AlphaPlus

Digital Opportunities and Barriers for Ontario's Vulnerable Adults

A research synthesis project examining the digital divide and the policies, programs and practices that could make a difference

Christine Pinsent-Johnson

Matthias Sturm

Digital Opportunities and Barriers for Ontario's Vulnerable Adults

Published by AlphaPlus, Toronto, Ontario, March 2017. Download at www.alphaplus.ca

This research was supported by the Government of Ontario through the Ontario Human Capital Research and Innovation Fund. For more information on the initiative, visit http://www.tcu.gov.on.ca/eng/eopg/programs/ohcrif.html

PREFACE

AlphaPlus supports digital literacy development for Ontario's vulnerable adults participating in Literacy and Basic Skills (LBS) programs. With an explicit mandate to provide supports to individual programs, AlphaPlus is deeply involved in supporting organizational and professional development through research; the promotion of meaningful and engaging learning activities for adult learners; and professional development using webinars, on-site coaching and workshops.

Through digital inclusion and literacy strategies focusing on the use of web-based technology and digital tools, AlphaPlus helps LBS service providers to impact client outcomes, improve business practices and strengthen program delivery. The approach is designed to meet individual organizational needs, identify new and existing resources, increase organizational and instructor confidence, and enhance the learner experience. The organization's reach is wide as it is actively involved in disseminating and promoting research efforts via a comprehensive and internationally recognized website in English and French; newsletters with 2,000 subscribers across Canada; engagement with the networks of literacy streams and sector groups in Ontario; and participation in provincial, national and international events and conferences.

A key background aspect of this project was the development of the state-of-the-field AlphaPlus report *Finding Our Way* (Moriarty, 2011), which surmised there was little research or research capacity dedicated to issues related to the use of digital technology and literacy development among Ontario's vulnerable adults. Since the publication of the report, the situation has worsened as previously available provincial and federal funding mechanisms have disappeared.

Another key background aspect was a series of research grants by AlphaPlus in 2012 that enabled researchers across Canada to investigate issues with respect to digital literacy in community-based settings. Some of this research provided a starting point in our investigative efforts into digital opportunities and equal access for vulnerable populations in Ontario, Canada, and beyond. With our findings in this report, we hope to contribute to shaping a digital literacy strategy in Ontario.

About the Authors

Christine Pinsent-Johnson is an independent adult education and literacy researcher and the primary author of this review. She has co-ordinated and participated in many research projects directly related to adult learning and literacy development, including her MA and PhD studies at the University of Ottawa. She has completed projects with

funding from the Ontario Ministry of Advanced Education and Skills Development (formerly Ministry of Training, Colleges and Universities); the Ontario Ministry of Education; the Ontario Ministry of Citizenship, Immigration and International Trade; and Employment and Social Development Canada. Christine is also a lecturer at Queen's University and the University of New Brunswick.

Matthias Sturm is the Senior e-Learning and Research Consultant at AlphaPlus and co-ordinated and collaborated on this review. He has led and participated in research projects for more than ten years and has been responsible and involved in every project stage, including project management, research methodology design, quantitative and qualitative data collection, data analysis and evaluation, report writing, supervision of copy-editing and translation, and presenting project outcomes. Matthias oversaw a series of research grants in 2012 that enabled research collaboration projects between academic institutions and community-based organizations to build a body of research in a field that has been underfunded for research-specific activities.

Special Thanks

Maria Moriarty is the Information Resources Officer at AlphaPlus and contributed to this review as a highly experienced librarian and literature searcher. She has worked at AlphaPlus for more than 20 years maintaining print and online library resources and keeping Ontario adult literacy instructors informed and engaged in the use of digital technology for instruction and professional development. Her 2011 international literature scan on digital access in adult literacy laid the foundation for the AlphaPlus research.

Suzanne Smythe is an Assistant Professor at Simon Fraser University with research interests in adult literacy education policy, digital inclusion and professional learning for educators. She is also a research associate at the Canadian Centre for Policy Alternatives (policyalternatives.ca) and blogs about adult learning policy (adultlearningmatters.wordpress.com). She offered guidance and support at key stages during the project. Her recent research projects (Adult Literacy and Digital Inequalities, and Digital Learning Community Engagement Project) resulted in several articles and papers referenced in this report, including two of the four case studies.

EXECUTIVE SUMMARY

Ontario's Digital Transformation

Ontario is transforming the way it interacts with the public and provides services, moving many routine interactions and transactions online (Government of Ontario, 2017). Part of this effort will include "opportunities for people to advance or gain new digital skills, especially those most in need" (n.p.). Because of a digital literacy strategy that is currently under development in Ontario, this research project is an ideal opportunity to fully explore what it means to be "an inclusive, digitally enabled province" (n.p.) and to look at promising policies, programs and practices that aim to create an environment of digital inclusion in other jurisdictions.

This synthesis review examines the findings of a jurisdictional search to better understand more comprehensive digital literacy learning and inclusion opportunities for current and future users of e-government services. A digital divide does persist in Ontario and Canada. Simply affording an Internet connection remains an issue for many low-income Ontarians. In addition, once people are online, differences in their education level, literacy and online problem-solving; and access to digital learning supports contribute to a divide. Ontario's digitally vulnerable adults are those who already experience social and economic inequality. Inequalities relate to age, income, education, living in rural and remote communities, and immigration (Haight, Quan-Haase, & Corbett, 2014). The review's findings will help the government better understand the depth of the digital divide, the relationship between Ontarians who are not participating in a digital society and broader socio-economic circumstances, in addition to currently available supports and initiatives at the federal, provincial and municipal levels. Overall, we found an absence of federal initiatives to support vulnerable Ontarians, while current provincial initiatives lack co-ordination, sustainability and scalability. However, there are promising pockets of innovation in Ontario and elsewhere from which to learn.

Exploring the Depth of the Digital Divide

The following elements of a digital divide are considered and used to organize the research synthesis: connectivity and affordability, variations in use and types of online activities, access to support and learning opportunities, and opportunities to leverage online engagement.

People may have Internet connectivity in theory, but is it slow, sporadic or simply unaffordable? Older Canadians, low-income

Canadians and those who live in rural and remote areas have lower rates of connectivity (Canadian Internet Registration Authority [CIRA], 2014; Statistics Canada, 2012). Cost is a barrier but so is relevance and trust (Ipsos, 2015). Some may sacrifice basic needs to pay for a monthly plan (ACORN Canada, 2016). In British Columbia, low-income and social assistance recipients who rely on cheaper pay-as-you-go plans have encountered barriers when attempting to access vital social support services (British Columbia Public Interest Advocacy Centre, n.d.).

Consistent connectivity may be obtained, but are there variations in use and types of online activities? While Canadians spend more time on the Internet than others around the world, most time is spent on social media, gaming, messaging and using video phone services (CIRA, 2014). Those who are highly engaged in a variety of activities — including information-gathering, keeping up with current events or making travel plans — are younger (under 54), better educated, employed and live in cities; whereas those with less intense and low levels of engagement are older, typically retired, live outside of urban areas and have lower household incomes (Ipsos, 2016). Very few Canadians are interacting with a health-care professional online, visiting government websites or applying for a job online, except the very highly engaged user (Ipsos, 2016). In addition, Canada has a greater literacy skills gap compared with other Organization for Economic Co-operation and Development (OECD) countries, with more Canadians at the highest and lowest tested levels (Statistics Canada, 2013b). Income and education level are directly related to literacy proficiency (both digital literacy and print literacy). Those adults with lower incomes and less than a high school education are overrepresented in lower literacy skill categories and under-represented in higher skill levels (Heisz, Notten, & Situ, 2016). Dutch researchers (Van Deursen & Van Dijk, 2014) found that those with higher levels of education and what they call social status use the Internet in "more beneficial ways," even though Dutch citizens with lower levels of education and disabilities spent more time online. This is likely similar for Canadians.

> **Although inequalities within society have always existed, the internet created an even stronger division; the higher status members increasingly gain access to more information than the lower status members. The internet is not only an active reproducer of social inequality, but also a potential accelerator (p. 521).**

Do individuals have access to meaningful, informed and supported online engagement and learning opportunities, providing the user with choice, control and security? One's access to formal learning, training programs and networks of informal support are limited if they aren't in school, are unemployed, live in isolation or work in a low-skilled job with few training opportunities.

The greatest sponsors of training for adults are employers. From 2002 to 2008, the rate of employment-related training increased 30 per cent for all adult age groups, including those who are 45 to 64 (Knighton, Hujelah, Iacampo, & Werkneh, 2009). However, not everyone receives employer sponsorship. Those who are university-educated are five times more likely to participate in further education and training compared with those who have a high school education or less (Myers & de Broucker, 2006), even though adults with lower levels of education have the same interest in learning as those with higher levels of education (Smith, Rose, Ross-Gordon, & Smith, 2015). When adults with less than a secondary or post-secondary credential seek out educational and training opportunities, they are too often relegated into remedial programs focused on basic skill development rather than more comprehensive, intellectually challenging and meaningful learning (Myers & de Broucker, 2006).

Do individuals have opportunities to leverage online engagement for production activities and full participation in society? Digital skills pay off for some but not all. Higher skills are related to earnings, and people's skills are valued once they are employed, but the skills on their own won't help all get employed (Reder, 2015). Sustained engagement in the labour market and digital engagement at home support the development of literacy proficiency and higher skill development over time, but the relationship between higher proficiency and employment is weak (Bynner, Reder, Parsons, & Strawn, 2010). Limited opportunities at work may hamper the impacts of one's readiness to learn. It is likely that many workers and their skills are undervalued and underutilized at work (Smith et al., 2015). In relation to health, only the most highly educated accrued health advantages from stronger digital problem-solving skills (Prins, Monnat, Clymer, & Toso, 2015). Very importantly, in societies that value social cohesion and the inclusion of all citizens, digital proficiency level is related to social trust. The greater the digital skill proficiency level, the more social trust was noted (Reder, 2015).

What policies, programs and practices are in place to address all aspects of a digital divide and inequities — that is, connectivity and affordability, variations in online activity and Internet use,

access to support and learning opportunities, and leveraging opportunities?

Absence of Federal Initiatives

Federal policy and program support — including sustained funding that addresses connectivity and affordability, variations in online use, opportunities for collaborative and supported learning, and the potential to leverage online engagement programs — is nearly non-existent.

Although issues related to affordability and the development of digital literacy are mentioned in the government's policy vision *Digital Canada 150*, they are not specifically addressed. Average monthly communications expenses range from $100 to over $200 or around 8 per cent of monthly incomes; affordable services are those that do not require sacrificing basic needs, constituting only 4 per cent to 6 per cent of a household's monthly income (Public Interest Advocacy Centre, 2015). Addressing the issue of affordability are corporate initiatives from Telus and Rogers, but the projects are limited in scope (for example, CBC News, April 2016). Although the CRTC recently announced that broadband is an essential service, affordability was not addressed (Geist, December 2016).

The federal government did have a stronger role in the past through the Community Access Programs (CAP) and funding for adult literacy, but it has or is in the midst of gradually and quietly withdrawing all support and opportunities for vulnerable adults (Blanton, 2014; Hayes, 2013), including access to employment training for the unemployed or with low levels of education (Hayes, November 2016b). According to an international comparative review, "the field of adult literacy has languished and has been unable to contribute to Canadian society as it should" (National Adult Literacy Agency [NALA], 2011, p. 24). Federal support for all forms of adult literacy learning has nearly disappeared, forcing the closure of numerous organizations involved in professional development, research, advocacy and library services (Smythe, 2015).

Calls for change have come from researchers working in the fields of sociology, library and information sciences, and adult education (see Bradley, 2013; Colledge & Haight, 2016; Canadian Literacy and Learning Network [CLLN], 2014). Informed, meaningful and equitable online engagement are fundamental issues of citizenship, democratic participation and belonging in Canadian society. They are a matter of systemic inequality that if not addressed will perpetuate themselves despite statistically close to universal access to the Internet.

Provincial Initiatives Lack Co-Ordination, Sustainability and Scalability

The support for digital access and learning initiatives at the provincial level is different from the national picture. Various opportunities and points of access do exist, but challenges related to underfunding, overregulated eligibility and reporting criteria, curriculum focused on remediation and disjointed basic skill development, and limited access to learning and teaching resources and expertise impede the potential of programs. Until this point, Ontario has been without a comprehensive digital access and learning opportunities policy to support vulnerable adults.

Issues of connectivity and affordability are taken up regionally with the support of corporations, non-profit organizations and municipal governments. Such a regional approach is piecemeal and sporadic, with pockets of innovative connection and affordability strategies, including library-sponsored Wi-Fi and laptop lending programs, and an innovative Chromebook laptop lending program set up by an adult literacy program. Without overall co-ordination, however, there is no equitable access and distribution of supports.

Ontario has a comprehensive adult learning system involving three different ministries. In addition, Ontario's public libraries are some of the key players in providing digital access and learning support. Up to 400,000 adults, many of whom are considered vulnerable, access government-funded learning opportunities, including workshops in libraries, adult language and literacy development courses, and adult secondary credit courses. Although the potential reach of government-funded programs could make an impact, the efforts to support digital literacy development are currently not co-ordinated in any way.

Although public libraries saw over 200,000 participants in various workshops and learning sessions last year, and provided access to 11,500 public computer workstations and hundreds of online resources (Ministry of Tourism, Culture and Sport [MTCS], 2016), not all Ontarians have seamless and equitable access due to local community resources and finances (Federation of Ontario Public Libraries, 2015). In addition, the current overreliance on "one-shot" instructional sessions in libraries for children, youth and adults hinders the ability to provide sustained and meaningful learning opportunities (Bradley, 2013).

Close to 60,000 adults participate in Ontario's English and French as a Second Language Programs in 40 school boards (Ministry of Citizenship and Immigration [MCI], 2016). However, programs have inadequate and inequitable access to e-learning infrastructure, including outdated

computer equipment, poor Internet connections, firewalls and insufficient electrical outlets, as well as limited tech support (Lawrence, Haque, King, & Rajabi, 2014). In addition, there is a need for professional training and ongoing support for instructors to support e-learning.

About 80,000 adult students (age 18 and over) enrolled in secondary credit courses in 61 school boards across the province in 2016 (Ministry of Education, 2016). Due to funding limitations for those over the age of 21, programs often rely on pre-packaged curriculum units developed and sold by the Independent Learning Centre (ILC), a non-profit government agency, rather than teacher-taught and -developed courses (Deloitte, 2010). Currently, three technology-related courses are offered through ILC, but none directly addresses broader digital literacy and information literacy development. In general, students most in need of meaningful and relevant digital literacy practices in high school, after failing the mandatory Grade 10 literacy test, encounter curriculum that is overly focused on remediation and irrelevant to their lives, concerns and interests (Jackson, 2013).

Ontario offers a literacy development program to 42,000 adult learners in communities across the province. While its fundamental structure — with a variety of programs and services offered in community centres, school boards and colleges, including online learning and specialized supports for Franco-Ontarians, Deaf and hard-of-hearing adults, and Indigenous learners — seems ideally designed to reach vulnerable adult learners, several policy and program design features prevent programs from offering a wide range of digital literacy development courses and supports. As LBS is situated within Employment Ontario, a provincial program designed to support employment, being an older learner or not having an employment or post-secondary education (PSE) goal means that programs could be reluctant to work with those adults.

While the current provincial curriculum does integrate notions of applied use in the context of learners' lives (rather than learning isolated basic skills and functions), it is very limited in the way it describes the development of comprehensive and collaborative digital literacy and does not provide an integrated description of digital and print-based literacy development (Pinsent-Johnson & Sturm, 2015).

Programs, whether in libraries, community centres or schools, often rely on pre-packaged online videos and accompanying worksheets with time, funding and professional development constraints (AlphaPlus, 2012). In these pre-packaged learning systems, individual interests and desires, such as connecting with grandchildren on Facebook, learning to use online banking or researching health information, are reformulated into unrecognizable basic skills units (for example, saving and accessing files,

using a mouse or inserting graphics into a word-processing file). Smythe (2013) argues that

> **A robust conceptual framework for incorporating digital technologies in adult literacy education should address not only the issue of how to incorporate technologies, but also how to transform current policy and funding regimes characterized by an emphasis on accountability over instruction, a narrow framing of digital literacy as "computer skills,", and uneven access to digital technologies and other learning resources across jurisdictions and institutions (p. 567).**

One example of such a framework was developed by Bach, Shaffer and Wolfson (2013). Their digital human capital framework addresses four outcomes to support socio-economic equality and digital inclusion: civic engagement, influence on policy, social change and economic advancement.

We identified several innovative and exciting provincial initiatives. However, while they do provide value, they are likely unsustainable without broader policy support and can't be scaled up so they are available more widely without a more co-ordinated policy and accompanying supports.

What promising policies, programs and practices could be used to support a more comprehensive and inclusive approach to digital literacy development for vulnerable Ontarians?

Promising Practices Elsewhere

Germany's broadcast licensing fee addresses **affordability and connectivity** using a flat-rate fee structure for each household covering all forms of telecommunications (i.e. radio, TV, phone, Internet). It includes reduced rates for those receiving any form of social assistance.

An example of an innovative online learning initiative that encourages engagement and learning to address **variations in online use** is Citizen Maths, developed by Catherdale College (2017) in the U.K. While the topic may be of limited interest, it is the design, usability and self-directed approach that are promising.

A promising example of **supported learning** and professional development for educators, mentors and peers is Digital Promise (2016), a U.S.-based non-profit organization that activates digital learning

innovation to guide the development of collaborative, relevant and rich learning experiences. The organization supports educators (whether in a school system, in a language or literacy program or working in a library), designers and entrepreneurs.

Examples of promising **leveraging opportunities** were found in the U.S. and Europe.

Educator Innovator (2016), based in the U.S., is an online meetup for educators who are re-imagining learning to ensure broadened access that is socially embedded, interest-driven and oriented toward educational, economic or political opportunity — what they call connected learning. A key activity is their annual Connected Learning Massive Open Online Course.

The Learner Web facilitates adults' long-term efforts to gain a recognized secondary education credential and access PSE. Unlike pre-packaged online resources, learners and programs are able to assemble activities and modules to meet their needs. Learners use individualized learning plans and e-portfolios to track their work and accomplishments. The model supports a key finding from previous research (see Reder, 2009 and 2012) that demonstrates how adults move in and out of programs as they gradually move toward meeting an education goal and acquiring a credential.

In addition to gaining a recognized credential, adults may also want to demonstrate their digital knowledge and expertise. One example of a recognition framework is the European Union's *Digital Competence Framework*, or DigComp 2.0. The framework identifies the key components of digital competence in five areas: (1) information and data literacy, (2) communication and collaboration, (3) digital content creation, (4) safety and (5) problem-solving.

An essential aspect of leveraging is the involvement of other organizations beyond the charitable, adult education and library sectors. Scotland's One Digital project is an innovative example of a far-reaching leveraging initiative. Over 1,000 staff and volunteers from the social service sector participated in a series of digital inclusion and participation workshops in order to support access and learning opportunities for the vulnerable adults with whom they work.

