces allows teachers to collaboratively build connected and shared collections. Culling through collections of learning objects and materials allow teachers to personalize a plan for individualized, modular, learning events and to present students with a learning map. Teachers as curators design a plan of available activities, resources and materials to engage student learning in diverse and equitable ways. By modelling the curation process, teachers extend learning for their students by “bringing digital and media literacy competencies into the classroom” and building “meaningful teaching and learning approaches for today’s participatory media landscape” (Mihailidis, 2013).

Teacher as ACTIVATOR

Activators work with students to create the learning processes and projects. As Fullan and Langworthy (2013) state, “teacher activators, along with their students in the partnership, will

collaborate to construct – or deconstruct as the case may be – richer understandings of what the new roles for teachers looks like in practice” (p. 11).

In *Visible Learning, Tomorrow's Schools, The Mindsets that make a difference in Education* (n.d.), John Hattie describes an activator as “an active teacher, passionate for their subject and for learning, a change agent” while a facilitator is an “inquiry or discovery based provider of engaging activities” (p. 30). As teachers transition to being activators of learning, they integrate digital technologies to support reciprocal teaching by providing feedback, setting challenging goals, frequently integrating assessment results to inform teaching and applying behavioural organizers into classroom culture (p. 32).

Digital technology is an essential tool for the teacher as activator. Digital tools such as [Socrative](#) can provide feedback on learning that is instantaneous and embedded into teaching/learning events. Peer feedback is simplified when projects are open and accessible within digital networked environments. Teacher feedback can be recorded with audio or video and provided to students individually. Reciprocal teaching using tools such as [Explain Everything](#) and [Show Me](#) can become integrated into student tasks. Metacognitive tasks can provide evidence of deeper learning when video or audio captures student thinking. Establishing challenging goals and explicit success criteria, along with tracking achievement, can be managed readily with spreadsheet and database technologies.

Fullan and Langworthy (2013) suggest schools and school systems “recognize and engage these individuals as “activators” of new pedagogies and deep learning within and across clusters” with the intent to “build from what they are doing, extending their capacity through connected communities that are led by practicing change agents” (p. 26). Those teachers engaging in their role as ‘activator’, infusing technology into this evolving work of teaching and learning, need to be acknowledged and supported, bringing their work visibly to a larger, global education community. Locating like-minded educators can be done through social networks, grassroots activities and innovative collaborations where active educators share their work with others.

Here, again, questions of digital divide pose challenges. Bandwidth limitations, poor access to sufficient hardware/software resources and insufficient professional development opportunities can impact the development of the ‘activator’ model of teaching.

Teacher's role in ASSESSMENT and EVALUATION

Assessment means 'to sit beside' allowing students opportunity to 'show what they know'. Evaluation of learning recognizes the place for professional judgment. Innovative assessment practices, according to Fullan and Langworthy (2013), includes rapid feedback cycles, variety of participation in process (peer, outside experts), complex assessment experiences and assessing complex learning products e.g. student artefacts (p. 10). Formative assessment is continuous, specific and focuses on improving student learning. This assessment provides students with 'just-in-time' feedback to alter their approach, adjust misconceptions and come to deeper understanding.

Adapting technology to fit into an evolving recursive assessment practice will challenge teachers working within more traditional teaching environments.

"The next generation of assessments will likely focus on activities which result in a product or performance. In this model, the assessment system should be able to identify features of student behaviour and make observations on it, not in terms of binary correctness, but in the form of useful information on the ways in which the learner has engaged with the activity" (Fullan & Donnelly, p. 17).

Integrating digital technologies into assessment practice will continue to evolve as formative practices are applied to the process as well as the product of learning activities. Google forms, [Linoit](#), [Cacoo](#) or [Padlet](#), can be applied to create '[exit tickets](#)' or in-class tasks to 'show what you know'. Teachers are discovering that digital technology can provide excellent platforms and software for quick and just-in-time assessment of student needs and readiness levels.

3.3 Instructional Leadership with Digital Technology

The notion of teacher leadership is not new. Lead teachers are present in many schools or systems in a variety of roles and purposes. Leadership comes from a growth mindset and a risk-taking attitude. When teachers become leaders in their own learning, there is a greater sense of purpose and connection. Digital media and electronic communication is opening doors and creating new opportunities for more teachers to lead by example.

Within digital spaces for educators, we can apply the concept of communities of practice as modelled by Wenger and Trayner (2011). Forms of participation within communities can apply

to professional learning and instructional leadership with evolving digital literacies. As expertise and engagement grow, members of digital communities can evolve from transactional participant and peripheral observer, to occasional engager and active participant. Those within the core group can organize, mediate and engage others in digital spaces as instructional leaders.