What is the role of governments and public institutions to ensure digital equity and digital inclusion? What are the aspects of current and future policies, programs and practices that could make a difference and support the transition to e-government services?

Digital Equity Strategies

Pulling this all together will require a digital equity strategy. A promising example is from the City of Portland (2016), which recently adopted a comprehensive *Digital Equity Action Plan* (DEAP). The plan articulates five digital equity goals: (1) access, (2) training and support, (3) leadership and capacity-building, (4) connectivity to the digital economy and (5) the development of a policy framework. The plan was informed in part by a framework developed by the Institute of Museum and Library Services (IMLS) (2012), which encourages multi-stakeholder engagement so that "all people, businesses, and institutions have access to digital content and technologies that enable them to create and support healthy, prosperous, and cohesive 21st century communities."

Digital equity initiatives in other jurisdictions have stalled when efforts aren't comprehensive and lack direct involvement of government and multiple community stakeholders. A review of Scotland's strategy calls for an increased role for "trusted intermediaries" such as voluntary workers, community development workers, health professionals, librarians, social workers and housing officers. The review also calls for an effort to better identify different "hooks" to engage diverse groups of citizens and a branding effort so that all initiatives are recognizable (White, 2013).

Williams (2014), who critiqued New Zealand's strategy, argues that efforts to address a digital skill and engagement divide cannot fall to the education and charitable sectors alone. A digital equity strategy works on the basis of multiple community collaboration and partnerships. If adults have no leveraging opportunities, pathways and broader social and economic outlets for their newly acquired skills, then the efforts will falter.

Digital literacy programs focused only on individual skill development without being connected to more comprehensive social, cultural, community and economic development initiatives cannot address digital inequities (Bach et al., 2013).

Conclusion and Recommendations

The following recommendations were developed based on the findings in this report. Please refer to the Conclusions and Recommendations section on page 66 for a more detailed discussion.

Recommendation 1 – Support alternative access opportunities at publicly accessible points, especially in communities with a high rate of intermittent access.

Recommendation 2 – Scale up innovative connectivity and laptop conversion initiatives.

Recommendation 3 – Develop learning opportunities and activities that connect to people's passions, interests and concerns.

Recommendation 4 – Investigate expressions of interest in online use to better support digital inclusion projects and programs.

Recommendation 5 – Develop a sustained online portal focused on supporting digital inclusion projects and programs.

Recommendation 6 – Develop a digital literacy and inclusion strategy with stakeholder input on its implementation.

Recommendation 7 – Reconceptualize traditional learning and teaching approaches and policy structures to upend the skills to application ascendancy.

Recommendation 8 – Measure outcomes according to the pursuit of passions, interests and concerns, not the achievement of particular digital and literacy skills.

Recommendation 9 – Develop a research hub to curate and disseminate research to educators, librarians and community support workers. Conduct research, including participatory projects.

INTRODUCTION

Ontario is transforming the way it interacts with the public and provides services, moving many routine interactions and transactions online (Government of Ontario, 2017). This is not simply a website redevelopment project. The Digital Government initiative aims to transform people's "online experience" and "the most important government services" by redesigning and reconfiguring the way citizens interact with government, including, for example, online mechanisms to contribute to budget deliberations and to provide input on issues. Importantly, in the context of this review is an effort aimed at creating "opportunities for people to advance or gain new digital skills, especially those most in need" (n.p.). Currently under development is a digital literacy strategy in consultation with the Ministry of Advanced Education and Skills Development (MAESD) (Government of Ontario, September 2016). This research project is an ideal opportunity to fully explore what it means to be "an inclusive, digitally enabled province" (n.p.) and promising policies, programs and practices that ensure people can gain new skills and put them to use in all areas of their lives.

E-government efficiency is an opportunity for individual efficiency, engagement and ease of access, but it also means the individual must take on additional responsibility and effort, potentially bypassing support and guidance from government employees in community service centres. This places increased pressure on people's digital and print literacy abilities in order to access government services. Many Ontarians will quickly adapt, and others will draw on networks of support to help them navigate and access services online. Others, however, will encounter challenges related to connectivity and affordability of an Internet connection; experience with and trust in making online transactions (often involving personal information); finding support to troubleshoot problems and ask questions; and being able to fully participate in democratic decision-making. The differences between those Ontarians who will comfortably and readily move through each challenge and those who will falter constitute a digital divide, one that goes much deeper than having an Internet connection. Imposing comprehensive digital government changes without addressing existing digital inequalities may in fact directly contribute to widening a digital divide (Van Deursen & Van Dijk, 2009).

According to international testing results from the Program for the International Assessment of Adult Competencies (PIAAC), it is possible that nearly one-third (31 per cent) of Ontarians[1] may face challenges when in an online environment involving multistep navigation, form-filling and

[1] During testing, these adults either opted out of taking the international test online or scored at the lowest level, indicating they may have had a challenge with the technology and/or faced challenges when reading the text.

finding discrete pieces of information (Statistics Canada, 2013b). An Ontario-based digital literacy researcher writes the following:

> **Given that systems of public education in Ontario … and other adult educational institutions, employers, and municipal, provincial, and federal government agencies have made the move to putting services online, adults' limited capacities to understand and navigate the technological/digitized terrain are worrisome (Greig & Hughes, 2012, p. 16).**

Ontario's digitally vulnerable[2] adults are those who *already* experience social and economic inequality. Such inequalities relate to age, income, education, living in rural and remote communities, and immigration (Haight et al., 2014). Compounding these factors are inequalities of online activity and access to a full range of societal supports and opportunities related to health care, politics, economic activity and social capital (Robinson et al., 2015). Rapidly expanding and ever more entrenched digitally driven processes and practices at work, at home and in the community exacerbate existing social and economic inequalities (White, 2016). Economically, educationally and socially vulnerable adults are stuck in a double bind. This is a particularly pressing issue, considering Internet access and digital literacy have become a basic requirement of social, economic and educational participation as institutions, employers and agencies use exclusively online points of access, services and communication. Governments have a role in subsidizing rapidly changing and expanding demands on people's literacy (Brandt, 2001), particularly when governments themselves accelerate and expand that demand. Ontario's recently announced plan to address digital inequities is overdue and lags behind the efforts of other jurisdictions. However, their efforts can inform the development of a comprehensive digital literacy strategy for the province.

[2] The term digitally vulnerable is used here to describe those adults who do not have an Internet connection and/or who are not engaged in a variety of online activities, who are not accessing networks of learning support and who are not able to leverage their online engagement.

Review Methods

This report represents the findings of a comprehensive synthesis of the current literature, policies and programs that address digital access and digital learning for economically, educationally and socially vulnerable adults in order to propose specific recommendations for the Ontario context. The work was guided by the following questions:

1. What are the co-ordinating policies, program approaches and personal circumstances that impede digital access and learning opportunities for Ontario's vulnerable adults?
2. What are the co-ordinating policies, program approaches and personal circumstances that extend and encourage access to digital learning opportunities?
3. What are some key principles that could be used when considering the modification or enhancement of current policies and program approaches to ensure all Ontarians have equitable digital access and learning opportunities?

We conducted a systematic review (Gough & Thomas, 2016) that included peer-reviewed literature found using academic databases and reports, position papers and commentaries produced by organizations and individuals, resulting in a synthesized response to the research questions. Further details of the search are in Appendix 1.

This current work builds on a previous review completed by AlphaPlus that examined the way adult learning programs and educators can increase capacity to support digital literacy learning[3] and inclusion opportunities for adults who are not using technology in a sustained manner at work, in their homes and communities or in a formal education program (Moriarty, 2011). That review concluded there is a scarcity of research directly related to adults with lower levels of education using and developing digital literacy, combined with a lack of policy at both the federal and provincial levels that directly addresses digital literacy development. Overall, there has been a "shallow adoption rather than deep integration" of digital learning in provincially funded adult literacy programs.

> **If the adult literacy sector settles for shallow adoption rather than deep integration, many of the opportunities that digital technologies and e-learning offer may be missed. Educators and students may be denied the opportunity to fully engage with technology on their own terms (p. 36).**

This review will expand the scope of the programs examined previously to include all provincially funded points of technology access and engagement, namely libraries, adult literacy and language development programs, and adult secondary credit programs.

We are alert to program experiences and the way that existing adult learning programs are and are not supported to provide relevant, meaningful and sustained digital learning opportunities. More importantly,

[3] We use the term digital literacy in a comprehensive way that includes notions of belonging, identity, inclusion and opportunity. Literacy, digital or otherwise, is not simply learning to read and write in order to facilitate other learning and social opportunities. It is an ongoing and never-ending process of text-based consumption, production and learning. As technology and other social situations introduce novel demands and new forms of text-based communication in our lives, we all become literacy learners. However, access to learning supports, opportunities for sustained engagement and leveraging are inequitably distributed.

we also recognize how an individual can be caught up in a complex web of policies and regulations that shape access and learning opportunities. Federal, provincial and municipal policies and regulations overlap in the digital access and learning settings in which an adult could participate (Smythe & Breshears, 2017). Issues related to access and support could be conceptualized and enacted differently by each level of government, coming together in unanticipated, perplexing and often frustrating ways for the individual user. We have also included four case studies to illustrate the depth of a digital divide and provide insights into the role of adult education and learning supports. The case studies help to better attune our understandings, particularly when examining policy that tends to envision an idealized Internet user.

CASE STUDY 1: COMPLICATING THE MEANING OF ACCESS

Suzanne met Malek when he was a student in the English as a Second Language (ESL) class that met just before the Digital Café on Wednesday afternoons. Jan, a volunteer tutor in the ESL class, discovered that Malek is an artist and eagerly suggested he google the name of an upcoming art festival that she thought he would enjoy. Jan was always looking for authentic contexts for her students to use their English language skills. But Malek hesitated and then laughed her off. “No, no computer!” He waved politely and left.

Isha, a community outreach worker who also taught the ESL class, arrived to find Jan and Suzanne standing in the middle room. “Does Malek not like to use computers?” Suzanne asked.

“Malek would probably like to use computers,” Isha replied, “but I don’t think he has ever tried. I know he has no computer at home because I have been helping him fill in a bunch of government forms.”

Malek, a well-known artist in his home country, came to Canada 12 years earlier with the intention to work as an art teacher in a college. Things did not go as planned; he could not learn English quickly enough to work with students, so he turned to employment in building maintenance until an accident made it impossible to continue. When life changes suddenly, people need to learn new literacies quickly; in Malek’s case, this included finding information about disability benefits, negotiating online government forms, and researching other resources he might need, such as affordable housing. Such information is scarcely available anymore in print in the community. When Malek went to government offices, he was redirected online, even though the case workers were well aware that he could not at the time afford an internet connection or computer at home.

With Isha’s encouragement, Malek began to attend the Digital Café. The first few sessions were rough. One of the first tasks for new computer users is to get an email account. This is difficult for people who are not yet proficient with keyboards, because the three-step verification processes designed by email platforms require accurate encoding of a password, a secondary email, and/or a cell phone number to which is sent a verification code. Malek, like many other Digital Café participants, had no secondary email or cell phone, and working around this was a source of considerable frustration.

Malek was the first to arrive at the Digital Café each week so that he could claim the same familiar computer in the corner of the room. Indeed, after a few weeks of side-by-side coaching from tutors and painstaking trial and error, he came to recognize the blue icon from which to launch the internet browser and was able to key in the name of his email provider, find the username and password fields, and, referring to his notebook, enter his password carefully but accurately. His new proficiency was expressed in the flow of his hands across the laptop, his frown of concentration (rather than the look of despair of earlier times) as his hands and eyes moved together with the keys. “Ha ha!” Malek exclaimed with a smile of

satisfaction the first time he entered his email username and password in the fields correctly and landed in his email inbox.

Malek began to email his children and friends in his home country, and they directed him to Facebook. This changed everything. Although Malek was able to make voice calls to his adult children in his home country from time to time on a landline, he had sporadic contact with other friends, family, and his grandchildren. With a Facebook account, his children began posting photos of his grandchildren, he kept up with politics and happenings, and he posted short messages to his friends. It got to the point where he was complaining that when he opened his email, there were too many Facebook message links for him to read. But Malek was thrilled. He still did not have a computer of his own and he did not feel confident to go to the library to use their computers for extra practice and online time. What if he got stuck? He worried his English wasn't good enough to ask for help and maybe the librarians would be busy.

In January 2015, almost a year after his first computer class, Malek arrived at the Digital Café with a laptop computer. It was enormous, heavy, a model that the younger tutors said they had never seen before. But a friend had lent it to him and at least it worked. He had recently qualified for disability benefits, and with this modest increase in income he decided to get a home internet connection and forego his TV cable to cover the cost. He had a "new subscriber" internet rate he could barely afford and a working laptop. Malek was digitally connected! At the Digital Café, Malek continued to learn how to search on the internet so he could watch soccer and the news, and he practised this at home following instructions from the tutor that he wrote down for himself in his notebook in English with annotations or added notes in his first language. He joined an online typing tutor program to increase his typing fluency, though only did this at the Café as he had difficulty launching the program and saving his work when he was alone at home. When it came to communicating with government and filling in government forms, Malek still needed help from tutors, who often spent long hours with him, and other learners at the Café, working through the complex instructions and protocols. Nevertheless, his proficiency flourished; he was able to learn new tasks with his faster and more accurate typing, and he had a feel for the keys and desktop layout on his own machine.

But then the internet subscription "starting rate" expired and Malek could no longer afford his internet connection. He changed to another internet provider and waited for several weeks for this provider to send someone who spoke his language to his home to set up the modem. But shortly after the service person arrived, his laptop crashed. Its operating system was too old to connect to the new internet modem. Persistent and determined, Malek continued on at the Digital Café, using the desktops once or twice a week when the Café was open. But we noticed that his fluency faltered; "Where is that internet thing [the browser]?" "Where do I enter my password again?"

Excerpted from Smythe and Breshears, 2017, pp. 76-77

Framing the Findings

To fully examine the depth of a digital divide, we developed a thematic list to organize the findings. The list is comprised of a synthesis of the work of other researchers who articulate the depth and complexity of a digital divide well beyond the issue of connectivity. Indeed, the vast majority of Canadians and Ontarians have an Internet connection. But what is sacrificed to maintain the connection, and what compromises do people have to make to access the Internet? How frequent and regular is their access to a computer or tablet? Are they relying on public access points that lack privacy and safety? Are they using their smartphones as a primary digital tool? How is the Internet being used? Are people supported in their online navigation, technical know-how and tech-savvy choices? And most importantly, does their engagement lead to better opportunities, and social and civic participation?

Prominent Canadian researchers (Haight et al., 2014) describe three divides:

1. Affordable, equitable and sustained home access;
2. The level and type of online activity; and
3. The ability to leverage social connectivity to transmit information, produce knowledge and identity, and develop and maintain social capital.

They argue that the digital divide that is defined primarily by affordability is persistent and has expanded to include the level and type of activity and inequality in the ability to leverage that activity. Having the greatest impact on the deep entrenchment of a digital divide is the level of education that one has. Those with only a high school education are the most impacted. Compounding the impacts of poverty and education are social differences. "Digital inequalities continue to combine with race, class, gender, and other offline axes of inequality" (Robinson et al., 2015, p. 570). The ever-expanding array of online activities introduces new forms of disparity as more government services, cultural and learning resources, media, general information and economic activity moves online.

A more nuanced understanding considers the divide from the perspective of individuals and the relevance of digital usage in their lives (Selwyn, 2004). Four stages are described:

1. Formal/theoretical access (access is available but may be sporadic or unsustainable);
2. Consistent access at work, at school or in the home, but not necessarily meaningful or relevant;

3. Meaningful engagement providing the user with choice and control; and
4. Relevant social and personal outcomes and production activity related to political, social, and economic activity.

Finally, the divide is considered from a usability perspective (Nielsen, 2006):

1. Economic,
2. Usability for low literacy users and older adults, and
3. Empowerment and participation inequality (default settings, ad placements in search engines, and click bait).

For the purposes of this review, focused on identifying opportunities and barriers that can exacerbate or alleviate the digital divide for Ontario's vulnerable adults, we have synthesized and elaborated on aspects of each articulation in order to develop the following description. The following elements of a digital divide are considered and used to organize the research synthesis:

1. **Connectivity and affordability**: Internet connectivity may exists but it may be slow, sporadic or simply unaffordable.
2. **Variations in online use**: Consistent connectivity may be obtained, but there are variations in use and types of online activities that may or may not be personally relevant.
3. **Opportunities for collaborative and supported learning**: Individuals have access to various meaningful, informed and supported online engagement and learning opportunities, providing the user with choice, control and security.
4. **Potential to leverage online engagement**: Individuals have opportunities to leverage online engagement for production activities and participation in society.

In the first section, each element of a digital divide is fully explored using research from Canada and other countries to provide a comprehensive understanding of the notion of a digital divide. Then the elements are used to provide an organizational framework to explore how existing programs policies and practices at the federal level, followed by a provincial and municipal exploration, are or are not in place to support digital access, engagement and learning opportunities. The report also includes promising practices from other jurisdictions, and a related annotated bibliography (see Appendix 2). The final section contains a conclusion and recommendations to support the development of opportunities for Ontario's digitally vulnerable adults.

OVERVIEW OF THE DIGITAL DIVIDE

Each of the elements — connectivity and affordability, variations in online use, opportunities for collaborative and supported learning, and the potential to leverage online engagement — will be fully explored in this section.

Connectivity and Affordability

Ontario has a new digital "action plan," an ambitious project designed to transform how the government interacts with Ontarians. An aspect of the action plan includes moving more government services online, likely resulting in the closure of in-person service centres.[4]

The Ontario government is not unique, as more and more services at the federal and municipal levels migrate online. The moves are usually promoted as a modernization effort, a way to catch up with a highly tech-savvy and connected population. The government claims that 90 per cent of Ontarians "use the Internet regularly to make purchases, find information, learn new skills and interact" (Government of Ontario, June 2016), but the reality is quite different. Indeed, upon first glance, it seems like the vast majority of Ontarians are prepared for the government's transformation; however, closer examination of each aspect of the claim — the percentage who are connected, the notion of regular use, the types of activities, and the ability to mobilize that activity to learn new skills and interact — presents a far more problematic picture that counters the claim that most are prepared for e-government.

According to the Canadian Internet Registration Authority (CIRA), which synthesizes data from a variety of sources, 87 per cent of Canadian households, as of 2013, have an Internet connection. However, Canada ranks 16th in global Internet penetration, behind Scandinavian countries, New Zealand and the U.K. (The U.S. is 28th.)