New and emerging technologies change the role of teacher/leaders through networks that are innovative, grassroots and social. Professional learning needs to address both technical and pedagogical learning relevant to infusing digital literacies in classrooms.

Innovative

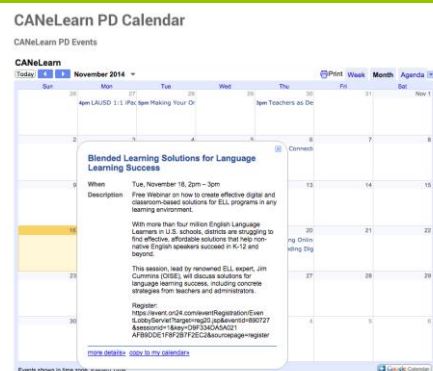
Becoming a connected and collaborative educator is the first step that should be modeled to our students. Joining organizations and groups of teachers and sharing education-focused materials within physical and virtual spaces is an essential professional learning activity. Digital networks are not just for the technologically savvy teachers – they extend towards many areas of interest, expertise in subject matter and innovations in technology.

Canadian Educators Association (CEA)

CEA is a network of educators supporting the transformation of education through research and sharing best practice. Research informs conversations about transformation in education. Through video, podcasts, webinars, and social media, they connect and inform educators at all ages and stages across the country.

CANeLearn

This newly formed organization supports educators with networking, collaboration and research relevant to online and blended learning.



Connecting educators through digital networks is a growing trend. October is designated [Connected Educators month](#). The Connected Educators organization models leadership in global collaboration with groups of educators in unique digital connection spaces by collating a [community directory](#).

[International Society for Technology in Education \(ISTE\)](#)

ISTE is an organization focused on research, sharing, developing resources and best practice in all areas of digital teaching and learning. Their [connected learning networks](#) create spaces for unique groups of educators to connect and collaborate on topics of interest. Their affiliations with Canadian groups, such as the Educational Computing Organization of Ontario ([ECOO](#)) provide richer, deeper learning opportunities for Canadian educators.

[Global Education Network](#)

The Global Education Network connects educators worldwide and conducts an annual free conference in a fully digital space, with over 160 special interest groups volunteering to collaborate and present information. Archives of previous conference presentations are maintained and linked through the website. In this way, areas of interest relevant to global education topics are shared, discussed and available in an open repository.

[iEARN Canada](#) – Canadians learning with the world

This international network is one of the oldest and largest networks that connect educators and students across the globe with special projects that connect to curriculum and make a difference to the global community. For teachers, there are unique [conferences and webinars](#) offered throughout the year.

Engaging in networked digital spaces can ignite professional learning for classroom teachers looking for innovative ways of teaching. Looking outside of local schools and districts for professional development can provide new and interesting practices and reduce feelings of isolation. Providing teachers with time and incentives to collaborate within these digital networks adds incentives to continue their professional growth.

Finding ways to sustain momentum within innovative spaces will be an ongoing challenge. Allowing innovations to shift and spread throughout educational communities and spaces will take more than a few online learning opportunities. Providing ongoing support and

opportunities for pedagogical innovation will result in deeper, enriching learning and teaching experiences.

Grassroots

With the spread of digital technologies, the locus of control for professional learning shifts from experts to practitioners in the field. One growing trend to demonstrate the grassroots organization of personalized learning is the [Ed Camp](#) movement. Steadily growing in participation globally, an Ed Camp is free to all who attend and participants set the agenda. Anyone who attends can present their ideas, and the 'law of the feet' allows people to move to and from sessions according to their learning needs.



The emergence of the [MOOC](#) – Massive Open Online Course – has also changed where and when professional learning can occur. Some examples such as [ETMOOC](#), [DIGIFOOT12](#) and [OSSEMOOC](#) have been organized and managed by Canadian educators. Participation is free, open and accessible. Participation is done where and when possible, usually without credit or recognition.

Grassroots professional learning and leadership can come from small groups of passionate teachers willing to step outside the classroom walls and engage in larger, deeper conversations in both physical and digital spaces. Recognition comes from the community. There are no required assessments since people participate for the sake of learning. Grassroots organizations and events are dependent on the commitment of a core group of community members. Coordinators and active group members can support the endeavours of the core members to create professional learning opportunities. School systems should recognize the work of these grassroots advocates in whatever way possible.

Social

Teachers talk about teaching. When a group of teachers gets together, they talk about what they are doing, what's working, what isn't or how and why they try new things. Talking together has now gone digital. Talking is not relegated to the staff workroom or the occasional professional learning session. Teachers can connect digitally to others with similar interests, areas of expertise or innovative practices. Twitter and Tweet chats allow teachers to connect with other passionate educators interested in the same things, working on the same types of

transformations or facing the same challenges. The Canadian Education Association (CEA) has collected a [top 10](#) and [top 50](#) list of passionate Edu-tweeters, indicating the growing potential of this grassroots connectivism. Another list – [Canadian Educators on Twitter](#), collated by one educator, includes links to educational organizations. [Tweet chats](#) at scheduled times with set topics convened by moderators allow teachers to meet on Twitter to have a “discussion” by posting tweets.