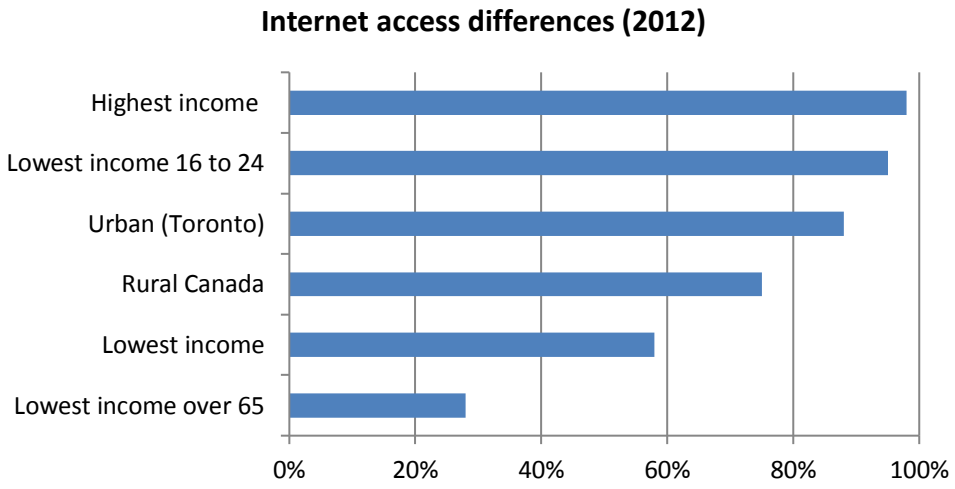
A great challenge in Canada is geography. The urban-rural access divide is pronounced and is particularly acute in the North. Broadband is available to 100 per cent of Canadians in urban areas but drops to 85 per cent for those in rural areas. It is drastically low in Nunavut, where only 27 per cent have access (CIRA, 2014). A recent announcement by the CRTC to make broadband access an "essential service" will address this access difference. (More details are provided in the next section.)

Also contributing to the access divide is income. According to Statistics Canada (2012), 98 per cent of those earning $98,000 or more (the highest

[4] We are beginning to see the closures occur, although the process may be more complicated than anticipated. See, for example, Government flip-flops on Service Ontario closures

income quartile) are connected, compared with only 58 per cent of Canadians earning $30,000 or less (the lowest income quartile).

Ontario's household access at 84 per cent is slightly behind British Columbia and Alberta at 86 per cent (CIRA, 2014). Of those with no access in Ontario (16 per cent), one-fifth said this is because of the cost of service or hardware. The majority (61 per cent) without access stated they had no need or interest.



More recent findings from Ipsos (2015) are focused on individual rather than household access. The researchers state 91 per cent of Canadians have access at home, and only 5 per cent do not use the Internet in any way including through their mobile devices or outside the home. The rate, close to Ontario's claim of 90 per cent, obscures some differences in rural versus urban access and age. In addition, the survey was conducted by landline and cellphone. People with pay-as-you-go plans may have been reluctant to participate (eating up valuable minutes), thus potentially under-representing those with low incomes.

What may also be overlooked in many of these studies is sustained high-speed access. A regional study from the Kitchener Public Library found that 23 per cent of people in the area had devices but no Internet access or very limited data plans (Kitts, 2015).

Ipsos researchers also note a worrisome finding among those with no access. Cost and affordability are not the only reason for non-access. Older non-subscribers do not see the relevance and have no interest or do not feel they have the skills and digital literacy. Researchers conclude that the digital divide is not only fuelled by income inequality but also age and relevance.

> **If the government wants to ensure that all Canadians can benefit from the internet, then affordable access is not necessarily the only strategy for all, but rather developing programs and policies to engage and educate Canadians on the full benefits of participation in the digital economy (Ipsos, 2015, p. 5).**

Such challenges are not unique to Canadians. Older Americans with low incomes are overrepresented in the 15 per cent of Americans who are not online (Zickuhr, 2013). The greatest barriers also include relevance, followed closely by usability and then affordability.

A recent analysis of findings from a survey involving low-income and moderate-income Canadians indicates that the affordability issue is acute for low-income earners (ACORN Canada, 2016). More than half of the nearly 400 surveyed (online and on paper) pay for Internet access using money budgeted for food and rent. The vast majority (84 per cent) simply stated that the cost of high-speed Internet is "extremely high." In 2013, 14 per cent of Canadians were low-income earners ($41,866 for a family of four after taxes) (The Globe and Mail, 2016).

An advocacy initiative from British Columbia demonstrates how government service delivery changes can have inequitably harsh impacts on those with the fewest resources and ability to address such changes (British Columbia Public Interest Advocacy Centre, n.d.). When British Columbia's welfare and disability service-delivery model introduced a centralized phone line and an online application process, access barriers were also introduced. Long waits on phones became particularly problematic when most low-income and social assistance recipients use cheaper pay-as-you-go plans. In addition, required online access became a problem for those without an Internet connection and with low levels of education and more tenuous literacy skills.

Critics of the move to modernize government services pose three compelling arguments, framed as digital access myths, illustrating that access in theory — that is, connectivity — obscures a far more complex reality of real access in people's everyday lives.

1. The first myth, according to Newman and Gurstein (2016) is that everyone is online, which is too often perpetuated as a justification of organizations, corporations and governments that want to move all services online, usually as a cost-saving move. (In the U.K., going online is 20 times cheaper than phone access,

30 times cheaper than mail and as much as 50 times cheaper than in-person service centres (Gov.UK, 2013).

2. The second myth is that moving services online will make them more accessible, neglecting to account for what the authors refer to as the "enablers and disablers of access" such as education level, income, support networks and literacy.
3. The third myth, write the authors, is that everyone makes the choice to be online. Governments make a huge assumption that people actually *want* to access services online, particularly when matters are complex.

Variations in Online Use

Another element of the digital divide is related to actual online use. Are connectivity and access, once obtained and sustained, similar for all? What are the differences in usage based on socio-economics and demographics? And how do these differences play out in people's lives?

There is an assumption that once people are connected to the Internet, they will automatically become highly engaged with online activities, and these activities will be meaningful and informed and will then automatically lead to other opportunities. The assumption is perpetuated and given credibility by powerful tech figures like Mark Zuckerberg, who proclaimed — while attempting to establish Facebook in India to expand its market — that if people are connected, they will get jobs, learn and be lifted out of poverty (Bhatia, May 2016). The same assumption was used by the federal government as a rationale for ending its funding of the Community Access Program in 2012. Since the vast majority of Canadians now have broadband in their communities, the government rationalized, it no longer has a role in facilitating access and online engagement (Government of Canada, 2009).

Canadians lead the world in time spent on the Internet and pages visited, with most spending their time on social media, gaming, messaging and using video phone services such as Skype and FaceTime. Less time is spent by Canadians on banking or pursuing hobbies, interests and news (CIRA, 2014). The top five online activities identified by Statistics Canada in 2102 are using email, browsing for information on goods and services, banking, accessing news and using social networking (Statistics Canada, 2013a). Less popular activities include researching local events and using government websites.

While the overall picture of activity suggests we are highly engaged, researchers who have looked closely at the issue argue that there are growing gaps in usage and engagement level. Discussions of access, they

argue, need to be expanded to include digital literacy and learning opportunities (Colledge & Haight, 2016). We can see this gap play out in the PIAAC data that looked specifically at digital skills usage in what is named "problem-solving in technology rich environments." While Canadian adults overall perform at levels that are higher than average compared with their OECD counterparts, Canada has a greater digital literacy skills gap compared with other OECD countries. A higher proportion of Canadians appear at the highest and lowest skill levels compared with other countries (Statistics Canada, 2013b).

Ipsos (2016) recently completed a highly detailed study that compared levels of online engagement (very low, low, moderate and high levels of engagement) with particular demographic groups defined by age, education and income, which led to the development of comprehensive user profiles. Those who are highly engaged in a variety of activities are younger (under 54), live in cities, are better educated and employed; whereas **those with less intense and low levels of engagement are older, typically retired, live outside of urban areas and have lower household incomes.**

Very low users have no home or mobile access and are more likely to access the Internet at work, school or elsewhere. Not surprisingly, their time spent online is limited, and they are twice as likely to spend less than five hours a week online compared with the average user.

The very low users without home and mobile access are in a catch-22. Limited and sporadic access means they are unable to fully engage online in the same way as other Canadians who spend most of their time on social media, gaming, messaging and using video phone services. In addition, they may be living in isolation with few meaningful social connections (Government of Canada, 2016). It's not surprising then that a lack of relevance and trust in the Internet are cited as greater barriers to their engagement than a lack of opportunity. Cited less often (and perhaps understated, write the researchers) is a lack of knowledge related to banking, social activities and booking appointments. It's a cycle of disconnection. Those who are socially isolated do not see the relevance of spending time online to communicate and connect with family or friends. Their limited online engagement means they aren't gaining a level of comfort and remain distrustful, and they are not able to develop their digital knowledge and skills. As the authors conclude, increased use leads to increased intensity and range of activities, and use and engagement increase as skill and comfort (including trust) increase.

They also note that very few Canadians are interacting with a health-care professional online or visiting government websites, except the very highly engaged user. This is a concern, the authors state, as those who likely need this kind of access and information the most are in the "very low" and "low" engagement groups (i.e. older, typically retired, living outside of urban areas with lower household incomes). Overall, only 17 per cent of **all users** profiled in the study access government websites, and only 18 per cent search for a job online.

Similar findings were revealed in a recent U.S. study. Over half of Americans are "relatively hesitant" to use the Internet to support personal learning (Pew Research Center, 2016). Part of the reason is that they engage less in personal learning activities. In addition, explain the authors, they may also have a lower level of digital skills and/or trust in supplying private information and receiving information. Within this group, 14 per cent are simply unprepared to use the Internet to support personal learning. The least digitally ready tend to be women over the age of 50 in lower income households with lower levels of formal education. Those who are most prepared tend to be in their 30s and 40s with higher incomes and higher levels of education.

Also revealing similar trends in use among particular groups, researchers from the U.K. conclude that 23 per cent (an estimated 12.6 million adults in the U.K.) don't have the required level of basic digital skills to complete routine tasks such as finding a previously visited website or installing an app (Ipsos Mori, 2015). Adults in this group tend to be older and retired, suggesting they lack the opportunity and/or desire to acquire the skills, explain the researchers. The group is also overrepresented by those in what are considered working class occupations, and others who depend on the welfare state for their income.

We can also see evidence of the interplay of income, education and literacy (both digital literacy and print literacy) using PIAAC data. Low income is associated with being a recent immigrant, a lone parent, being Indigenous, a single adult between 45 and 64, and having an activity limitation (Heisz et al., 2016). Each group is also overrepresented in what is called the lowest skill category (i.e. Level 1) and under-represented in the highest skill category (i.e. Level 4/5). Even more pronounced is the relationship between level of education and the literacy skill categories. While 17 per cent of Canadians tested at Level 1, nearly half of adults (44 per cent) *without* an education credential had results that fell into Level 1, indicating a relationship between low income, low education and overall literacy skill level as tested by PIAAC.

Collaborative and Supported Learning

People's lives are not limited by their socio-economic and demographic categories. Their individual concerns, passions and interests can be the catalyst that supports their online engagement (Smith & Graham, 2012). However, individual desire and interest need to be supported. Figuring things out on one's own, or what is called the do-it-yourself approach to digital skill development, only benefits those who *already* have a strong basis of skills and does not benefit those who have more tenuous skills (Matzat & Sadowski, 2012). In addition, the do-it-yourself idea is more of a myth, argues Smythe (2014). It's important to think about the networks of support and knowledgeable others we all draw upon to support our digital pursuits. Online navigation processes and passwords present a myriad of complexities to the novice user. It's a perplexing initiation for most.

> **Digital learning is accomplished in large part through collaboration and mentorship with others. There is little that anyone, regardless of their digital fluency, accomplishes in their everyday digitally-mediated lives completely on their own (p. 239).**

For many Ontarians, that guidance may be informal, particularly if they live, work and learn in a rich digital environment with experts to call upon for support. Others may pursue more formal learning opportunities to hone their skills. However, some may not see any learning opportunities available to them, particularly if they are costly or are not tailored to their needs, interests and skill level. Canadian adults with lower levels of education do not participate in education and training nearly as often as adults with higher levels of education. This is not simply a personal decision. It is also a matter of not being able to access opportunities as a result of not having someone to sponsor and subsidize that engagement, resulting in a lack of leveraging opportunities.

Between 2007 and 2008, nearly half (47 per cent) of all Canadians participated in some form of education and training. The rate was slightly higher for Ontarians (49 per cent). While the study did not specifically examine online training and digital literacy, it is likely that much of this learning involved computer use. Most of this activity was related to employment, and the greatest sponsors of the activity were employers. From 2002 to 2008, the rate of employment-related training increased 30 per cent for all adult age groups, including those who are 45 to 64. In addition, access to employer-sponsored training increased

slightly for those without high school. However, the overall trend in adult training and education, in which most training is geared to those with higher levels of education, remains prevalent in Canada (Knighton et al., 2009).

Those who are university-educated are five times more likely to participate in further education and training compared with those who have a high school education or less (Myers & de Broucker, 2006). Both employers and governments direct more of their training and education support dollars to those with higher levels of formal education — "a practice which may result in further intensifying inequalities in education and subsequent labour market outcomes" (Kerr, 2011, p. 32). The gap is intensifying, as the federal government recently shifted funding available to support adults with low levels of education and literacy from their adult literacy program (the Office of Literacy and Essential Skills) to employer-sponsored training and the Canada Job Grant program. (We will look closely at the availability of digital learning opportunities at the federal, provincial and municipal levels in the next section.)

Dutch researchers (Van Deursen & Van Dijk, 2014) found that those with higher levels of education and what they call social status use the Internet in "more beneficial ways," even though Dutch citizens with lower levels of education and disabilities spent more time online. Those with lower levels of education engage more in gaming and social networking, both of which are very time-consuming.

> **[D]ifferences in education have always been one of the causes of differences in society and opportunities in life and, thus, the internet is just the next advancement in communication technology with its usage determined by education (p. 521).**

Their findings likely hold for Canadians. They argue that policy must go beyond ensuring an Internet connection and generalized skill development to address usage differences. Those with lower levels of education need to see online activities that are meaningful and relevant to their lives, and opportunities for career development, personal development and personal learning pursuits.

> **Although inequalities within society have always existed, the internet created an even stronger division; the higher status members**

> **increasingly gain access to more information than the lower status members. The internet is not only an active reproducer of social inequality, but also a potential accelerator (p. 521).**

Finally, while much of the analysis regarding adult learning in Canada is focused on those of working age, it's vitally important to consider opportunities for retired adults. One commentator writes that older adults "have been left out of the technology conversation" (Burrell, 2016). A recent study argues that "you can teach old dogs new tricks" and aging on its own does not present a barrier to digital learning. Rather, it is a lack of experience and use more than aging that contributes to the digital divide (Eshet-Alkalai & Chajut, 2010). Once engaged with technology, seniors develop new practices and routines, combining digital practices with traditional practices and sometimes replacing traditional practices. Seniors make their digital choices based on affordability, personal preferences and convenience. Their digital practices are an inherent expression of their agency and individual decision-making (Quan-Haase, Martin, & Schreurs, 2016).

Leveraging Online Engagement

Even if all Ontarians could access meaningful, informed and supported online activity, would their digital expertise pay off? Could they leverage their new knowledge and abilities for employment and increased income, social inclusion, and education and training?

When the OECD (2015) asked this question using PIAAC data, they found that digital skills pay off for some but not all. Indeed, those with a high level of digital skills are more likely to be employed and earn more, and their digital skills are valued in the labour market. However, further analysis of the same data from the U.S. reveals digital inequities, particularly when it comes to opportunities to leverage skills in the labour market. Females, Hispanics, African-Americans and immigrants are not able to draw on their skills to access employment as readily as males, whites and non-immigrants (Reder, 2015). Although, explains Reder, higher skills are related to earnings, and people's skills are valued once they are employed, the skills on their own won't help all get employed.

Using longitudinal data from a different study, researchers demonstrate that sustained engagement in the labour market and digital engagement at home support the development of literacy proficiency and higher skill

development over time. However, evidence that the effects move from proficiency to employment is weaker (Bynner et al., 2010).

When it comes to getting a job, the vast majority (79 per cent) of Americans go online to help them in their job search (Smith, 2015). Close to half have applied for jobs online and one-third state that online job search sites are their main resource. However, those with a high school education or less tend to rely more on their smartphones to complete complex tasks such as creating resumés and cover letters, and applying for jobs. When using their smartphones, nearly half encounter challenges accessing content, displaying information and reading the text. Those with lower education levels also recognize the additional challenges they have creating a professional resumé and effectively using social media to highlight their skills and experience, explains the author.

Digital engagement can have a positive impact on particular aspects of social inclusion, such as having an active lifestyle, access to cars rather than public transport, mental health and being socially connected (although a weaker relationship) (Martin, Hope, Zubairi, & Ipsos MORI Scotland, 2016). In addition, based on an analysis of PIAAC data from the U.S., Reder (2015) argues that digital engagement outside the workplace is associated with social trust, volunteerism, political efficacy and general health. Also, the greater the digital skill proficiency level, the more social trust was noted. (Other social outcomes did not have the same relationship with proficiency level.) In a further exploration of the U.S. data in relation to health, researchers found that only the most highly educated respondents accrued health advantages from stronger digital problem-solving skills. They conclude that people with lower levels of education are less likely to "convert" their digital skills into health benefits (Prins et al., 2015).

As mentioned previously, Canadians with higher levels of education are five times more likely to participate in education and training programs compared with those with high school or less, often due to a lack of opportunity and sponsorship. However, many of those adults with lower levels of education are interested in pursuing formal learning. An analysis of PIAAC data reveals there is no relationship between skill level and learning interest (Smith et al., 2015). In other words, those with lower levels of education have the same interest in learning as those with higher levels of education. In addition, the authors also found that their learning interests support their skill use at home but not at work. The authors explain that limited opportunities at work may hamper the impacts of one's readiness to learn. In addition, they

conclude, it is likely that many workers and their skills are undervalued and underutilized at work.

Education level, race, gender, whether one is a recent immigrant or in a job with learning opportunities and employer sponsorship of those opportunities will mediate people's opportunities to leverage their digital knowledge and skills to access employment, additional training opportunities, social inclusion and health benefits. Considering the systemic barriers to opportunity, some individuals are limited in their ability to capitalize on digital skills and knowledge.

FEDERAL POLICY AND PROGRAMS

Federal policy support, including sustained funding that addresses connectivity and affordability, variations in online use, opportunities for collaborative and supported learning, and the potential to leverage online engagement programs is nearly non-existent. Addressing the issue of affordability of connectivity in a piecemeal way are corporate initiatives, but the projects are limited. Although the connectivity issue was recently addressed, affordability of that connectivity was not. The federal government did have a stronger role in the past through the Community Access Programs and funding for adult literacy, but it has or is in the midst of gradually and quietly withdrawing all support and opportunities for vulnerable adults.

Federal Government Addresses Connectivity but Not Affordability

The CRTC recently made a long-anticipated announcement to declare broadband an essential service (CBC News, December 2016a; CRTC, 2016). This means that Internet providers will have up to a decade to ensure access for two million Canadians living in rural and remote areas, including download speeds of up to 50 megabits per second and unlimited Internet service. While considered a positive development, the issue of affordability remains (CBC News, December 2016b). One commentator writes, "The Commission could have gone much further in mandating broadband obligations, addressing affordability, and curtailing data caps" (Geist, 2016).