When teachers can engage with other educators and explore ideas outside of their day-to-day work, their teaching transforms. Participating in debates within digital spaces, with other educators whose ideas spark new thinking can transform classroom practices. Social media provides the forum for greater and deeper connections and conversations to occur.

Teachers lead learning by modelling for their students. Joining into the Twitter conversations by following, retweeting and sharing is an important first step. Grassroots, social and conversational contact with other educators through this digital media works to clarify thinking and create new synergies. Familiarity with this social medium will help teachers engage their students in connecting, communicating and collaborating with others across the country and around the world. When engaging in professional development using social media safe practices guidelines should be outlined and followed (e.g. the Ontario College of Teachers’ [Social Media Guidelines](#)).

3.4 Trends in the Terrain of Digital Technologies in Education

When describing the terrain of digitally enhanced education, consideration needs to be made of the physical space, environment and the ecosystem in which teaching and learning occur. The terrain includes the specific resources and physical hardware that support teaching and learning which continues to evolve. Here we review several trends:

- mobility, focusing on hand-held devices and bring your own devices (BYOD);
- interactivity – including interactive whiteboards (Smart boards, Promethean boards);
- openness within ever expanding places for learning - from physical classroom space to school-based (e.g. learning commons), to community and local resources/references, to open Internet-based learning spaces; and
- augmented spaces through the application of QR codes, augmentative reality software and wearable tech.

Mobile and BYOD

The use of mobile and bring your own device (BYOD) technologies is beginning to gather momentum in Canadian classrooms. When students bring their own devices into the classroom, schools provide Internet and intranet service for the variety of platforms and operating systems. While many classroom teachers struggle with the issues of managing, overseeing and integrating these digital tools into their teaching and learning practices, students who are familiar with their own technologies can become the experts in the classroom.

Managing the diversity of hardware and software means that there are issues to overcome relating to conflicts within software applications or issues between devices and the Internet service. Continued system level support with a focus to extend the digital space, as well as place and time to engage in digital technologies, is essential. Managing equity of access is another problem, given digital divides that allow some students to bring the latest and greatest gadgets while others cannot. While schools can support access by providing some school based 'loaner devices,' this only partially addresses equity concerns because those students who have their own the devices will have greater opportunity to develop mastery of the technology.

Despite some great potential in BYOD initiatives, there are many challenges to address as well (Beggs, et. al., 2013) such as the development of acceptable use agreements and school policies for personal property. As well, safety and security of student information continues to be an overriding concern. Providing teachers and students with models of best practice and clearly established boundaries will assist if and when mobile and BYOD technologies become commonplace in classrooms. In the meantime, issues with accessible and reliable wireless networks, bandwidth and hardware will need to be addressed.

Interactive

Interactive whiteboards (IWBs) such as Smartboards or Promethean boards are now frequently found or requested as a learning resource in classrooms. Viewing and interacting with digital content using IWBs potentially adds to student engagement and interaction with content. Using the boards as a large portal to learning can enable students to interact with wide-ranging topics, people and resources.

As IWBs become more common in classrooms, the challenge is to ensure they are used as interactive learning tools rather than passive projectors. As teachers become more familiar with

designing classroom environments to optimize digital technologies, the IWB can become an interactive portal to the world of learning for their students. Sharing resources and activities through resource exchange networks, such as the [Smart Exchange](#), will ensure that this technology tool doesn't lose its interactive edge.

The features and applications of IWBs can be enticing to students and teachers. However, adopting IWBs as essential digital tools will put strain on school systems because of the high costs involved. Unless the cost of IWBs is reduced, connecting less expensive technologies such as an [interactive pen](#) or an [interactive projector](#) as learning portals to engaging activities may be the long term solution.

Open

Cloud based technologies are now being integrated into education, making teaching and learning products and processes readily accessible within classroom spaces, learning commons, libraries, external environments and in students' homes. Resolving challenges and issues with security, data management, privacy, permissions and access will continue to impact the speed of adoption. With cloud based storage and retrieval, students and teachers can collaborate, connect and create in new ways. Working documents are no longer limited to the physical space of the classroom desk or storage shelf. Throughout the process, and when projects are completed, students can communicate and share with global audiences. With documents that are open and accessible, students can feel a greater sense of pride and purpose for their learning products that can be seen by others and they can develop their digital citizenship by demonstrating responsibility within digital spaces. Engaging in open educational terrain through creating and analyzing Open Educational Resources (OER) offers rich opportunities for students and teachers to engage in authentic electronic spaces and apply digital literacy and civic awareness to learning tasks. Further, OER can enhance personalization and precision of teaching when the right resource is found at the right time to optimize student learning.