Until this announcement, an analysis of federal high-speed connectivity and access policies over the past decade (1995–2015) concluded that they are becoming "increasingly unambitious." Compared with its OECD counterparts, Canada dropped from second to 13th for connectivity and is considered to have one of the world's slowest speeds at the highest cost (Evanview, Stobbs, Rathi, & McNally, 2015).

In a comprehensive exploration of affordability, including phone, Internet and television, all low-income groups unanimously said phone (whether cell or landline) was their most important communications device. Different groups then placed varying values on other services. For example, low-income families with children placed a high value on home Internet service. Others valued television more, particularly those who are less mobile, and older Canadians. Average monthly communications expenses ranged from $100 to over $200 or around 8 per cent of monthly incomes (Public Interest Advocacy Centre, 2015).

> **Generally, consumers were reluctant to cancel their communications services, even in the face of increasing costs and tight household budgets. Those who were not willing to further reduce or cancel their communications services said that money would have to come from other expenses, such as occasional cinema movie trips for children, holiday and Christmas gifts, smoking, and any personal spending for the adults. Some consumers were even willing to cut other basic expenses, including food, clothing and health care, rather than cancel their communications services. Others insisted that they would not know where they could cut back in their household budget (p. iv).**

The report concludes that affordable services are those that do not require sacrificing basic needs and would likely constitute only 4 per cent to 6 per cent of a household's monthly income. Importantly, affordability must also allow consumers to make choices in their communication services that fit their needs.

Canada's policy vision for Internet access is outlined in the document *Digital Canada 150*, which is organized by five main themes: connection, privacy, economic opportunities, digital government and Canadian content. Although issues related to affordability and the development of digital literacy are mentioned, they are not specifically addressed and tracked in the same way as other initiatives. While there is no direct reference to providing affordable and sustainable Internet, there is mention of the government's role in distributing refurbished (and possibly outdated) hardware to non-profit programs, seniors and new

Canadians (Innovation, Science and Economic Development Canada, 2015).

Currently, two of the big three telecommunications service providers (Rogers and Telus) are addressing the issue of affordability. Both corporations are offering low-cost ($10 per month) basic Internet service to low-income households. Rogers' Connected for Success program is available in low-income housing communities in Toronto, Waterloo, Ottawa, Fredericton and Corner Brook. Telus's Internet for Good program is available to low-income single parent families in Vancouver and Alberta. While both initiatives address the issue of affordability, they are limited in scope and eligibility.

A federal program designed to help Canadians get online and use technology was the Community Access Program (CAP), which was funded by Industry Canada from 1994 to 2012. Most sites were set up in community centres, libraries and schools. At its peak, 8,800 CAP sites received federal funding. Government evaluators concluded that the program "may have outlived its usefulness," claiming that 94 per cent of Canadians live in a community where broadband is available for purchase (Government of Canada, 2009). Although the evaluators acknowledged the existence of a digital divide in their report, they did not suggest how it would be addressed once CAP programs were no longer funded.

> **Even though the digital divide continues to persist among specific demographic groups, the most effective channels through which to address this need was beyond the scope of this evaluation (para. 21).**

When writing about the end of federal support for CAP, Blanton (2014) argues poverty remains "the single biggest predictor of a person's inability to receive ICT [information and communications technology] services" (para. 44). The rural poor are doubly impacted by the removal of public access programs like CAP. Small libraries were not able to take on public access costs similar to urban libraries. Others who are impacted include the poor in urban areas with only limited library access and no home access. Importantly, those who do have home access but may lack the skills, confidence and support to fully engage are also impacted. Future programs, argues Blanton, must be "nimble and insightful" to address these persistent digital divide facets.

Absence of Policy and Programs

The do-it-yourself approach or what Smythe and Breshears (2017) refer to as a "laissez-faire" approach in developing digital engagement and opportunity is apparent in digital connectivity policies at the federal level. The approach is fuelled by the unquestioned assumption that once people have access to the Internet, they will suddenly have opportunity. "The logic is that the more one uses the Internet, the more proficient one becomes and the more socially equal and empowered" (p. 71). However, not considered in such thinking, write the researchers, are a myriad of confounding circumstances in people's lives. "Notable is a near absence of meaningful consideration of whether potential users have the means to take advantage of the availability of an Internet connection" (p. 73).

Soon after CAP funding disappeared, the federal government also withdrew its commitment to supporting adult literacy. Since 2014, support for those who are unemployed and/or with low levels of education "has stalled" (Hayes, November 2016a). Currently, there is no federal funding mechanism to support digital literacy among those who are digitally and socially vulnerable. Throughout the 1990s until 2006, Canada had a more collaborative and community-oriented role in the way it provided support for adult learning and literacy, including digital literacy (Hayes, 2013). While it didn't have an explicit national policy, it did have a national system of funding support.[5] At its peak, over $45 million was available to a variety of non-profit organizations, including support for training through federal-provincial transfer agreements. However, for the past decade, the federal department responsible for literacy-related activities has underspent by 20 per cent to 40 per cent and decreased the budget by over 50 per cent (Hayes, November 2016b).

Canada is the only developed and wealthy nation in the world without a national policy or sustained and accessible funding support for adult literacy and learning initiatives, including digital and information literacy specifically targeting its marginalized citizens. In 2011, before funding "stalled," the absence of policy was soundly critiqued in an international review that compared policies in the U.S., the U.K., Sweden, Finland, the European Union, New Zealand and Australia.

> **The absence of policy is a policy. In lieu of coherent national and/or provincial/territorial policies, adult literacy in Canada remains fractured and piecemeal. This offers a salutary lesson for other countries. Canada is well known for its interest in adult literacy and numeracy, and boasts an extensive record of**

[5] A report from the Council of Ministers of Education Canada notes there is no official definition or consistent articulation of adult education and adult literacy at the national level. Instead, Canada has relied on an employment standards framework, the Essential Skills, to articulate policy and program development for adult literacy (CMEC, 2012).

> **important research in the field. However, because federal and provincial/territorial policy-makers have not sought to craft coherent adult literacy policies and to integrate them with broader policy focuses such as employment, inequality and community cohesion, the field of adult literacy has languished and has been unable to contribute to Canadian society as it should (NALA, 2011, p. 24).**

Rather than supporting adult literacy for those with lower levels of education or those who were unable to access other learning opportunities (including indigenous adults, older adults, those living in poverty, and adults with mental health challenges and disabilities), the previous decade of adult literacy policy interest had been on the development and use of an interconnected assessment and skill standard apparatus. It was designed to produce comparable measures to international literacy results and subsumed policy level discussion of actual literacy development among people, including digital literacy[6] (Council of Ministers of Education Canada [CMEC], 2012; Pinsent-Johnson, 2015; Smythe, 2015).

However, even a narrow focus on the development of an assessment and skill standard apparatus may be waning. Only $8 million from an $18 million budget was allocated to organizations to address literacy using the Essential Skills framework in 2015–2016. It is difficult to determine if any of this funding was used to support digital literacy development, since no project descriptions are available (Hayes, November 2016).

We found evidence of only one source of private sector funding at a national level. The Canadian Internet Registration Authority (CIRA) provides $1 million annually to community initiatives. However, digitally vulnerable adults are one of four competing target groups along with youth and children, infrastructure in remote communities and research. In addition, only entrepreneurial initiatives and not a comprehensive array of digital literacy, including the development of social connection and e-government interaction, are eligible for funding.

Before having their funding cut in 2014, the Canadian Literacy Learning Network took a digital technology snapshot of the field (CLLN, 2013). They identified several key issues that limited the ability of programs to support adults with low levels of education and tentative or no digital literacy, including a lack of high-speed broadband in rural and

[6] There was a short-lived attempt to reformulate Essential Skills standards related to "computer use" (one of nine Essential Skills), but no evidence of this reformulation effort was found online.

remote programs, making it impossible to stream videos and curtailing both meetings and access to learning resources. Overall, there is a lack of funding and technical support, which limits the development of appropriate resources, professional development and the development of long-term technology plans and policies.

We found evidence of only one recently completed digital literacy initiative for vulnerable adults from a national organization. ABC Life Literacy Canada, a national non-profit adult literacy advocacy organization, developed a three-hour workshop called Internet Matters, which provides information about affordable access, general uses, and online safety and security. The workshop was delivered as a pilot project in Toronto Community Housing in November 2016 (ABC Life Literacy Canada, 2016).

Indirect funding mechanisms such as the federally funded Language Instruction for Newcomers to Canada (LINC) could be considered a way to support the development of meaningful, informed and supported online activity, but only for those who are eligible. The program targets recent immigrants and government-sponsored refugees, but does not include immigrants who have been in Canada for longer periods and have obtained their citizenship, nor refugee claimants. Many of the eligible immigrants have already developed a comprehensive repertoire of digital literacy skills and knowledge in one language and need support to adapt and reformulate those skills into English or French. Their challenge is different from those with low levels of education who have never had the opportunity to develop digital skills.

Recent funding guidelines from the federal funder of the LINC program, Citizenship and Immigration Canada (2015), include several mechanisms that support digital literacy, including distance language training and assessment, online service delivery (curriculum, tools and content) and social innovation projects that incorporate digital technologies. These recent efforts may address a previous digital learning shortfall identified in an evaluation of the LINC program in 2010. At that time, just under 80 per cent of LINC providers stated that computer programs and online programs were used in classes. Only 12 per cent of LINC programs offered computer-focused learning in classes. Learners themselves said one of the main aspects that could be improved is access to computers and more time spent learning with technology (Citizenship and Immigration Canada, 2010).

Recent calls for adults and children to learn coding (see, for example, Sariffodeen, 2016) divert our attention from the real issues in people's lives: access, affordability and supported digital literacy development.

The need for coders is drastically overblown, argues an online commentator (Usher, 2016), since the need for the developers of software is miniscule compared with the need to develop adept end-users and their digital literacy.

The Absence of Policy Is a Policy

Informed, meaningful and equitable online engagement is a fundamental issue of citizenship, democratic participation and belonging in Canadian society. However, it seems that the federal government has limited its role to supporting a long-term plan for broadband access, but not affordability of that access, nor equitable online engagement and digital literacy development and support. This is becoming an even more pressing concern as more and more federal government services and access points are available exclusively online. The development of e-services without considering who is and isn't able to access those services is tantamount to closing doors on people. Calls for change have come from researchers working in the fields of sociology, library and information sciences, and adult education.

In a recent commentary, Colledge (from Ipsos) and Haight (a university researcher in sociology), argue that federal policy must address a growing digital use gap along with issues of affordability.

> **[I]t's critical that Canada develop a more comprehensive strategy that addresses the growing digital adoption gap through complementary investments in education and digital literacy (Colledge & Haight, 2016*).***

A key reason is to ensure full democratic participation in society as more government services move online. Colledge and Haight highlight a key finding from an Ipsos study that less than 20 per cent of Canadians use the Internet in a consistent way to "interact with government websites or health-care professionals, search for employment, or for distance education."

From the field of library and information science, Bradley (2013) describes an ad hoc approach to the development of information and broader digital literacy, and calls for a co-ordinated approach that involves the federal government, provincial governments, library associations and other stakeholder groups. Similar to the field of adult literacy, notes the researcher, Canada doesn't have its own policy vision for information literacy. Those working in the field rely on definitions and conceptualization from other jurisdictions. Such a makeshift

approach to policy and related funding mechanisms has a direct impact on service and support. Bradley describes an overreliance on "one-shot" instructional sessions in libraries for children, youth and adults.

Before having their funding cut, a national adult literacy organization articulated a vision of a comprehensive approach to adult digital literacy development entails (CLLN, 2014). The vision includes universal broadband access; adequate funding for hardware, tech support and upkeep; and funding to support professional development and practitioner knowledge. In addition, they also argue for the need to fully integrate digital literacy with other forms of literacy and other literacy purposes such as academic literacy, literacy to support personal projects, literacy for community engagement and broader social participation.

Importantly, a policy needs to move beyond the confines of programs, ensuring that the issue is not simply relegated to the charitable, volunteer sector, but is addressed as part of broader social policy that recognizes the way technology has introduced new forms of thinking and communication with profound impacts on us all. Programs can only do so much, argues LaDousa (2014). They cannot change broader social circumstances that prevent individuals from leveraging their digital literacy skills and expertise. Funders, and programs themselves, need to recognize these limitations and avoid downloading exclusive responsibility of digital literacy and literacy development onto the individual without adequately considering their access to opportunities and resources.

This is an ideal time for the federal government to reconceptualize its role and its support of adult learning. Digital literacy development for vulnerable adults is fundamentally an issue of citizenship and access to democratic institutions and opportunities, including economic and entrepreneurial opportunities. Over two decades of a narrow focus on adult literacy for work and the development of human capital have faltered. Over the same period of time, several rounds of the International Adult Literacy Survey (namely IALS, ALLS, and PIAAC) have produced findings based on snapshot assessments of the Canadian population that underline that there have been little improvements made in reading and document use. With Problem-Solving in Technology-Rich Environments (PS-TRE) added in PIAAC, it is likely that there will not be significant improvements in the next round of the survey. Canada's PS-TRE results are unique among the survey's participating countries in that the majority of participants were rated at the lowest and the highest levels, with much fewer participants rated in between. Canada's inaction and erosion of direct supports and the

broader socio-economic circumstances that shape people's opportunities are likely to contribute to a lack of improvements. Policies ought to support bringing about changes at the lowest levels and a narrowing of the gap between results at the highest and lowest levels.

Arguably, digital access and literacy development opportunities are no longer a matter of individual equality, but are now a more pressing matter of fairness that considers the needs and existing resources of individuals in their attempts to fully participate in a digital society. They are a matter of systemic inequality that, if not addressed, will perpetuate itself despite statistically close-to-universal access to the Internet.

CASE STUDY 2: AN EDUCATOR STARTS WITH LEARNER INTERESTS

Jake has spent 4.5 years teaching adults to learn with computers in a variety of community-based programs in and around Vancouver, BC. His experiences offer a lens into the relationships between digital technology and literacy among very marginalized and low-income adults who strive to learn amidst many competing struggles for housing, health, food and safety. From Jake's perspective, access to computers, and to high speed Internet is important in a democracy that is increasingly moving "online". Many government forms and applications for subsidies or financial support are now only available online, so Internet and computer access is important to ensure everyone is able to find and apply for these resources.

In the adult learning centre, adults may drop in for help filling in a form or to use the computers; others may choose to attend more regularly, meeting with a tutor to work on a project or build literacy skills for further academic study. Jake introduces adults to computers, keeping in mind that many people are very curious about computers, but also very fearful of making mistakes, or wary that it will be "too hard" and they won't be able to manage. Sometimes people expect to fail when they learn something new, Jake explains, a result of their negative past learning experiences.

Jake starts his computer tutorials with the question, "What do you want to be able to do?" Almost everyone wants an email or Facebook account and to surf the Internet. In a short time, one man with a new Facebook account found his brother, whom he had not seen in 18 years. Another young man continued to expand his computer-based learning. Jake learned that he had his Grade 10, and he is now completing his secondary school graduation. Jake has also found that sometimes when people say, "I want to learn computers" what they also really want is to improve their reading and writing. For example, when an adult types in a URL or a Facebook message, they will often comment that they need to learn to spell, or write or type better. Here, Jake connects them to other literacy learning opportunities: a tutor, a reading club, perhaps an ABE [Adult Basic Education] class.

Jake maintains that linking instruction to the technologies that adults have access to outside of a classroom or tutorial relationship is central to learner-centred practice. In this way, he is wary of taking up the newest digital tools for use in formal learning settings, when students don't have access to these in their everyday lives. For example, it may be fun to have a class set of iPads so people can play with applications, but how does this support learning when the instructor collects the iPads at the end of the class and the learners go home empty handed? In this way, "first tier" digital tools can support literacy learning in very creative ways in some settings. But they can also widen the social distance between instructors and learners: "I have this and you don't", as well as creating relations of dependency.

Similarly, Jake suggests that technologies work best in adult learning when they start from

where learners are in their interests and confidence. He suggests a process wherein students master the many different tools embedded in a computer at their own pace: word processing, using a printer, attaching files, finding images and music and so on, building confidence, control and learner engagement, so that when they come to make digital stories (if they choose to) or other creative content, they are able to participate more actively in the process.

Excerpted from Smythe, 2013, pp. 566–567

PROVINCIAL AND MUNICIPAL POLICY AND PROGRAMS

Ontario aims to be "an inclusive, digitally enabled province" that "create[s] opportunities for people to advance or gain new digital skills, especially those most in need" (Government of Ontario, 2017). *Mandate Letter: Digital Government* (Government of Ontario, September 2016) states that one of the specific priorities to "fulfill Ontario's vision of transforming the way that citizens interact and engage with their government through the power of digital technology" includes "making it easier for citizens to participate in government and for government to be more responsive to citizens, including developing a digital literacy strategy in consultation with the Ministry of Advanced Education and Skills Development." Ontario's new mandate to develop a digital literacy strategy steers toward a broader frame of digital access, exploring digital inclusion, which is the goal of ensuring that people have the access and skills to benefit from digital technologies in their lives. Ontario is working to achieve digital inclusion by lowering barriers to access, increasing skills and empowering people who might otherwise be marginalized and excluded from the design or use of digital technologies (Government of Ontario, personal communication, March 10, 2017).

Currently, the support for digital access and learning initiatives at the provincial level is limited. Various opportunities and points of access exist, but challenges related to underfunding, overregulated eligibility and reporting criteria, curriculum focused on remediation and disjointed basic skill development, and limited access to learning and teaching resources and expertise impede the potential of programs. Until this point, Ontario has been without a comprehensive digital access and opportunities policy to support vulnerable adults. In their Ontario-based report, Greig and Hughes (2012) argue for the vital importance of "publicly funded spaces [that] foster and provide opportunities for greater social inclusion for otherwise disadvantaged, isolated groups" (p.17). We will examine the various funding mechanisms currently in place to fund those public access points and learning opportunities. Each of the elements — access and affordability, variations in use, opportunities for collaborative and supported learning, and the potential to leverage online engagement — will be examined within the Ontario context.

Connectivity and Affordability

Currently in Ontario, issues of connectivity and affordability are taken up regionally with the support of corporations, non-profit organizations and municipal governments. Such a regional approach is piecemeal and

sporadic, with pockets of innovative connection and affordability strategies, but without overall co-ordination to ensure equitable distribution. Examples of the efforts include the following.