Infrastructures within learning terrains require a high speed, reliable broadband. Fullan and Donnelly (2013) state "technology [should be] connected to high-speed Internet, allowing for real time adaptation of the programme to the learner [and] built in access to the resources of the global Internet," (p. 21). Ownership, authorship and maintenance of cloud based files and documents can become challenges if not structured within clearly established policies and guidelines.

Becoming a fully open learning environment and accessing fully open resources does not happen without policy changes and guidelines. V. Roberts examines how open learning can be integrated in stages: First, social networks and digital technologies are integrated into traditional classroom settings and closed learning management systems. Then course offerings can be publicly shared on blog or wiki spaces that allows for public viewing without participation. The final stage would see fully open and accessible digital learning spaces that link students to open and public resources, with feedback coming from a variety of public sources (Barbour, 2013, p. 22). As Roberts notes, in Canada, all three levels of open educational endeavours require parental permissions and input.

As the creator of the first K-12-focused MOOC, Roberts offered an open and accessible six-week course (#Digifoot12). This was an opportunity to learn about digital citizenship and digital identity in an open, connected, digital space (Barbour, 2013, p. 23).

Augmented

Teachers are beginning to apply digital tools such as [QR codes](#), augmentative reality (AR) software, such as [Aurasma](#) and wearable devices such as Google glasses ([recently approved for use by Industry Canada](#)) and activity trackers to augment physical spaces with digital content. For example, [LearnNow](#) in British Columbia provides access for students to use digital devices to track daily physical activity. A Grade 7 class in Saskatchewan used an artefact to trigger an 'aura' of their [Most Remarkable video stories](#).

One very immediate outcome of augmenting physical classroom spaces with digital content is to provide windows into the world of learning for outsiders. With school district officials and parents wishing to see what is going on in schools, students and teachers can use emerging digital tools to augment the classroom terrain to enhance information sharing. For school events, such as an open house, students can create welcome messages embedded into QR codes found on their workspaces. Video stories can be linked to art or artefacts that students have created and displayed.

With the potential of embedding digital learning artefacts (audio, video, text, graphic productions) within the physical spaces, new opportunities for students to communicate, collaborate and create arise. Embedding reflective practices about where, when and why projects can be produced and consumed will enhance authentic learning and add metacognition to student learning.

4. CONCLUSION

The results of this overview and environmental scan of the digital literacy and digital citizenship policy landscapes in Canada and the still unsettled terrain of classroom teaching and learning with the new digital technologies demonstrate that this is a transitional moment in education policy and practice in this country. While the leading edge of pedagogical innovation is at the grassroots level of teacher-practitioners who are experimenting with digital tools in creative and ambitious ways, broader implementation strategies rely on the long-term visions of policy makers at the provincial and territorial level. Clearly, there are marked differences between how different provinces and territories are implementing digital literacy and digital citizenship policies. And, while individual teachers and teacher groups are able to react more nimbly to the opportunities afforded by rapidly changing digital technologies, a large majority of teachers across the country awaits and relies upon the implementation strategies set out by policy makers.

The goal of this report is to lay the cards on the table, to show Canadian educators and policy makers a comprehensive snapshot of the *lay of the land* at this critical juncture. We hope that this paper will provoke informed debate on a variety of implementation models and pedagogical practices that are already in place across the country. While a national digital literacy and digital citizenship strategy would run counter to the established practice of determining education policy at the provincial and territorial level, we feel that the time is right to establish some common parameters and guidelines to include all Canadian teachers and students in the learning curve and educational outcomes that derive from a profound rethinking of education in a digital era.

You are invited to join the conversation about topics and issues in teaching and learning in the landscape and terrain of digital literacy. Twitter @DLterrain or use #DLterrain.

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Appendix – RESOURCES AND LINKS

This is not intended to be an exhaustive resource for all items relevant to this paper. It is intended to be a starting point for further investigation into topics of interest.

Maker Movement

- Maker Faire in education – <http://makerfaire.com/education/>
- Maker Movement in the Classroom – <http://www.edutopia.org/blog/maker-movement-moving-into-classrooms-vicki-davis>
- Hack Education’s report Top Ed-Tech Trends of 2012: The Maker Movement <http://hackeducation.com/2012/11/21/top-ed-tech-trends-of-2012-maker-movement/>
- SimCoLab, Barrie – <http://simcolab.org/about/>
- Maker Kids, Toronto – <http://www.makerkids.com>
 - HIVE organization, funded by Mozilla
 - Hive Toronto – <http://hivetoronto.org>
 - Hive Vancouver – <http://www.hivevancouver.com>
 - Hive Waterloo – <http://hivewaterloo.ca/popup/>
- Robotics events – <http://www.firstroboticscanada.org/main/>
- Cardboard Box – <http://cardboardchallenge.com>
- Cardboard Boat
 - <http://www.canadianoutback.com/events/cardboard-boat-building.php>
 - <http://www.skillsontario.com/competitions/cbr/scopes>
- Rubber Band Powered Creations -<http://www.instructables.com/id/Klutz-Rubber-Band-Powered-Contest-Winners/>

Coding – <http://code.org>

- Code Studio – <http://studio.code.org>
- Scratch – <http://scratch.mit.edu>

- Hopscotch – <http://www.gethopscotch.com>
- Tynker – <http://www.tynker.com>
- An overview of seven coding tools for students: includes [Scratch](#) and [hopscotch](http://www.edutopia.org/blog/7-apps-teaching-children-coding-anna-adam)
<http://www.edutopia.org/blog/7-apps-teaching-children-coding-anna-adam>
- Canada Learns Code – <http://canadalearnscoding.com>
- Code for Kids – <http://codeforkids.ca>
- Code Kids – <http://www.codekids.ca>
- Ladies Learning Code – <http://ladieslearningcode.com>
- Hour of Code – <http://hourofcode.com/ca>
- Science Fair/Youth Science
- <http://sf.youthscience.ca/national-school-programs>
- SMARTS connecting youth with a passion for science <http://smarts.youthscience.ca>

Producer

- Teacher blogs
 - Mrs Watson’s class blog – <http://mrswatson.ca>
 - Mrs. Black’s class blog – <http://blackdeer.edublogs.org>
 - Blogging in NWT – <http://blogginginnwteducation.wikispaces.com>
- Kidblog – safe blogging site for students <http://kidblog.org/home/>
- Student blogs – <http://comesomersaultwithsarah.blogspot.ca>

Graphic Novels/Comic Strips

- Bitstrips – <http://www.bitstripsforschools.com> based in Toronto, Ontario
- Learn Alberta: comic strip module – <http://www.learnalberta.ca/content/elci/>
- Pixton – <http://www.pixton.com/ca/> based in British Columbia
- Mannion, K. (2008) Literacy through graphic novels. The Curriculum Foundation
<http://www.curriculum.org/storage/258/1335553486/GraphicNovels.pdf>

- Baker, F. 2012). Media Literacy in the K-12 Classroom – pg. 69 Cartoon analysis worksheet – <http://www.iste.org/docs/excerpts/MEDLIT-excerpt.pdf>
- Cartooning with digital images in NWT <http://www.youtube.com/watch?v=nBko9OM6VbE>

Microblogging

- Twitter in a primary classroom – blog post Aug. 2013
<http://learningandsharingwithmsl.blogspot.ca/2013/08/using-twitter-in-primary-classroom.html>
- Canadian educators and organizations to follow on Twitter
<http://davidwees.com/content/canadian-educators-twitter>
- Ontario educators to follow on Twitter – <http://brianaspinall.com/?p=258>
- Using Tumblr – <http://coolcatteacher.blogspot.ca/2011/05/beginners-guide-to-tumblr.html>
- 10 ways to use Instagram in the Classroom – <http://www.edudemic.com/instagram-in-your-classroom/>

Teachers Using Twitter

- CEA lists Using twitter
 - <http://www.cea-ace.ca/education-canada/article/twitter-and-canadian-educators>
 - <http://www.cea-ace.ca/blog/max-cooke/2012/03/5/twitter-and-canadian-education---danger-and-benefits-developing-top-10-list>
- 10 twitter chats for teachers – <http://www.educatorstechnology.com/2014/06/10-twitter-chats-every-teacher-should.html>
- Elementary teacher twitter chat: #elemchat session on Saturdays at 5 p.m. EST See more at – http://www.educationworld.com/a_tech/using-twitter-for-professional-development.shtml
- Why and How Teachers are using Twitter – <http://www.edudemic.com/teachers-are-using-twitter/>

VLOG

- Video about vlogging – <http://www.youtube.com/watch?v=7iQdY1v9c98>

- Mrs. Wideen's blog – <http://www.mrswideen.com/2013/03/using-explain-everything-in-primary.html>

Podcasting

- Elementary Teachers Federation of Ontario – So You Want to Start up your own class podcast
<http://www.etfo.ca/Resources/ForTeachers/Documents/So%20You%20Want%20to%20Start%20Up%20Your%20Own%20Class%20Podcast.pdf>
- Learning in Hand – <http://learninginhand.com/podcasting/>
- CSC – Engaging Boys Video Series – Podcast Production: Mike Poluk
<http://www.curriculum.org/secretariat/engaging/production.shtml>
- CEA videos and podcasts – <http://www.cea-ace.ca/video>