- A partnership between Toronto Public Library and Google to offer free take-home Wi-Fi hubs, which can be loaned to patrons for up to six months. All branches in low-income neighbourhoods are involved. (CBC News Toronto, June 2014).
- Rogers' Connected for Success program recently expanded its pilot in Toronto low-income housing to similar neighbourhoods in Ottawa and Waterloo (and will also expand to New Brunswick and Newfoundland and Labrador). Tenants can sign up for basic Internet access at $9.99 per month (CBC News, April 2016).
- The City of Pickering was recently named one of the top 21 Smart Communities in the world, receiving acknowledgement from the Intelligent Community Forum for its program Pickering Public Library Connects, an outreach program that teaches digital literacy skills and loans out laptops and portable hotspots to low-income households to provide equitable access to digital technology (Calis, 2016).
- The Eastern Ontario Regional Network (EORN), a digital infrastructure development organization, was recognized for being the only organization of its type to promote digital skill development in its digital strategy (Evanview et al., 2015). Through education and training programs, EORN says it will help Eastern Ontarians learn how to use the new regional broadband network and will pursue network applications to reduce social isolation, improve education and skills, and improve personal/household prosperity (EORN, 2015).
- The non-profit organization RCTech provides low income Ontarians with refurbished hardware, software and learning modules (RCTech, n.d.) but does not provide ongoing tech support, particularly if refurbished hardware has issues, nor does it provide updates to replace outdated software.

While individual program initiatives are promising, the overall approach is not co-ordinated or supported in any way to ensure more equitable access and distribution of supports.

CASE STUDY 3: BUILDING A LAPTOP LENDING LIBRARY FOR FREE

The Literacy Group of Waterloo Region built a Chromebook laptop lending library for free. With the support of AlphaPlus technology coaches old sluggish laptops were converted into CloudReady devices that work much like Chromebooks at no cost to the program. The Literacy Group's Program Manager, Chris Prosser, used these converted laptops as a lending library for their Literacy and Basic Skills (LBS) clients.

Chris said that the Waterloo-based organization had old laptops that were once used for a mobile computer program that had older operating systems and no longer had valid updates. But even though they were older computers, their hardware had barely been touched and they looked brand new. As a community-based organization, he didn't have the time or financial resources to upgrade or replace these computers, so the Chromium OS Conversion Pilot Project with AlphaPlus was a great fit.

Chromium OS is the open-source version of Google's Chrome Operating System (OS) that takes up much less memory to store and processing power to run. Once the Windows OS is replaced by a Chromium OS software offered by Neverware at no cost, old laptops that have become sluggish and slow often run smoothly again using cloud-based Google Apps.

Chris further explained that he wanted to be sure the old laptops would work with Wi-Fi, since many learners didn't have Internet access at home. He wanted learners to be able to take the Chromebooks to coffee shops or the library, where Wi-Fi was available for free. The AlphaPlus coach explained and demonstrated how to load the program and because many laptops were different, converting each one had its own challenge. If an issue was not resolved on the spot, the coach would take pictures of screens, learn how to fix it and send the directions. Chris managed to get eight laptops converted himself. AlphaPlus also provided training to show teachers the capabilities of the Chromebooks.

Chris was convinced that this was a fantastic chance for his learners to improve. These were learners at the lowest level of literacy who had very little or absolutely no computer training. During on-site, in-class sessions, they are taught computer skills, but these were often lost in the time between sessions. So the converted laptops looked like they would be best put to use in a laptop lending library to give learners a chance to take them home and learn at their own pace, away from the pressure of the classroom.

Lending policies were crafted, and the Chromebooks were tested. Clients who wanted to access the Chromebooks could apply for a membership to the lending library. They had to have been with the program for six months and to present the goal for which they want to use the laptop in order to be approved.

Chris thought that an advantage to the lending library was that the Chromebooks didn't need protection from viruses and downloads and that the simple interface provided 90% of the things his learners wanted to do, like online

learning, accessing Facebook, or using Google Docs to do homework. Also, because the laptops were old and no longer a financial asset, he was less concerned about them being broken, lost or left on a bus.

With respect to the benefits to learners, Chris pointed out that Chromium OS is user-friendly and that learners could safely and securely go online to use the extensions and apps. Some had found it difficult to relate to a Windows environment in the past because they had never used it, but because Chromebooks have similar functions to smartphones, it helped them relate to the technology better.

Clients who tested the library model said that being able to use a computer at home had improved their understanding of how it worked. They were also able to use laptops to apply for work online and navigate job-training applications.

From AlphaPlus (November 2016).

Potential to Support Engagement, Learning and Leveraging Opportunities

Ontario has a comprehensive adult learning and training system involving three different ministries. In addition, Ontario's public libraries are key players in providing digital access and learning support. We will briefly examine the various points of access and opportunities for people to advance or gain new digital skills, especially those most in need. While our examination is not exhaustive, it does demonstrate the potential reach that current government-funded programs can have. In addition to the one we highlight are many more supported by community organizations.

The adults who access government-funded learning opportunities, including workshops in libraries, adult language and literacy development courses and adult secondary credit courses, are those most likely to be digitally vulnerable and include the following major groups:

- Those with low-incomes and/or who rely on social support programs
- Adults with low levels of education or unrecognized credentials

In addition, within those groups are older adults, immigrants, adults with disabilities, and adults living in rural and remote communities, including on First Nations reserves.

The table below provides an overview of the provincially funded programs and numbers of participants in various courses and workshops based on most recently available data.

Points of Access and Learning Opportunities for Vulnerable Adults

Program	Number of Adults Supported	Funding
Non-Credit English and French as a Second Language Program	64,000 adults enrolled in 2015–2016 in 40 school boards across the province (MCI, 2016)	Ministry of Citizenship and Immigration (MCI)
Adult Secondary Credit	80,000 adult students (18 and over) enrolled in courses in 61 school boards across the province (Ministry of Education, 2016)	Ministry of Education
Employment Ontario's Literacy and Basic Skills (LBS) Program	42,211 adults enrolled in 2015–2016 (Ministry of Advanced Education and Skills Development [MAESD], 2016)	Ministry of Advanced Skills and Education (MAESD)
Public Libraries	149,184 attendees in newcomer programs 40,043 attendees in Makerspace, digital media and self-publishing programs 17,833 attendees in career, job help and skills programs (MTCS, 2016)	Local municipalities and the Ministry of Tourism, Culture and Sport (MTCS)
TOTAL	**393,271 adult learners**	

Although the *potential* reach of government-funded programs could make an impact, the efforts to support digital literacy development are currently not co-ordinated in any way. More importantly, we have to consider why programs, many of which have been operating for over two decades, have not been able to comprehensively support low-end and moderate users identified in the Ipsos study. What limitations do programs currently have? We briefly examine available curricular and learning supports of the four funded learning opportunities available to adults to gain digital literacy, finding an overall approach that reveals multiple and overlapping challenges related to:

- Underfunding,
- Overregulated eligibility and reporting criteria,
- Curriculum focused on remediation and disjointed basic skill development, and
- Limited access to learning and teaching resources and expertise.

Public Libraries

In addition to having over 200,000 participants in various workshops and learning sessions, Ontario's public libraries provide access to 11,500 public computer workstations and hundreds of online resources (MTCS, 2016). However, argues the Federation of Ontario Public Libraries (2015), there is a lack of co-ordination and alignment with other stakeholders:

> **The Swiss cheese access to the web, digital resources, equipment and support across Ontario's communities creates an inequity that is dangerous and unsustainable for Ontario's long term social and economic success (p. 10).**

The Federation and others (see, for example, Newman, 2008) call for more formalized partnerships between the education system and libraries. In addition, while libraries may have hardware, there is little support or training for library staff to deliver homework and curricular support programs in kindergarten to Grade 12 (K–12). (There is no mention in their document of working with Ontario's educationally underserved adults who are not in K–12 or PSE.)

The impacts of an unco-ordinated and piecemeal approach directly shape what can and can't be done to support digital literacy development in Ontario's public libraries. In her overview of information literacy development (a key aspect of broader digital literacy), Bradley (2013)

describes an overreliance on "one-shot" instructional sessions in libraries for children, youth and adults.

> **In these sessions, the librarian is parachuted in for a single, fast-paced session with students without any way of knowing if individual students have received prior instruction and with little time to conduct an assessment to find out. The concept of "information literacy" is glossed over, if mentioned at all, in the face of a need to communicate essential information in a very short time frame. This ad hoc approach to library instruction (there is scarcely opportunity to develop any meaningful attempt at information literacy) is time-consuming and frustrating for librarians, who feel stymied in their attempts to engage students in deep and meaningful information work. Ultimately, it is students who suffer most; they may hear basic information again and again but never move beyond it to develop the information skills that would assist their studies and enrich their lives (pp. 12-13).**

Non-Credit English and French as a Second Language Program

Ontario's English and French as a Second Language Program is offered in 40 school boards, usually as part of adult and continuing education departments, across Ontario. The program has broader eligibility criteria than the federally funded LINC program and is open to immigrants who have become citizens and refugee claimants. In addition, there are no age restrictions or target groups. In 2015–2016, 12 per cent of the adult language learners were over 60. The system is somewhat flexible in its design and can quickly respond and adapt to changing community needs and interests by opening a new class if they have enough students to fill a class. Programs need to generate enough student enrolment to cover instructor salaries, resources and space rental. The class size can be a challenge, though, if programs want to address more specific needs. Also, smaller programs can't generate the same levels of funding as larger programs. This directly impacts access to technology and teaching support.

Researchers recently examined e-learning options in Ontario's ESL programs and conclude that there is inadequate and inequitable access to e-learning infrastructure, including outdated computer equipment, poor Internet connections, firewalls and insufficient electrical outlets as well as

limited tech support (Lawrence et al., 2014). The researchers also identified a need for professional training and ongoing support for instructors to support-e-learning. The program is currently developing e-learning pilots that include self-directed, blended and virtual classrooms (MCI, 2015).

The adult ESL/French as a Second Language (FSL) program recently completed an extensive online curriculum development project called Quartz, providing instructors with online access to curriculum guidelines, lesson-planning supports and learning supports. The new curriculum guidelines do not explicitly address digital language and literacy development, although it is acknowledged as part of "opportunities for innovation in teaching and learning" (p. 5). Instructors are encouraged to use technology to enhance teaching and learning and make connections to learners' lives (Ministry of Citizenship and Immigration [MCI] & Toronto Catholic District School Board, 2014).

Adult Secondary Credit

Ontario's secondary credit system for adults adheres to the same curriculum and graduation guidelines in place for teens in high school, with the exception of a prior learning credit-earning system for adults. Despite having to meet the same graduation criteria, it is funded at one-third or less of the basic per student rate than regular high schools (Deloitte, 2010). The funding disparity has led to a series of practices designed to offset the shortfall, such as hiring contract teachers, overfilling classes to offset lower enrolment courses (up to 50 students per class in some examples), and an overreliance on packaged curriculum units and independent learning rather than teacher-taught and -developed courses. At the same time, explain the authors of the Deloitte report, it has also led to more innovative and collaborative approaches designed to streamline administrative activities, including collaboration with other adult learning programs.

The adult secondary credit program is currently undergoing a policy reform process to support regional co-ordination that will enable better access to courses (online and face-to-face) for adult learners. The strategy also includes regional assessment and referral to ensure students are in the program that best meets their needs, consistently applied standards for credit recognition, and better access to pathway planning and educational counselling. However, there is no mention of digital literacy development beyond expanding online courses. In other words, the strategy is being developed around existing courses and the way these courses support (or don't) adult digital literacy development.

During consultations about the reform initiative, participants raised many issues that could interfere with the implementation of the broader strategy and further discussion of digital literacy development, such as:

- Completion between boards to attract and register students;
- Lack of funding to provide comprehensive intake and assessment, pathway planning and guidance support; and to facilitate partnerships and referral in the community; and
- Overreliance on contract teachers without access to professional development and comprehensive supports, including paid preparation time and time spent with students to provide broader supports (Ministry of Education, 2015).

Many adult secondary programs rely on packaged curriculum courses developed and sold by the Independent Learning Centre, a non-profit government agency. Currently, three technology-related courses are offered:

1. Information and Communication Technology, focused on the use of business software applications;
2. Introduction to Computer Studies, which is an introduction to coding; and
3. Media Studies, which doesn't actually require online access (Independent Learning Centre, n.d.).

The courses are very limited, and none directly addresses broader digital literacy and information literacy development outside of a business context such as navigation and search strategies, determining the truthfulness and accuracy of information, assessing reliable sources, finding high quality learning sites, critical analysis of information, and ensuring online privacy and security of personal information. While some teachers may address these topics as part of their courses, their reach is limited.

An important insight into the way the Ontario secondary school curriculum relegates digital learning to remediation and limits learning opportunities is revealed in a study of students who failed Ontario's mandatory Grade 10 literacy test (Jackson, 2013). Students most in need of meaningful and relevant digital literacy development practices encounter curriculum and teaching and learning practices that are limited and irrelevant to their lives, concerns and interests, states the researcher. Study participants, in a class designed for those who failed the test, wanted to engage with texts that connected with their personal experiences and uses of literacy (what they referred to as "real" texts). They also highly valued a variety of multimodal literacies that they didn't have access to in their course. Outside the course, they "felt empowered by their online literacy practices" but within the course, in response to the remedial focus, literacy is seen to

be “a site of resistance” (p. ii). In essence, after failing a mandatory test, they are learning to dislike school and the school’s version of literacy even more.

Employment Ontario’s Literacy and Basic Skills Program

Ontario offers a literacy development program to adult learners in communities across the province. While its fundamental structure — with a variety of programs and services offered in community centres, school boards and colleges, including online learning and specialized supports for Franco-Ontarians, Deaf and hard-of-hearing adults, and Indigenous learners — seems ideally designed to reach vulnerable adult learners, several policy and program design features prevent programs from offering a wide range of digital literacy development courses and supports.

Current eligibility criteria are focused on adults with less than high school, those who may need assistance with employment readiness, those who receive income supports, and adults who are working age, with a particular focus on adults who are 45 to 64 (MAESD, 2016). Many of the criteria support the very adults who are in need of digital literacy development. One exception is support for older retired adults. As LBS is situated within Employment Ontario (a provincial program designed to support employment), being an older learner without an employment goal means that programs are very unlikely to work with that particular learner.

In addition, the reality of the profile of participants is quite different from the stated eligibility criteria. Nearly half of the adult learners are under 30 and more than half (56 per cent) *already have* a high school credential or a higher level of education (Employment Ontario, 2016). Similar to those returning for secondary credit, many of these adults are taking specific course requirements and improving their marks for post-secondary courses or gaining a recognized Ontario credential. The focus then, on assisting young adults with entry into secondary credit and post-secondary programs, may leave little opportunity for the development of more comprehensive digital literacy development for older learners, those not pursuing entry into formal education, and those who want to enhance their skills to support personal and family-related concerns and interests, including their health, well-being and overall social participation.

Since being integrated with Employment Ontario, the LBS program has become highly regulated, arguably overregulated, with a complex curricular and accountability reporting system. The curriculum framework used for reporting purposes parses digital skills development along with six other domains of learning, including reading, writing, numeracy and oral communication domains. While the curriculum does integrate notions of

applied use in the context of learners' lives (rather than learning isolated basic skills and functions), it is very limited in the way it describes the development of comprehensive and collaborative digital literacy and does not provide an integrated description of digital and print-based literacy development (Pinsent-Johnson & Sturm, 2015). The field, however, had envisioned a much more integrated and comprehensive approach to digital literacy and competency — an approach that is interconnected with other competencies and far more comprehensive than the final product (Sturm, 2011).

Entrenching the parsed and limited treatment of digital literacy development in teaching and learning activities is a highly complex and far-reaching assessment system involving three distinct sets of mandatory assessments (one of the three assessments is still under development). When fully implemented, LBS will be the only education and learning system in Ontario that will use students' assessment results to make program funding decisions. Such a highly regulated curricular and accountability approach is already having inequitable impacts, compelling co-ordinators and educators to make decisions about what to teach and whom to teach in order to ensure that programs are able to meet the high-stakes reporting requirements to maintain funding (Pinsent-Johnson & Sturm, 2015).

Programs often resort to using pre-packaged online videos and accompanying worksheets with time, funding and professional development constraints (AlphaPlus, 2012). These are often designed for students to work independently. They also incorporate a skill-building remedial approach that artificially separates and delineates technical skills from literacy development. In these pre-packaged learning systems, individual interests and desires, such as connecting with grandchildren on Facebook or learning to use online banking or researching health information, are reformulated into unrecognizable basic skills units related to saving and accessing files, using a mouse or inserting graphics into a word-processing file.

Also funded by LBS and Employment Ontario are post-secondary access programs offered at Ontario's colleges, which have a more formalized curriculum. Students there can enrol in a "computer fundamentals" course. But similar to the ILC course focused on the use of business software applications, it is very limited (College Sector Committee for Adult Upgrading, n.d.).

A recent article exemplifies the problems with such a limited approach when describing the digital literacy demands of highly skilled trades, such as carpentry, automotive service, and heating and air conditioning (Kelly,

2015). The trades are becoming more reliant on digital technology, and tradespeople need to respond, states the reporter. They also need more than an understanding of the basic functions and need to "problem solve, find the information online, retrieve it, organize it to make sense, and then transmit it to someone else." The computer skills approach designed to teach students "the basics" in using word processing and email too often emulates a workbook or skill development approach, lacking the robust, collaborative, problem-oriented learning highlighted in the article and by Smythe (2013), who argues:

> **A robust conceptual framework for incorporating digital technologies in adult literacy education should address not only the issue of how to incorporate technologies, but also how to transform current policy and funding regimes characterized by an emphasis on accountability over instruction, a narrow framing of digital literacy as "computer skills," and uneven access to digital technologies and other learning resources across jurisdictions and institutions (p. 567).**

One example of such a framework was developed by Bach et al. (2013). Their digital human capital framework addresses four outcomes to support socio-economic equality and digital inclusion: civic engagement, influence on policy, social change and economic advancement. In addition, each outcome is cross-referenced with a set of "project values and competencies" that need to be in place to support the outcomes. Bach et al. provide an overview of their framework, which is excerpted below (2013, p. 254). Such a framework could be adapted and expanded for the Ontario context.

Project Values and Competencies	Digital Human Capital outcome: Civic engagement	Digital Human Capital outcome: Influence on policy	Digital Human Capital outcome: Social change	Digital Human Capital outcome: Economic advancement
Ideology/mission	To involve participants in community issues and to produce meaningful experiences and explore solutions	To influence policy and push for reform benefitting marginalized communities	To push for significant changes in cultural values and norms, which currently disenfranchise groups	To create opportunities for living wage jobs and personal educational goals
Partnerships	Include advocates for technology, health, education, and economic advancement; governmental entities	Realize positive impacts on a broad cross-section of groups and concerns	Collaborative efforts to push for inclusive social programs and policies	Collaborative efforts to push for education, skills training and other opportunities for living-wage jobs
Skills taught	Video recording and editing, blogging, photography, online social networking, website creation	Storytelling on digital platforms, sharing videos with policy makers, online petitioning	Video recording and editing, blogging, photography, online social networking, website creation	Relevant software programs, online job searching, electronic resume creation
Learning context	Public computing centers and existing social service infrastructure (e.g. libraries, community development corporations, recreation centers, senior centers)	Public computing centers and existing social service infrastructure (e.g. libraries, community development corporations, recreation centers, senior centers)	Public computing centers and existing social service infrastructure (e.g. libraries, community development corporations, recreation centers, senior centers)	Public computing centers and existing social service infrastructure (e.g. libraries, community development corporations, recreation centers, senior centers)

Innovations to Learn From

Contact North

Contact North, established in 1986, is a portal for access to post-secondary courses, secondary courses and basic skills courses for adults; and offers a suite of online learning from primary level learning through to university. The government-funded organization has partnerships with 110 communities, including 27 indigenous communities. It provides information to both students and instructors to support online learning (Contact North, 2016). A recent overview of the organization's achievements and impacts concludes that it exemplifies the importance of sustained efforts to ensure access and opportunity for those in remote areas (Paul, 2012). The organization, writes the author, has changed the face of education in Northern Ontario, increased participation in PSE, and extended opportunities for francophones and indigenous learners. The example of Contact North demonstrates the impact that a sustained and supported online portal and access point can have.

Hamilton's Xperience Annex

Hamilton's Xperience Annex is an innovative partnership program between the city library system, youth support organizations and Mohawk College (City of Hamilton, 2016). The key component is personal contact with a youth navigator who facilitates access to Hamilton's myriad of

employment- and education-related opportunities and social supports for young adults between the ages of 18 and 29. In addition, the Hamilton Public Library provides a makerspace, a digital media lab, performance space as well as individual and group meeting space. Mohawk College has begun a new initiative called City School, offering tuition-free courses and workshops in the library space, helping to connect the makerspace and digital media lab with access to PSE. The partnership between the library and the college facilitates an access flow from an accessible public space with a variety of informal learning opportunities to more formalized learning.

Public Library Programs

Within the vast library system, there are also many exciting pockets of innovation and learning opportunities related to digital literacy development and affordable access. For example, many libraries, such as those in Toronto, Hamilton, Ottawa and Kitchener, now offer makerspace with a 3D printer and other equipment (Kitts, 2015). An example of a targeted program is offered by Innisfil Public Library, which provides training in using email and online security for seniors, and runs a technology social club called Appy Hour (MTCS, 2016). Other innovative programs are offered by the Kitchener Public Library, which offers Wi-Fi hotspots for patrons for three weeks (Kitts, 2015).

Each of these innovative examples addresses aspects of the digital divide:

- Access and affordability is addressed by some public libraries, particularly those in larger urban and suburban areas. It is also addressed by AlphaPlus and its initiative to convert outdated laptops to CloudReady devices using Chromium OS like Chromebooks;
- The programs vary in use and aim to provide more equitable use (such as access to 3D printers and senior-specific programs at public libraries; and the IT coaching services of AlphaPlus supporting LBS programs, administrators and educators);
- There are opportunities for collaborative and supported learning (such as some library programs and likely some innovative programs in literacy, language and secondary credit[7]); and
- There is potential to leverage online engagement (seen in Hamilton's partnership program and the Contact North model of remote access).

But the piecemeal approach is highly limited and sporadic. Two of three factors, identified by C. Smith (2015), that are needed for a comprehensive approach to addressing a digital divide are missing. The three factors are

value, sustainability and scalability. While innovative examples may indeed provide one factor — value — they are likely unsustainable without broader policy support and can't be scaled up so they are available more widely without a more co-ordinated policy and accompanying supports.

CASE STUDY 4: AN EXEMPLARY APPROACH IN AN ONTARIO LBS PROGRAM

A community-based adult literacy program develops a collaborative, integrated and engaging digital learning program that is responsive to leaners' interests, concerns and life circumstances

In 2011-2012 as part of the Learning Together with Digital Technologies project, AlphaPlus conducted an illustrative case study at the Centre for Community Development and Learning (CCL&D). We observed Literacy and Basic Skills (LBS) classes for those with reading and writing abilities below a secondary level, as well as the Immigrant Women's Integration Program (IWIP) digital storytelling class. At CCL&D, digital technologies are an integral part of all programming. They have a dedicated and very well-equipped, state-of-the-art digital technology learning area and a set of standalone laptops for use by students. Guided and facilitated by instructors, students are expected to participate in the programming through the use of computers, to have an email address, to communicate by email with instructors, to write using computers, and to work collaboratively. CCL&D has designed programming around the use of Microsoft Office Suite and Digital Storytelling3 – major tools for learning both for LBS students and for IWIP participants (AlphaPlus, 2012, p.11).

In all of the learning activities that we observed at CCL&D, the instructor facilitates rather than instructs. The instructor generally begins by showing students a sample of what they will be required to do, giving students just enough information to get started and then allowing them to explore, and encouraging students to ask for help as they need it. There is a strong emphasis on visual and experiential learning.

"Students learn by doing and are actively encouraged to collaborate, learn with and from each other, and to turn to the instructor for support. Students become absorbed in the tasks and the amount of peer-to-peer learning is impressive, particularly at the higher learning levels as students support and assist each other, sharing what they know, asking each other questions and working cooperatively and collaboratively" (AlphaPlus, 2012, p.13).

In early 2017 AlphaPlus followed up with CCL&D to review the current use of digital technologies in the program. In a personal communication with the program coordinator we learned that the use of digital technologies for learning and teaching at the Centre for Community development and learning (CCL&D) is closely aligned with the stated mission of the organization to create a strong culture of community engagement through capacity-building, progressive learning and innovative training.

Digital technologies are made available to all learners and are fully integrated in learning activities. The ultimate goal is to support personal empowerment and to ensure that learners become comfortable and confident in using technology in their chosen goal path and in daily life. CCL& D uses a blended learning approach in their learning programs, taking into account the diverse learning needs and learning styles of learners.

Examples of technology integration in the program

Learners learn by doing and are encouraged and supported to use a range of devices, programs and online resources to learn, to complete assignments and to participate in engaging projects. The emphasis is on the purposeful use of digital technologies rather than on specific tools. In the process of using digital technologies learners gain experience using specific tools such as the Microsoft Office Suite but focusing on purpose rather than on the features of the tool.

In one program learners engaged in digital storytelling activities learn how to use specific tools to accomplish tasks in a fully contextualized and purposeful way, using MS PowerPoint, online image search, audio recording, editing, in collaborative, production team method.

In another program, learners participate in a variety of creative projects such "Dragon's Den" in which learners are required to conduct online research, develop a product marketing and promotion plan. This offers learners multiple opportunities to acquire and practice a range of digital technology skills in a creative and engaging way.

In a third program, learners are supported to use a variety of mobile apps, programs and online activities to develop and enhance numeracy skills using authentic tasks. For example, learners use mapping, compass and directions apps to explore the local area and calendar apps to record assignments and deadlines.

Throughout many programs learners are encouraged to explore and use a range of devices, software and mobile apps and Social media for authentic and purposeful learning, for example learners with an employment goal use LinkedIn an employment focused social network. The emphasis is on using digital technology in practical and purposeful ways, to engage students in meaningful learning and to support the development of confidence and competency in using technology.

Based on learner feedback as they exit the program staff report that:

Overwhelmingly learners report that they are no longer fearful about technology – they may enter the programs with tech anxiety (often based on a lack of exposure to tech) but gain confidence during the program. They get major exposure to a range of devices, programs, etc. in a learning environment and are supported to think about the why of the tech in addition to the what and how – to ask "how is tech helpful to me?"

Learners report a sense of confidence as they transition to other environments e.g. Post-Secondary education and employment. Learners feel confident in their ability to face the online world at the college level and to use technology searching for employment, in using technology in the workplace; adding the skills they have acquired to their resumes

Learners who were reluctant to acquire digital devices or unable to use devices in the home report a greater sense of confidence in their ability to independently use technology, reducing their dependence on other family members to use technology in daily life, e.g. online banking and using the internet. Learners also report a new-found ability to help younger children in using technology for school assignments etc. and as a means to engage with their children using technology together.

From AlphaPlus (March 2017).

PROMISING POLICY, PROGRAMS AND PRACTICES IN OTHER JURISDICTIONS

What are the most promising policy supports, programs and practices from other jurisdictions that could be used to inform Ontario's goal to ensure "opportunities for people to advance or gain new digital skills, especially those most in need" (Government of Ontario, September 2016)? We completed an annotated bibliography to highlight a comprehensive range of activities and approaches organized by jurisdictions (see Appendix 2). In addition, we synthesized the information to highlight the most promising initiatives.

Connectivity and Affordability

Although the CRTC finally addressed the access issue, it ignored affordability. This will impact Ontario's efforts to engage all Ontarians in a digital transformation. Currently, charitable efforts led by Rogers are addressing the issue in a very limited way in the province. How can low-cost, consistent connectivity be obtained? What is the role of government and telecommunications service providers? An example of a much more comprehensive approach is Germany's broadcast licensing fee for ARD ZDF Deutschlandradio Beitragsservice (2016). The licence fee of €17.50 per month for each household (or approximately $25.00) is designed to provide funding for public broadcasters and to build, maintain and improve telecommunication infrastructures that ensure equitable access for service providers and their customers. The fee is not linked to a broadcasting device. It is irrelevant how many TVs, radios or computers there are in a residence. Those receiving social welfare payments can apply for an exemption. In addition, people with disabilities pay a reduced fee. Indeed, such an approach would be led by the CRTC. The issue of affordability, however, impacts provinces and municipalities.

Variations in Online Use

Variations in online use are apparent once adults are connected. How can engagement be encouraged using design and usability principles for older adults and those with more tenuous literacy abilities? How can better connections be made to adults' personal interests, passions and pursuits? One example of an innovative online learning initiative that takes such an approach is Citizen Maths developed by Catherdale College (2017) in the U.K. While the topic may be of limited interest, it is the design, usability, appeal and self-directed approach that are promising. Adults can access the online course directly. It is designed to help adults "learn maths in a new way" outside the context of a formal course or program. The activities are focused on solving practical problems in five areas: proportion, uncertainty, representation, pattern and measurement. Each section takes five to ten

hours to complete and is built around short video lessons combined with demonstrations and online apps to try out new problem-solving activities.

Collaborative and Supported Learning

Meaningful, informed and supported online engagement provides the user with choice, control and security. How can access to mentors, peers, tutors and other learning resources be facilitated to support collaborative and meaningful learning?

One example is an approach taken by Digital Promise (2016), a non-profit organization that works directly with educators, whether in a school system, in a language or literacy program or working in a library. It aims "to spur innovation in education in order to improve the opportunity to learn for all Americans." In addition to working with educators, it also targets entrepreneurs, researchers and leading thinkers to develop innovative digital learning approaches and online learning experiences. Supporting their efforts are two research briefs:

1. *Designing technology for adult learners: Applying adult learning theory*
   This research brief outlines key principles of online instructional design for adult learners: (1) start with personal experience, (2) take a problem-solving orientation, (3) give opportunities for reflection, (4) provide opportunities for adults to control their own learning and (5) support transformative learning.
2. *Designing technology for adult learners: Support and scaffolding*
   This companion brief focuses on the technical design elements of online learning for adults: (1) keep lessons short and focused, (2) rely on the visual, (3) supply numerous resources in an accessible way, (4) increase learner-teacher connections and (5) help learners engage with each other.

It is important to recognize that Digital Promise provides support to help educators and instructional designers move away from developing parsed and pre-packaged skill development units, whether online or in workbooks. It promotes an approach to learning design and curriculum development that starts with the experiences and interests of the adult learner rather than a table of learning skills and outcomes.

Leveraging Opportunities

Leveraging online engagement for production activities and participation in society can lead to changes in people's lives. What are the leveraging and social participation opportunities available for particular groups and communities? How can access to these opportunities be mediated? What new opportunities can be developed?

One example from the U.S. is an approach to education called "connected learning." It advocates for broadened access to learning that is socially embedded, interest-driven and oriented toward educational, economic or political opportunity — that is, leveraging digital learning opportunities (Ito et al., 2012). Working with the principles and practices of a connected learning approach is Educator Innovator (2016), an online meetup for educators who are reimagining learning. Educator Innovator is both a blog and a growing community of educators, partners and supporters. A key activity is their annual Connected Learning Massive Open Online Course.

Another leveraging space is the Learner Web developed by Portland State University. The aim is to facilitate adults' long-term efforts to gain a recognized secondary education credential and access PSE. Adults work with tutors and educators to personally plan and track their learning progress. The resources are adaptable to the needs of specific regions and individual learners. Unlike pre-packaged online resources, learners and programs are able to assemble activities and modules to meet their needs. Learners use individualized learning plans and e-portfolios to track their work and accomplishments. The model supports a key finding from previous research (see Reder, 2009 and 2012) that demonstrates how adults move in and out of programs as they gradually move toward meeting a specific goal.

Not all adults are on a path that leads to a secondary or post-secondary credential. While education credentials will carry inherent value for individuals and employers, supporting credentials are also valued and can support leveraging opportunities. Recognizing digital competence and achievements may be useful for many adults, particularly those of working age. One example of a comprehensive recognition framework is the European Union's *Digital Competence Framework*, or DigComp 2.0. The framework identifies the key components of digital competence in five areas: (1) information and data literacy, (2) communication and collaboration, (3) digital content creation, (4) safety and (5) problem-solving.

An essential aspect of leveraging is the involvement of other organizations beyond the education sector. It's not all up to educators and adult learners to support social participation opportunities, particularly those beyond the confines of a program. Scotland's One Digital project is an innovative example of such a far-reaching leveraging initiative. The Scottish Council for Voluntary Organisations (n.d.) describes an initiative in which over 1,000 staff and volunteers participated in a series of digital inclusion and participation workshops in order to support access and learning opportunities for the vulnerable adults with whom they work.

Digital Equity Strategies

The development of digital equity strategies that are part of more comprehensive government digital transformation initiatives is not widespread. Overall, municipalities have led the way in the development of comprehensive digital transformation strategies up to this point (Delorme, 2016). Those broader digital government transformation plans may or may not directly address digital equity. Although we did not find examples of comprehensive digital equity strategies — those that include action plans, timelines and evaluative criteria in other Canadian provinces or municipalities — there are examples at the municipal level from the U.S. Portland, Seattle and Austin developed strategies using a framework developed by the Institute of Museum and Library Services (IMLS) (2012). The IMLS report gave substantial guidance to the cities in defining digital inclusion, determining the primary goals and initiatives within the plans, and providing baseline measures for understanding digital equity nationwide (Benton Foundation, 2016). This framework encourages engagement across all sectors of the community so that "all people, businesses, and institutions have access to digital content and technologies that enable them to create and support healthy, prosperous, and cohesive 21st century communities." As we have become aware, shortly before the end of this project, the Ontario Government is using an adapted version of this framework in the ongoing development of its digital strategy. (Government of Ontario, personal communication, March 10, 2017).

The City of Portland (2016) recently adopted a comprehensive *Digital Equity Action Plan* (DEAP). The effort was developed and championed by the city, county and public library. The plan articulates five digital equity goals:

1. **Access** – Ensure access to affordable high-speed Internet and devices for those in need.
2. **Training/support** – Provide training and support to ensure that everyone has the skills to use digital technology to enhance their quality of life.
3. **Leadership/capacity-building** – Empower community partners to bridge the digital divide through funding, co-ordination, training and staff resources.
4. **Connectivity to the digital economy** – Create opportunities for jobs in the digital economy for underserved populations.
5. **Policy** – Build a policy framework that supports digital equity and meaningful Internet adoption, leading to better community outcomes.

Importantly, the plan also includes timelines, detailed strategic actions, lead partners, reporting mechanisms and evaluation criteria. It will be very informative to follow this initiative to better understand the role of

governments in supporting digital equity. Will their more direct involvement as a partner in a multi-stakeholder collaborative effort make a difference?

Government Role and Lessons Learned

We also found two examples of digital equity initiatives that have stalled. Both initiatives primarily involve efforts in the charitable and adult learning sectors without direct involvement of government.

Scotland's Digital Participation Fund, a charitable organization that provides funding to support digital equity efforts, was not making substantial headway in addressing the issue (White, 2013). Several recommendations, including an increased role for "trusted intermediaries" such as voluntary workers, community development workers, health professionals, librarians, social workers and housing officers were made. The intermediaries could also have a role in delivering the personalized and differentiated approach that is needed to help different groups of citizens. Accompanying this effort is a need to identify different "hooks" to engage different groups of citizens. Finally, the author recommends a branding effort so that all initiatives are recognizable.

Similarly, a researcher in New Zealand laments her country's digital equity efforts. Williams (2014) argues that efforts to address a digital skill and engagement divide cannot fall to the education and charitable sectors alone. A digital equity strategy works on the basis of collaboration and partnerships, she emphasizes. If adults have no leveraging opportunities, pathways and broader social and economic outlets for their newly acquired skills, then the efforts will falter. Governments and businesses foster a set of conditions that are necessary for successfully embedding Internet use in a community. In addition, sufficient funding is needed to fully support the "social facilitation" dimension that plays a key role in ensuring novice Internet users stay online and continue to develop their digital literacy in socially supported ways, including at home in a family context.

Digital literacy programs focused only on individual skill development without being connected to more comprehensive social, cultural, community and economic development initiatives cannot address digital inequities (Bach et al., 2013). In other words, simply providing universal access and skills development will not impact socio-economic inequalities and social exclusion.

CONCLUSION AND RECOMMENDATIONS

This report has synthesized a body of diverse research and research commentary to examine the digital divide and its impacts on vulnerable Ontarians, highlight potential opportunities to support digital inclusion for all and recommend specific strategies. We fully examined the depth of a digital divide, using a thematic list to organize the findings. The elements of a digital divide are used in this section to pose guiding questions for the recommendations.

Continued regular and frequent access to the Internet is essential for acquiring and maintaining online skills. For many citizens, meaningful and sustained interaction with online offerings is limited by connectivity (location and quality of connection), the device they have access to (phone, laptop, tablet or computer), and purpose (expressions of interest, learning programs or government services). Without opportunities to build self-efficacy in the use of online offerings, many services may only reach a fraction of the citizenry. Either alternative, often costly, ways to access services need to be provided or a part of the citizenry will not access these services. Connectivity and affordability are the building blocks for meaningful access and self-efficacy.

Connectivity and Affordability

How can low-cost, consistent connectivity be obtained? What is the role of government and telecommunications service providers?

Recommendation 1 – Support alternative access opportunities at publicly accessible points, especially in communities with a high rate of intermittent access.

Despite the high rate of Internet connectivity, there is a continued need for public access points that are safe, secure and private. If government services are required to be accessed online, there need to be alternative opportunities of access and support. There may also be a need for access points that are safe, secure and private for anyone without proper access at home or work. Public infrastructure, such as that provided by public libraries, best serve this purpose, as access points provided by businesses may not be sufficiently monitored and may be subject to intrusion.

Recommendation 2 – Scale up innovative connectivity and laptop conversion initiatives.

There are a number of examples of innovative connectivity and laptop conversion initiatives that could be upscaled to provide more alternative opportunities to underserved communities. Public libraries are lending out WiFi hotspots and are providing individuals who do not have Internet access at home with connectivity. Adult learning programs convert laptops to

Chromebooks and lend these out to individuals to build online self-efficacy that is sustained and not intermittent. The success of these and other initiatives shows that reaching more people this way may support accessing government services online.