Digital Storytelling

- Digital storyteller
 - Alberta – <http://www.nmc.ca/alberta-stories-bringing-digital-storytelling-to-albertas-classrooms/>
 - Toronto – <http://storycentre.wordpress.com>
 - Athabasca – <http://elab.athabascau.ca/workshop/digital-storytelling>
 - Concordia – <http://storytelling.concordia.ca/research-creation/academic-publications>
 - Ontario Teachers Federation – <http://www.otffeo.on.ca/en/learning/books-of-life/books-of-life-in-your-classroom/>
 - 2Learn.ca – <http://www.2learn.ca/ydp/dstandydp.aspx>
 - Northwest Territories – digital storytelling with powerpoint
<http://www.youtube.com/watch?v=CP4cqpDQ6h4>

Gaming

- Gaming is new literacy: Four roles of literate learners
<http://www.curriculum.org/LNS/thinking/files/EvolvingRoles.pdf>

- Games in the classroom e.g. mine craft
 - <http://www.gamingeducus.org>
 - <http://minecrafteu.com>
 - <http://liamodonnell.com/feedingchange/2012/10/27/minecraft-madness-and-play-at-ecoo-2012/>

Badging

- What are digital badges –
- HASTAC site – <http://www.hastac.org/digital-badges>
- What Counts as Learning – Open Digital Badges for New Opportunities
- Ebook – http://dmlhub.net/sites/default/files/WhatCountsAsLearning_Grant.pdf
- 7 Things You should know about badges – Educause
- <http://net.educause.edu/ir/library/pdf/eli7085.pdf>
- Digital Badge platforms – written by University of Southern California about digital badges in higher education
- <https://cst.usc.edu/files/2013/07/TechTeamBadgesfinal.pdf>
- Open Badge Factory – a badging platform for Canada
- <http://www.savvyfolio.net/user/don/obf>
- VTÉ – summary of introduction to open badges
 - <http://www.vteducation.org/en/articles/digital-badges/lab-session-summary-introduction-open-badges>
 - collaborative work space for LAB on open badges
 - <https://docs.google.com/document/d/17ihZnTcDIfkMg-tWeb1bWegwah8LE55ula7qnB5q5L8/edit#heading=h.5rl7l8nfc7e7>
- UBC – Currently in a pilot phase, three programs at UBC are investigating the application of digital badges to learning
 - <http://badges.open.ubc.ca>
 - <http://badges.open.ubc.ca/about/location/>
 - <http://badges.open.ubc.ca/about/open-badges/>

Augmenting Physical Spaces

- BC LearnNow – dpa tracker <http://www.learnnowbc.ca/services/DPALog/default.aspx>
- Connected Educators – <http://connectededucators.org>
- Kathy Shrock’s guide to Everything: QR codes in the classroom
<http://www.schrockguide.net/qr-codes-in-the-classroom.html>
- 40 interesting ways to use QR codes in the classroom
[http://aftech.pbworks.com/f/40_Interesting_Ways_to_Use_QR_Codes_in_the_Cla\(1\).pdf](http://aftech.pbworks.com/f/40_Interesting_Ways_to_Use_QR_Codes_in_the_Cla(1).pdf)
- Edutopia: QR codes in teaching – <http://www.edutopia.org/blog/QR-codes-teaching-andrew-miller>
- 50 QR code resources for the classroom – <http://www.zdnet.com/blog/igeneration/50-qr-code-resources-for-the-classroom/16093>
- QR codes in Education – livebinder resources <http://www.livebinders.com/play/play/51894>

Augmentative Reality

- Canadians applying augmented reality in the classroom
<http://www.techvibes.com/blog/canadians-leveraging-next-level-augmented-reality-to-spark-curiosity-in-the-classroom-2012-04-27>
- Augmented reality using Aurasma <http://theteachingpalette.com/2013/06/29/augmented-reality-using-aurasma/>
- Aurasma in education: YouTube channel
https://www.youtube.com/playlist?list=PLYk2ySKukLs6Fih_6xze0EYRyGJguDYCF
- Aurasma in education – <http://www.aurasma.com/category/education/>
- Bring Schools to live with Aurasma – step by step guide
<http://ipad4schools.org/2013/09/28/bring-schools-to-life-with-aurasma-app/>
- Google Glass – How Google glass can be used in education
<http://gettingsmart.com/2014/07/google-glass-can-used-education/>
- Teacher’s guide to google glass – <http://www.edudemic.com/guides/the-teachers-guide-to-google-glass/>