Variations in Online Use

How can online engagement be encouraged using design and usability principles for older adults and those with more tenuous literacy abilities? How can better connections be made to adults' personal interests, passions and pursuits?

Recommendation 3 – Develop learning opportunities and activities that connect to people's passions, interests and concerns.

Researchers at Carnegie UK Trust (2014) conclude that digital barriers must be tackled individually if people are to become digitally included. Our review highlights that the reasons why someone is not online vary according to age, gender, demographic group or geographical location. A primary motivation for people to go online is to find specific information that is of personal interest or relevance to them. A "one-size-fits-all" approach to supporting people who remain offline is unlikely to succeed, argue the authors. A differentiated and personalized approach is required, working with individuals and finding the right "hooks" to engage them and help them to gain access. Local activities to help people get online also need to be well co-ordinated to ensure that as many people as possible can be reached. The role of public, voluntary and community organizations, including language, literacy and adult secondary credit programs, which are in regular contact with those least likely to be online, is vital.

Recommendation 4 – Investigate expressions of interest in online use to better support digital inclusion projects and programs.

We also need to learn more about what the right hooks may be for particular groups. Some may be interested in tracing family histories. Others may be interested in digital photography and setting up an online portfolio and blog. Still others may be interested in developing a website to advertise and promote a small business, or honing academic and technical skills to prepare to take an online course. Activities must be developed to connect directly to these expressions of interest and not become buried in generalized skill development courses.

Collaborative and Supported Learning

How can access to mentors, peers, tutors and other learning resources be facilitated to support collaborative and meaningful learning?

Recommendation 5 – Develop a sustained online portal focused on supporting digital inclusion projects and programs.

There is a need for accessible online spaces for all involved, including informal mentors, librarians, adult language and literacy instructors, community support workers, social workers, employers and employment counsellors. These spaces should use similar design principles as broader e-government initiatives and be engaging and appealing to use. A portal could be developed as the primary means of branding the initiative. It would be supported with core funding and a team of design and learning experts representing adult language, literacy and library educators and researchers, who also have a mechanism to work directly with stakeholders. This portal should contain educator and mentor resources, including webinars and courses, in addition to learner engagement activities that can be directly accessed by adults independently or with educator and mentor support.

Leveraging Online Engagement

What social participation, education and employment access and economic development opportunities are available for particular groups and communities? How can access to these opportunities be mediated?

Recommendation 6 – Develop a digital literacy and inclusion strategy with stakeholder input on its implementation.

The *Digital Equity Action Plan* (DEAP) recently adopted by the City of Portland (2016) provides an excellent example of how municipalities can implement a framework on a local level. Building on this example, any digital inclusion framework needs to support meaningful access by setting out guiding principles with respect to issues related to digital equity (such as connectivity, community supports, leadership and capacity-building, support worker resources, and user opportunities for learning). It needs to include timelines, detailed strategic actions, lead partners, reporting mechanisms, evaluation criteria and incentives.

Recommendation 7 – Reconceptualize traditional learning and teaching approaches and policy structures to upend the skills to application ascendancy.

Build on the work of Smythe (2013), who argues for the development of a "robust conceptual framework," and the outcomes described by Bach et al. (2013): civic engagement, influence on policy, social change and economic advancement to upend the skills to application ascendancy. Most traditional learning and teaching approaches and policy structures assume that there is a hierarchy of skills to be mastered and then proceed to articulate learning, the outcomes of learning and learning activities using the hierarchy. Activity

becomes parsed and separated, obscuring the reason that motivated an individual to do something new with technology. This can happen with both the technical aspects and textual aspects of the activity. For example, before getting online to do online banking and pay bills, traditional approaches dictate that the individual may first need to master some "computer basics"such as naming parts of a computer, saving and retrieving files and using a word-processing application. In addition, the individual may need to master "literacy and numeracy basics" such as simple addition, creating a budget and vocabulary development. By the time the basics are mastered, the original motivation and interest may be lost. Particular technical and textual skills will be learned in the process of carrying out a meaningful activity. On occasion, some of these technical skills, like remembering how to set up a payee or finding particular bits of information on a bill, may need additional support and practice, and there may be an interest in mastering particular related skills, such as developing a budget. But these are accomplished within the context of the overall personally relevant and meaningful activity identified by the learner.

Recommendation 8 – Measure outcomes according to the pursuit of passions, interests and concerns, not the achievement of particular digital and literacy skills.

To support the development of an approach that puts people's interests, concerns and personal passions at the forefront, outcomes measures must reflect the approach and not sideline efforts by measuring only skill development. While skill development is important in some contexts, particularly if an adult learner wants to pursue formal education, it is not as important in other contexts. In addition, educators and mentors can be supported in an approach that involves back-ending skill development so that it always plays a support role, without dominating and subsuming the main learning endeavour. This element is integral when working with existing outcomes and curriculum frameworks in the three learning ministry programs. Educators will need to work with strategies, and strategies will need to be developed to help them map existing skill development indicators to learners' personally relevant and meaningful accomplishments. A way to ensure that outcomes are measured according to the pursuit of passions, interests and concerns, and not the achievement of particular digital and literacy skills, is to integrate multiple measurement mechanisms and sampling approaches.

Recommendation 9 – Develop a research hub to curate and disseminate research to educators, librarians and community support workers. Conduct research, including participatory projects.

Possible future research projects could include the following:

- Learning more about individual experiences using **surveys, interviews and focus groups** to better understand people's reluctance, concerns and challenges engaging in online activities and leveraging those experiences for social, economic and educational purposes.
- **Comparative case studies** of innovative programs and digital development activities to highlight how programs move from traditional skills-based approaches and integrate more collaborative, meaningful and intellectually challenging approaches that lead to leveraging opportunities.
- **Demonstration projects and learning labs** to try new ideas and approaches and gather evidence for evaluation purposes.

REFERENCES

ABC Life Literacy Canada. (2016). Digital literacy: What is digital literacy? Retrieved from http://abclifeliteracy.ca/digital-literacy

ACORN Canada. (2016). *Internet for all: Internet use and accessibility for low-income Canadians*. Retrieved from https://www.acorncanada.org/sites/acorncanada.org/files/Internet%20for%20All%20report.pdf

AlphaPlus (2012). *Learning together with technologies: illustrative Case studies*. Retrieved from http://www.alphaplus.ca/download/learning-together-with-technologies-illustrative-case-studies/

AlphaPlus (November 2016). Technology coaching in action: How the literacy group built a Chromebook laptop lending library for free. *AlphaPlus Newsletter*. Retrieved from http://www.alphaplus.ca/news/newsletter-archive/

Bach, A., Shaffer, G., & Wolfson, T. (2013). Digital human capital: Developing a framework for understanding the economic impact of digital exclusion in low-income communities. *Journal of Information Policy*, *3*, 247–266. Retrieved from http://www.jstor.org/stable/pdf/10.5325/jinfopoli.3.2013.0247.pdf

Benton Foundation. (2016). *Digital equity planning in U.S. cities*. Retrieved from https://www.benton.org/blog/digital-equity-planning-us-cities

Bhatia, R. (May 2016). *The inside story of Facebook's biggest setback*. The Guardian. Retrieved from https://www.theguardian.com/technology/2016/may/12/facebook-free-basics-india-zuckerberg

Blanton, C. (2014). The cancellation of the Community Access Program and the digital divide(s) in Canada: Lessons learned and future prospects. *The Journal of Community Informatics, 10*(2). Retrieved from http://ci-journal.net/index.php/ciej/article/view/1014/1104

Bradley, C. (2013). Information literacy policy development in Canada: Is it time? *Partnership, 8*(2). Retrieved from https://journal.lib.uoguelph.ca/index.php/perj/article/download/2489/3053

Brandt, D. (2001). *Literacy in American lives*. Cambridge, UK and New York, NY: Cambridge University Press.

British Columbia Public Interest Advocacy Centre. (n.d.). Access to welfare. Retrieved from http://bcpiac.com/our-work/welfare/

Burrell, C. (2016). Who will teach adults about digital literacy? *Huffington Post*. Retrieved from http://www.huffingtonpost.ca/cathy-burrell/digital-literacy-for-adults_b_12252934.html

Bynner, J., Reder, S., Parsons, S., & Strawn, C. (2010). *The three divides: The digital divide and its relation to basic skills and employment in Portland, USA and London, England*. London, UK: National Research and Development Centre for Adult Literacy and Numeracy. Retrieved from http://dera.ioe.ac.uk/21959/1/doc_4668.pdf

Calis, K. (November 2016). Pickering named one of the top 21 Smart Communities in the world. Metroland Media. Retrieved from http://www.durhamregion.com/news-story/6972520-pickering-named-one-of-the-top-21-smart-communities-in-the-world/

Canadian Literacy and Learning Network. (2013). *Digital technology snapshot of the literacy and essential skills field 2013*. Retrieved from http://www.literacy.ca/content/uploads/2013/06/digital-technology-snapshot-june-3-2013.pdf

Canadian Literacy and Learning Network (2014). *Digital literacy and problem solving in technology rich environments*. Retrieved from http://www.literacy.ca/content/uploads/2014/08/CLLN-PSTRE-May-22-session-report.pdf

Canadian Internet Registration Authority. (2014). *CIRA factbook 2014*. Retrieved from https://cira.ca/factbook/2014/the-canadian-Internet.html

Canadian Radio-television and Telecommunications Commission. (December 2016). *Telecom regulatory policy CRTC 2016-496*. Retrieved from http://www.crtc.gc.ca/eng/archive/2016/2016-496.htm

Carnegie UK Trust. (2014). *Making digital real: Case studies of how to help the final fifth get online*. Retrieved from http://www.carnegieuktrust.org.uk/carnegieuktrust/wpcontent/uploads/sites/64/2016/02/pub1455011481.pdf

Catherdale College. (2017). Citizen Maths. Retrieved from https://www.citizenmaths.com/

CBC News. (April 2016). Rogers to offer $9.99 Internet to low-income housing organization tenants. Retrieved from http://www.cbc.ca/news/business/rogers-cheap-Internet-1.3523584

CBC News. (December 2016a). CRTC declares broadband Internet access a basic service. Retrieved from http://www.cbc.ca/news/politics/crtc-Internet-essential-service-1.3906664

CBC News. (December 2016b). What good is declaring broadband a 'basic service' without regulating retail prices? Retrieved from http://www.cbc.ca/news/opinion/broadband-basic-service-1.3913627

CBC News Toronto. (June 2014). Google to offer free take-home WiFi. Retrieved from http://www.cbc.ca/news/canada/toronto/toronto-library-wifi-1.3634855

Chapin, A. (November 2013). Digital divide: Canada's poorest sacrifice basic needs to get connected. *Huffington Post*. Retrieved from http://www.huffingtonpost.ca/2013/11/14/digital-divide-canada-poor_n_4269171.html

Citizenship and Immigration Canada. (2010) *Evaluation of the Language Instruction for Newcomers to Canada (LINC) program*. Retrieved from http://www.cic.gc.ca/english/resources/evaluation/linc/2010/linc-eval.pdf

Citizenship and Immigration Canada. (2015). *CIC funding guidelines: National call for proposals 2015 settlement, resettlement assistance and inter-action (multiculturalism) programs (RAP)*. Retrieved from http://www.cic.gc.ca/english/department/grants-contributions-funding/documents/pdf/funding-guidelines-2015-eng.pdf

City of Hamilton. (2016). Xperience Annex. Retrieved from https://www.hamilton.ca/city-initiatives/strategies-actions/xperience-annex

City of Portland. (2016). *Digital equity action plan (DEAP)*. Retrieved from https://www.portlandoregon.gov/revenue/article/573122

Colledge, M., & Haight, M. (September 2016). The risk of building infrastructure without building digital literacy. *The Globe and Mail*. Retrieved from http://www.theglobeandmail.com/report-on-business/rob-commentary/the-risk-of-building-infrastructure-without-building-digital-literacy/article32043633/

College Sector Committee for Adult Upgrading. (n.d.). New ACE materials: Computer fundamentals. Retrieved from https://www.cscau.com/index.php/78-csc-main/205-new-ace-materials

Contact North. (2016). *Contact North: Outcomes*. Retrieved from http://teachonline.ca/sites/default/files/pdfs/outcomes_since_1986-eng.pdf

Council of Ministers of Education Canada. (2012). *Adult learning and education: Canada progress report for the UNESCO global report on adult learning and education (GRALE) and the end of the United Nations literacy decade*. Retrieved from http://www.cmec.ca/publications/lists/publications/attachments/283/grale_en.pdf

Deloitte. (2010). *Adult and continuing education business model review*. Retrieved from http://cesba.com/pdfs/Adult%20Education%20Business%20Model%20Review%20Final%20Report%20Jan%2027%202011.pdf

Delorme, R. (2016). *Digital strategies in local government: Private sector and early adopters lessons learned*. Western University, Master of Public Administration (MPA) Report. Retrieved from http://localgovernment.uwo.ca/resources/docs/research_papers/2016/Delorme,%20Robert%20-%202016%20-%20PUBLIC.pdf

Eastern Ontario Regional Network. (2015). *EORN digital strategy 2015–2024*. Retrieved from https://www.eorn.ca/en/resources/Digital_Strategy/EORN_Digital_Strategy_2015-2024.pdf

Educator Innovator. (2016). About. Retrieved from http://educatorinnovator.org/about/

Employment Ontario. (March 2015). *The Ontario adult literacy curriculum framework*. Retrieved from http://www.tcu.gov.on.ca/eng/eopg/publications/OALCF_Curriculum_Framework_Mar_15.pdf

Employment Ontario. (2016). *Literacy and basic skills report 2015–2016*. Available from Author.

Eshet-Alkalai, Y., & Chajut, E. (2010). You can teach old dogs new tricks: The factors that affect changes over time in digital literacy. *Journal of Information Technology Education, 9*, 173–181. Retrieved from http://www.jite.org/documents/Vol9/JITEv9p173-181Eshet802.pdf

Evanview, J., Stobbs, R., Rathi, D., & McNally, M. (June 2015). *Increasingly unambitious: A thematic analysis of Canadian broadband policy and programs* [Presentation]. Retrieved from https://era.library.ualberta.ca/files/x346d435c#.V-wVTPArLIV

Federation of Ontario Public Libraries. (2015). *Letter submitted to the special advisor to the premier on community hubs*. Retrieved from http://www.accessola.org/web/Documents/OLA/issues/2016/PitreSubmissionJune-3-2015.pdf

Geist, M. (December, 2016). *Historic or immaterial?: Making sense of the CRTC ruling on broadband access as a basic service*. Retrieved from http://www.michaelgeist.ca/2016/12/historic-or-immaterial-making-sense-of-the-crtc-ruling-on-broadband-access-as-a-basic-service/

The Globe and Mail. (February 2016). Low-income Canadians may draw on food budgets to pay for Internet. Retrieved from http://www.theglobeandmail.com/news/national/low-income-canadians-may-draw-on-food-budget-to-pay-for-Internet-group-says/article28513147/

Gough, D., & Thomas, J. (2016). Systematic reviews of research in education: Aims, myths and multiple methods. *Review of Education, 4*(1), 84–102. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/rev3.3068/epdf

Government of Canada. (2009). *Final evaluation of the Community Access Program (CAP)*. Retrieved from https://www.ic.gc.ca/eic/site/ae-ve.nsf/eng/03126.html

Government of Canada. (2016). *Report on the social isolation of seniors*. Retrieved from https://www.canada.ca/en/national-seniors-council/programs/publications-reports/2014/social-isolation-seniors/page05.html

Government of Ontario. (June 2016). *Making it easier*. Retrieved from https://www.ontario.ca/page/digital-government

Government of Ontario. (September 2016). *Mandate letter: Digital government*. Retrieved from https://www.ontario.ca/page/september-2016-mandate-letter-digital-government

Government of Ontario. (2017). *Digital government: Making government work better for people in the digital age*. Retrieved from https://www.ontario.ca/page/digital-government

Gov.UK. (2013). *Government digital strategy*. Retrieved from https://www.gov.uk/government/publications/government-digital-strategy/government-digital-strategy

Greig, C., & Hughes, J. (2012). *Adult learners and digital media: Exploring the usage of digital media with adult literacy learners*. AlphaPlus. Retrieved from http://www.alphaplus.ca/download/adult-learners-and-digital-media-exploring-the-usage-of-digital-media-with-adult-literacy-learners/

Haight, M., Quan-Haase, A., & Corbett, B. A. (2014). Revisiting the digital divide in Canada: The impact of demographic factors on access to the Internet, level of online activity, and social networking site usage. *Information, Communication & Society, 17*(4), 503–519. doi:10.1080/1369118X.2014.891633

Hayes, B. (2013). Shifting priorities: Federal literacy policy since 2006. *Northern Public Affairs, 2*(2), 38–43. Retrieved from https://brigidhayes.files.wordpress.com/2015/07/northern-public-affairs-shifting-priorities.pdf

Hayes, B. (November 2016a). Federal government underspends on literacy once again [Blog post]. Retrieved from https://brigidhayes.wordpress.com/2016/11/03/federal-government-underspends-on-literacy-once-again/

Hayes, B. (November 2016b). Who's getting funded? [Blog post]. Retrieved from https://brigidhayes.wordpress.com/2016/11/02/whos-getting-funded-take-2/

Heisz, A., Notten, G., & Situ, J. (2016). *The association between skills and low income*. Statistics Canada, Insights on Canadian Society. Retrieved from http://www.statcan.gc.ca/pub/75-006-x/2016001/article/14322-eng.htm

Independent Learning Centre. (n.d.) Course list. Retrieved from http://www.ilc.org/assets/pdfs/school/ilc_course_list_en.pdf

Innovation, Science and Economic Development Canada. (2015). *Digital Canada 150 2.0*. Retrieved from https://www.ic.gc.ca/eic/site/028.nsf/eng/home

Institute of Museum and Library Services, University of Washington, International City/ County Management Association. (January 2012). *Building digital communities: A framework for action.* Washington, DC: Institute of Museum and Library Services. Retrieved from https://www.imls.gov/assets/1/AssetManager/BuildingDigitalCommunities_Framework.pdf

Institute of Museum and Library Services, University of Washington Technology & Social Change Group, International City/ County Management Association. (May 2011). *Proposed framework for digitally inclusive communities*. Retrieved from http://files.eric.ed.gov/fulltext/ED521127.pdf

Intelligent Community Forum Canada. (2016). *Sharpening Canada's competitive edge: Digital equity*. Retrieved from http://www.icf-canada.com/digital-developments/sharpening-canadas-competitive-edge-digital-equity/

Ipsos. (2015). *Public perspectives: Participation in the digital economy 1.0.* Retrieved from http://www.ipsos-na.com/download/pr.aspx?id=15157

Ipsos. (2016). *Public perspectives: Participation in the digital economy 2.0: Summary profile of very low, low and moderate Internet users.* Retrieved from http://www.ipsos-na.com/download/pr.aspx?id=15919

Ipsos Mori (2015). *Basic digital skills: U.K. report 2015*. Retrieved from https://doteveryone-prod.s3-eu-west-1.amazonaws.com/uploads/Basic%20Digital%20Skills_UK%20Report%202015_131015_FINAL.pdf?utm_source=insights%20page&utm_medium=bdsresearch&utm_campaign=insights%22%20target=%22_blank