Resources and links from across Canada

Canadian Resources

- MediaSmarts – digital literacy fundamentals – <http://mediasmarts.ca/digital-media-literacy-fundamentals/digital-literacy-fundamentals>
- Council of Canadian Ministers – <http://www.cmec.ca/en/>
- Preparing for Live in a Digital Age: Results for Ontario and Newfoundland and Labrador (Nov. 20, 2014) http://www.cmec.ca/Publications/Lists/Publications/Attachments/340/ICILS2013_CdnReport_EN.pdf
- Preparing for Life in a Digital Age: The IEA International Computer and Information Literacy Study International Report (Nov. 20, 2014) http://www.iea.nl/icils_2013.html

Atlantic Canada Resources

- Foundation for the Atlantic Canada Technology Education Curriculum <http://www.gnb.ca/0000/publications/curric/techedfound.pdf>
- The Atlantic Canada Framework for Essential Graduation Learnings in Schools http://www.ednet.ns.ca/files/reports/essential_grad_learnings.pdf
- Newfoundland and Labrador Grade 8 Production Technology Curriculum Guide (2012), p. 16-19 http://www.ed.gov.nl.ca/edu/k12/curriculum/guides/teched/gr8production/g8_prodtech_full.pdf
- Nova Scotia. An Act to Amend Chapter 1 of the Acts 1995-1996, the Education Act, to Address Bullying by Promoting Respectful and Responsible Relationships http://nslegislature.ca/legc/bills/61st_4th/3rd_read/b030.htm
- Respectful and Responsible Relationships: There's No App for That! http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2123494
- Unlike Cyberbullying: Be a Responsible Digital Citizen <http://www.ednet.ns.ca/files/reports/Cyberbullying-March22.pdf>
- Technology in Education – support and resources site <http://www.edu.pe.ca/journeyon/#>

Quebec

- Quebec Education Program
<http://www1.mels.gouv.qc.ca/sections/programmeFormation/primaire/pdf/educprg2001/educprg2001.pdf>
- Quebec Education Program: Cross-Curricular Competencies
http://www1.mels.gouv.qc.ca/sections/programmeFormation/seconde2/medias/en/3_QEP_Chap03.pdf
- Quebec Learn website – links from this page to each of the 10 cross curricular competencies
<http://www.learnquebec.ca/en/content/curriculum/ccc/classroomC1/index.html>
- Quebec Education Program: Broad Areas of Learning – web page description of the five key areas
<http://www.learnquebec.ca/en/content/curriculum/bal/>
- Quebec Education Program: Broad Areas of Learning
<http://www1.mels.gouv.qc.ca/sections/programmeFormation/seconde1/pdf/chapter2.pdf>
- Strategy to prevent and stop violence and bullying in schools: Brief for Civics training sessions
<http://www1.mels.gouv.qc.ca/sections/programmeFormation/seconde1/pdf/chapter72.pdf>
- PHE Canada – listing elements of Quebec curriculum relevant to broad areas of learning
<http://www.phecanada.ca/advocacy/across-canada/quebec>
- The Lester B. Pearson School Board Digital Citizenship Program
<http://dcp.lbpsb.qc.ca/curriculum/>

Ontario

- Social Studies curriculum – The Ontario Curriculum: Social Studies, Grades 1 to 6; History and Geography, Grades 7 and 8
- Finding Common Ground: Character Development in Ontario Schools, K-12
<http://www.edu.gov.on.ca/eng/document/reports/literacy/booklet2008.pdf>
- Ontario Curriculum Documents – links to all curriculum documents, policy and resources –
<http://www.edu.gov.on.ca/eng/curriculum/>
- The Ontario Curriculum: English Grades 11 and 12
<http://www.edu.gov.on.ca/eng/curriculum/secondary/english1112currb.pdf>
- The Ontario Curriculum: Language Grades 1 – 8
<http://www.edu.gov.on.ca/eng/curriculum/elementary/language18currb.pdf>

- The Ontario Curriculum: Social Studies, Grades 1 to 6; History and Geography, Grades 7 and 8 <http://www.edu.gov.on.ca/eng/curriculum/elementary/sshg18curr2013.pdf>
- The Ontario Curriculum, Grades 9 and 10: English <http://www.edu.gov.on.ca/eng/curriculum/secondary/english910currb.pdf>
- Ontario Library Association web site with links to introductory video for Together For Learning and other shifts in pedagogy https://www.accessola.org/WEB/OLAWEB/OSLA/Together_for_Learning/Together_for_Learning.aspx?WebsiteKey=397368c8-7910-4dfe-807f-9eeb1068be31&hkey=844d0926-a451-4a8b-a004-413f8047cee5
- Together for Learning document in pdf http://www.accessola2.com/data/6/rec_docs/677_OLATogetherforLearning.pdf
- Ontario Skills Passport Framework <http://www.skills.edu.gov.on.ca/OSP2Web/EDU/DisplayEssentialSkills.xhtml>
- eWorkshop Online Resources for K-3 and Gr. 4-6 – repository of Guides to Effective Instruction, teaching resources for numeracy and literacy, relevant materials for healthy schools initiatives; includes new modules on active learning, literature circles and focus on technology – <http://eworkshop.on.ca/edu/core.cfm>

Manitoba

- A Continuum Model for Literacy with ICT Across the Curriculum <http://www.edu.gov.mb.ca/k12/tech/lict/resources/handbook/lict.pdf>
- Literacy with ICT Across the Curriculum: A Model for 21st Century Learning from K-12. Overview <http://www.edu.gov.mb.ca/k12/tech/lict/overview/index.html>
- Literacy with ICT Across the Curriculum: A Model for 21st Century Learning from K-12. Overview. Cognitive Domain: Student Friendly Version http://www.edu.gov.mb.ca/k12/tech/lict/teachers/show_me/student_friendly.html
- Nets for Students 2007 <http://www.iste.org/standards/standards-for-students/nets-student-standards-2007>
- Literacy with ICT – Delicious social bookmarking list for Digital Citizenship <https://delicious.com/lwict>

Saskatchewan

- Saskatchewan Ministry of Education. Technology in Education Framework: Teaching and Learning, Administrative Operations, Provincial Infrastructure
<http://www.education.gov.sk.ca/TEF/english>
- Understanding the Common Essential Learnings: A Handbook for Teachers
<http://www.education.gov.sk.ca/Understanding-CEL>
- Outcome Chart – Cross Curricular Competencies K-12
<http://mediasmarts.ca/curricularoutcomechart/outcome-chart-saskatchewan-cross-curricular-comptencies-k-12>

Alberta

- Bring your own device: a guide for schools
<http://education.alberta.ca/media/6749210/byod%20guide%20revised%202012-09-05.pdf>
- Digital Citizenship Policy Development Guide
<http://education.alberta.ca/media/6735100/digital%20citizenship%20policy%20development%20guide.pdf>
- Framework for Student Learning: Competencies for Engaged Thinkers and Ethical Citizens with an Entrepreneurial Spirit <http://education.alberta.ca/media/6581166/framework.pdf>
- Information and Communication Technology (ICT) Curriculum
<https://education.alberta.ca/information-communication-technology/>

British Columbia

- British Columbia Ministry of Education. (n.d.). Digital Literacy
https://www.bced.gov.bc.ca/dist_learning/digital-literacy.htm
- BC Ministry of Education. Digital Literacy competencies
http://www.bced.gov.bc.ca/dist_learning/digital-literacy-competencies.htm
- Defining Cross-Curricular Competencies: Transforming Curriculum and Assessment (Draft)
http://www.bced.gov.bc.ca/irp/docs/def_xcurr_comps.pdf
- English Language Arts: 8-12
http://www.bced.gov.bc.ca/irp/pdfs/english_language_arts/2007ela_812.pdf
- BC's Digital Literacy Framework (Draft)
https://www.bced.gov.bc.ca/dist_learning/docs/digital-literacy-framework-v3.pdf

- BC's Digital Literacy Characteristics
http://www.bced.gov.bc.ca/dist_learning/digital-literacy-characteristics.htm

Yukon

- YesNet – <http://www.yesnet.yk.ca/staffroom/techtools.html>
- Digital Literacy resource page <http://internetsafetyresources.weebly.com/digital-literacy.html>
- Department of Education Strategic Plan 2011-2019: Our Commitment to New Horizons
http://www.education.gov.yk.ca/about/strategic_plan.html
- English Language Arts 8 to 12 http://www.bced.gov.bc.ca/irp/pdfs/english_language_arts/2007ela_812.pdf
- Digital Literacy Resources <http://internetsafetyresources.weebly.com/digital-literacy.html>

Northwest Territories

- Learning with Information and Communication Technologies (LwICT) –web page with links to other references and resources <http://www.ece.gov.nt.ca/early-childhood-and-school-services/school-services/curriculum-k-12/literacy-information-and>
- Literacy with Information and Communications Technology document
<http://www.ece.gov.nt.ca/files/Early-Childhood/LwICT%20INFUSION%20GUIDE%20-%202012.pdf>
- Poster for Literacy with ICT across the curriculum – developmental continuum
<http://www.ece.gov.nt.ca/files/Early-Childhood/LwICT%20CONTINUUM-%20POSTER.pdf>
- Teacher created lesson plans that support ICT integration <http://www.ece.gov.nt.ca/early-childhood-and-school-services/school-services/curriculum-k-12/nwt-teacher-created-ict>