Ito, M., Gutierrez, K., Livingstone, S., Penuel, B., Rhodes, J., Salen, K., ... Craig, W. (2012). *Connected learning: An agenda for research and design*. Retrieved from http://clrn.dmlhub.net/publications/connected-learning-an-agenda-for-research-and-design

Jackson, L. (2013). *Literacy, standardization, and the digital age: Exploring the digital literacy practices of students who failed the Ontario secondary school literacy test* [Master's thesis]. University of Toronto. Retrieved from https://tspace.library.utoronto.ca/bitstream/1807/42627/5/Jackson_Lotoya__201311_MEd_thesis.pdf

Jacobsen, M. (2016). Teaching in a participatory digital world. *Education Canada, 56*(3). Retrieved from http://www.cea-ace.ca/education-canada/article/teaching-participatory-digital-world

Kelly, L. (January 2015). Skilled workers need Internet literacy to succeed. *Northern Ontario Business*. Retrieved from http://www.northernontariobusiness.com/Industry-News/engineering/2015/01/Skilled-workers-need-Internet-literacy-to-succeed.aspx

Kerr, A. (2011). *Adult learners in Ontario postsecondary institutions, Issue paper no. 9*. Toronto: Higher Education Quality Council of Ontario. Retrieved from http://www.heqco.ca/en-ca/Research/ResPub/Pages/Issue-Paper-No-9-Informing-policy-through-analysis-of-current-research.aspx

Kitts, D. (October 2015). How Ontario's public libraries fight the digital divide. *TVO Current Affairs*. Retrieved from http://tvo.org/article/current-affairs/shared-values/how-ontarios-public-libraries-fight-the-digital-divide

Knighton, T., Hujelah, F., Iacampo. J., & Werkneh, G. (2009). *Lifelong learning among Canadians aged 18 to 64 Years: First results from the 2008 access and support to education and training survey*. Culture, Tourism and the Centre for Education Statistics. Retrieved from http://www.statcan.gc.ca/pub/81-595-m/81-595-m2009079-eng.htm

LaDousa, C. (2014). Subject to address in a digital literacy initiative: Neoliberal agency and the promises and predicaments of participation. *Signs and Society*, *2*(2), 203–229. Retrieved from http://www.journals.uchicago.edu/doi/pdfplus/10.1086/677657

Lawrence, G., Haque, E., King, J., & Rajabi, S. (2014). Exploring the feasibility of e-learning in Ontario ESL programs. *TESL Ontario: Contact*, *40*(1), 12–18. Retrieved from http://www.teslontario.net/uploads/publications/contact/ContactSpring2014.pdf

Martin, C., Hope, S., Zubairi, S., & Ipsos MORI Scotland. (2016). *The role of digital exclusion in social exclusion*. Carnegie UK Trust. Retrieved from http://www.carnegieuktrust.org.uk/carnegieuktrust/wp-content/uploads/sites/64/2016/09/v3-2697-CUKT-Digital-Participation-Report.pdf

Matzat, U., & Sadowski, B. (2012). Does the "do-it-yourself approach" reduce digital inequality? Evidence of self-learning of digital skills. *Information Society, 28*(1), 1–12. doi:10.1080/01972243.2011.629023

Ministry of Advanced Education and Skills Development. (March 2016). *Literacy and basic skills report fiscal year 2015–2016*. Available from Author.

Ministry of Advanced Education and Skills Development. (2016). *Literacy and basic skills: Service provider guidelines*. Retrieved from http://www.tcu.gov.on.ca/eng/eopg/publications/lbs_service_provider_guidelines.pdf

Ministry of Citizenship and Immigration. (November 2015). *Ontario's vision for adult language training* [Presentation]. TESL Ontario Conference, Toronto. Retrieved from http://www.teslontario.net/uploads/paneldiscussion/Panel2015_MCIIT.pdf

Ministry of Citizenship and Immigration. (December 2016). *ESL/FSL MCIT update, CESBA conference 2016* [Presentation]. Retrieved from www.cesba.com

Ministry of Citizenship and Immigration and the Toronto Catholic District School Board. (2014). *Guiding principles and components of program planning*. Retrieved from http://quartzon.ca/documents/keystoneConcepts-Nov27.pdf

Ministry of Education. (2015). *Key findings from consultations on the Ministry of Education adult education strategy* [Presentation]. Retrieved from http://www.cesba.com/wp-content/uploads/2016/02/AES_ConsultationRptAODA_V03_Oct7_2015.pdf

Ministry of Education. (2016). *Overview adult & continuing education* [Presentation]. Retrieved from www.cesba.com

Ministry of Tourism, Culture and Sport. (2016). *Sector profile: Public libraries*. Retrieved from https://www.ontario.ca/document/environmental-scan-culture-sector-ontario-culture-strategy-background-document/sector-profile-public-libraries

Monsebraaten, L. (April 2016). Rogers to expand low-cost Internet to social housing tenants. *Toronto Star*. Retrieved from https://www.thestar.com/news/gta/2016/04/07/rogers-to-expand-low-cost-Internet-to-social-housing-tenants.html

Moriarty, M. (2011). *Finding our way: Digital technologies and e-learning for adult literacy students, educators and programs literature scan 2005–2011*. AlphaPlus. Retrieved from http://www.alphaplus.ca/download/finding-our-way-digital-technologies-and-e-learning-for-adult-literacy-students-educators-and-programs-literature-scan-2005-2011/

Myers, K., & de Broucker, P. (2006). *Too many left behind: Canada's adult education and training system*. Canadian Policy Research Networks. Retrieved http://www.cprn.org/documents/43977_en.pdf

National Adult Literacy Agency. (2011). *A literature review of international adult literacy policies*. Retrieved from https://www.nala.ie/sites/default/files/publications/A%20Literature%20Review%20of%20International%20Adult%20Literacy%20Policies%20110311_1.pdf

Newman, L., & Gurstein, M. (May 2016). *Goodbye digital divide, hello digital equity*. Retrieved from https://croakey.org/goodbye-digital-divide-hello-digital-equity-and-why-we-need-to-go-the-extra-mile-to-get-it/

Newman, W. (2008). *Third generation public libraries*. Retrieved from http://www.mtc.gov.on.ca/en/publications/third_gen_libraries.pdf

Nielsen, J. (November 2006). *Digital divide: The 3 stages*. Nielsen Norman Group. Retrieved from https://www.nngroup.com/articles/digital-divide-the-three-stages/

Organization for Economic Cooperation and Development. (2015). *Does having digital skills really pay off?* Retrieved from http://www.oecd-ilibrary.org/education/does-having-digital-skills-really-pay-off_5js023r0wj9v-en

Paul, R. (2012). *Contact North: A case study in public policy*. Retrieved from http://teachonline.ca/sites/default/files/contactNorth/files/pdf/publications/cn_casestudy.pdf

Pew Research Center. (2016). *Digital readiness gaps*. Retrieved from http://www.pewInternet.org/2016/09/20/digital-readiness-gaps/

Pinsent-Johnson, C. (2015). From an international adult literacy assessment to the classroom: How test development methods are transposed into curriculum. In M. Hamilton, B. Maddox, & C. Addey (Eds.), *Literacy as numbers: Researching the politics and practices of international literacy assessments* (pp. 187–205). Cambridge, U.K.: Cambridge University Press.

Pinsent-Johnson, C., & Sturm, M. (2015). *Assessment challenges, contradictions and inequities: An analysis of the use of digital technology and OALCF Milestones*. Retrieved from http://alphaplus.ca/download/research-overview-assessment-challenges-contradictions-inequities/

Prins, E., Monnat, S., Clymer, C., & Toso, B. (2015). *Examining associations between adult health and literacy*. Retrieved from https://static1.squarespace.com/static/51bb74b8e4b0139570ddf020/t/54da78a6e4b0f5214f04f907/1423603878589/Prins_Monnat_Clymer_Toso_PIAAC.pdf

Public Interest Advocacy Centre. (2015). *No consumer left behind: A Canadian affordability framework for communications services in a digital age*. Retrieved from http://www.piac.ca/wp-content/uploads/2015/03/PIAC-No-Consumer-Left-Behind-Final-Report-E0 nglish.pdf

Quan-Haase, A., Martin, K., & Schreurs, K. (2016). Interviews with digital seniors: ICT use in the context of everyday life. *Information, Communication & Society*, *5*, 691–707.

RCTech. (n.d.). Outreach. Retrieved from http://www.rcto.ca/programs-rctech-outreach.asp

Reder, S. (2009). Scaling up and moving in: Connecting social practices views to policies and programs in adult education. *Literacy and Numeracy Studies, 16.2/17.1*(1), 35–50. Retrieved from http://epress.lib.uts.edu.au/journals/index.php/lnj/article/view/1276

Reder, S. (2012). *The Longitudinal study of adult learning: Challenging assumptions.* The Centre for Literacy Research Brief. Retrieved from http://www.centreforliteracy.qc.ca/sites/default/files/CFLRsrchBrief_Chllngng_Assmptns.pdf

Reder, S. (2015). *Digital inclusion and digital literacy in the United States: A portrait from PIAAC's survey of adult skills*. Retrieved from https://static1.squarespace.com/static/51bb74b8e4b0139570ddf020/t/551c3e82e4b0d2fede6481f9/1427914370277/Reder_PIAAC.pdf

Robinson, L., Cotten, S. R., Ono, H., Quan-Haase, A., Mesch, G., Chen, W., ... Stern, M. J. (2015). Digital inequalities and why they matter. *Information, Communication & Society, 18*(5), 569–582. doi:10.1080/1369118X.2015.1012532. Retrieved from https://www.researchgate.net/publication/276880312_Digital_inequalities_and_why_they_matter

Sariffodeen, M. (October 2016). We need to teach 10 million Canadians to code or we'll get left behind. *The Globe and Mail*. Retrieved from http://www.theglobeandmail.com/report-on-business/rob-commentary/we-need-to-teach-10-million-canadians-to-code-or-well-get-left-behind/article32334031/

Scottish Council for Voluntary Organisations. (n.d.). One Digital: Building digital skills in the charity and voluntary sector. Retrieved from http://digital.scvo.org.uk/participation/one-digital/

Selwyn, N. (2004). Reconsidering political and popular understandings of the digital divide. *New Media & Society*, *6*(3), 341–362.

Smith, A. (2015). *Searching for work in the digital era*. Pew Research Centre. Retrieved from http://www.pewInternet.org/2015/11/19/searching-for-work-in-the-digital-era/

Smith, C. (2015). An analysis of digital inclusion projects: Three crucial factors and four key components. *Journal of Information Technology Education: Research*, *14*, 179–188. Retrieved from http://eric.ed.gov/?q=digital+AND+inclusion+AND+research&id=EJ1084453

Smith, D. T., & Graham, R. (2012). Household expenditures on information and communication technologies: A proposal for a digital practice model. *Race, Gender & Class, 19*(3/4), 161–178.

Smith, M. C., Rose, A. D., Ross-Gordon, J., & Smith, T. J. (2015). *Adults' readiness to learn as a predictor of literacy skills*. Retrieved from https://static1.squarespace.com/static/51bb74b8e4b0139570ddf020/t/54da7802e4b08c6b90107b4f/1423603714198/Smith_Rose_Ross-Gordon_Smith_PIAAC.pdf

Smythe, S. (2012). *Incorporating digital technologies in adult basic education*. AlphaPlus. Retrieved from http://www.alphaplus.ca/download/incorporating-digital-technologies-in-adult-basic-education-concepts-practices-and-recommendations/

Smythe, S. (2013). Incorporating digital technologies in adult literacy settings: Toward an equity-driven conceptual framework. In C. Kawalilak, & J. Groen (Eds.), *Proceedings of the Canadian Association for the Study of Adult Education* (CASAE) (pp. 563–568). Retrieved from http://casae-aceea.ca/~casae/sites/casae/files/2013_CASAE_Proceedings_0.pdf

Smythe, S. (2014). Exploring digital literacies and inequalities: Digital learning in the library. In *Proceedings of the Canadian Association for the Study of Adult Education* (CASAE) (pp. 237–240). Retrieved from http://journals.msvu.ca/ocs/index.php/casae2014/CASAE14/paper/viewFile/40/51

Smythe, S. (2015). Ten years of adult literacy policy and practice in Canada. *Language and Literacy: A Canadian E-Journal*, *17*(2), 4–21. Retrieved from http://ejournals.library.ualberta.ca/index.php/langandlit/article/view/24377/18363

Smythe, S., & Breshears, S. (2017). Complicating access: Digital inequality and adult learning in a public access computing space. *Canadian Journal for the Study of Adult Education*, *28*(2), 67–81.

Statistics Canada. (2012). *Canadian Internet use survey, 2012*. Retrieved from http://www.statcan.gc.ca/daily-quotidien/131126/dq131126d-eng.pdf

Statistics Canada. (2013a). *Individual Internet use and e-commerce, 2012*. Retrieved from http://www.statcan.gc.ca/daily-quotidien/131028/dq131028a-eng.htm

Statistics Canada. (2013b). *Skills in Canada: First results from the Programme for the International Assessment of Adult Competencies (PIAAC)*. Retrieved from http://www.cmec.ca/Publications/Lists/Publications/Attachments/315/Canadian-PIAAC-Report.EN.pdf

Sturm, M. (2011). *What is in a technology competency? A recipe for the skill(ed) use of digital tools*. AlphaPlus. Retrieved from http://www.alphaplus.ca/download/what-is-in-a-technology-competency-a-recipe-for-the-skilled-use-of-digital-tools/

Usher, A. (October 2016). *Stuff and nonsense about coding*. Retrieved from http://higheredstrategy.com/stuff-and-nonsense-about-coding/

Van Deursen, A., & Van Dijk, J. (2009). Improving digital skills for the use of online public information and services. *Government Information Quarterly*, *26*(2), 333–340. Retrieved from http://www.alexandervandeursen.nl/Joomla/Articles/Journal/2009%20-%20Improving%20digital%20skills.pdf

Van Deursen, A., & Van Dijk, J. (2014). The digital divide shifts to differences in usage. *New Media & Society, 16*(3): 507–526. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/1461444813487959

Van Deursen, A., & Van Dijk, J. (2016). Modeling traditional literacy, Internet skills and Internet usage: An empirical study. *Interacting with Computers, 28*(1), 13-26. Retrieved from https://www.researchgate.net/publication/265338437_Modeling_Traditional_Literacy_Internet_Skills_and_Internet_Usage_An_Empirical_Study

White, D. (2016). *Digital participation and social justice in Scotland*. Carnegie UK Trust. Retrieved from http://www.carnegieuktrust.org.uk/carnegieuktrust/wp-content/uploads/sites/64/2016/09/v3-2697-CUKT-Digital-Participation-summary.pdf

White, D. (2013). *Across the divide: Tackling digital exclusion in Glasgow*. Carnegie UK Trust. Retrieved from http://www.carnegieuktrust.org.uk/carnegieuktrust/wp-content/uploads/sites/64/2016/02/pub1455011597.pdf

Williams, J. (2014). New Zealand online: What's happened to our digital strategy? In E. Dodson & E. Papoutsaki (Eds.) *Communication issues in Aotearoa New Zealand: A collection of research essays* (pp. 80–94). ePress Unitec. Retrieved from http://www.unitec.ac.nz/epress/wp-content/uploads/2014/12/New-Zealand-Online_Whats-happened-to-our-Digital-Strategy-by-J.-Williams.pdf

Zickuhr, K. (2013). *Who is not online and why?* Pew Research Report. Retrieved from http://pewInternet.org/Reports/2013/Non-Internet-users.aspx

APPENDIX 1

Search and Analysis Details

A team of three was involved in the initial search. We also sought input on our search process from an academic expert in the field to ensure our search would be comprehensive. The search process was developed and overseen by an experienced librarian who also works in this area.

All resources were compiled in an online bibliographic database. Our search was broad and included academic databases; organizational databases in various jurisdictions; and general web searches for provincial and national initiatives, media articles and commentaries on the topic.

Academic Databases	Academic OneFile – Toronto Public Library (TPL)
	Canadian Business & Current Affairs (CBCA) Education (via ProQuest) – TPL
	The Learning and Technology Library (LearnTechLib) (formerly Education & Information Technology Library [EdITLib]) – available online
	Education Resources Information Center (ERIC) – available online
Jurisdictional Databases	Copian (hosted by Le Centre de documentation sur l'éducation des adultes et la condition féminine [CDÉACF]) – Canada
	MediaSmarts (Canada's Centre for Digital and Media Literacy)
	National Centre for Vocational Education Research (NCVER) – Australia
	Digital Literacy Acquisition and Equity Research Hub – U.S.
	Literacy Information and Communication System (LINCS) Resource Collection – U.S.
	National Institute of Adult Continuing Education (NIACE) – England and Wales
	Doteveryone – U.K.
	National Adult Literacy Agency (NALA) – Ireland
	Education Scotland (adult learning resources)
	One Digital – Scotland
	Electronic Platform for Adult Learning in Europe (EPALE)
	Studera.nu (Sweden's adult education portal and documentation, English version)
Other	Ontario and federal government policies, policy evaluations, position papers and program design mandates

General web search for media articles and commentaries from researchers and policy experts

Search Terms Used

- Acquisition of digital literacy
- Digital literacy
- Digital skills
- Technology skills
- Computer literacy
- Online skills
- Internet skills
- 21st century skills
- Digital skills for employment
- Digital skills for social inclusion
- Digital exclusion
- Digital equity
- Digital equality
- Digital divide
- Internet access
- Broadband access

Analysis and Synthesis

Once an initial search was completed, all items were tagged in the database. They were then reviewed again for relevance and alignment with the research questions. The working set of resources was approximately 90 items. All resources were then organized into categories and subcategories used to address the research questions. Resources were reviewed again during the writing process. Some items became anchor resources, suppling valuable additional information. Additional resources were added at this point using reference lists. The final number of references, including the annotated bibliography, is 176.

APPENDIX 2

Annotated Bibliography of Policy, Programs and Practices Outside of Ontario

The annotated biography is an overview of digital policy and programs in other jurisdictions. Promising practices are bolded and also appear in the body of the report.

United States

The U.S. has some of the most innovative programs related to supporting collaborative and connected learning and leveraging opportunities. Connectivity and affordability initiatives are left to corporations at the national level, similar to Canada. Although the U.S. does not have a national digital strategy in place, regional efforts in some jurisdictions, particularly the state of Washington, are promising.

Digital Strategies

Institute of Museum and Library Services, University of Washington Technology & Social Change Group, & International City/ County Management Association. (2011). *Proposed framework for digitally inclusive communities.* Retrieved from http://files.eric.ed.gov/fulltext/ED521127.pdf

This final report proposes a framework for digitally inclusive communities that provides a roadmap to help communities chart a course toward improving digital inclusiveness and consists of four components: (1) a vision for the future, (2) principles that define digital inclusion, (3) goals to make digital inclusion a reality and (4) strategies for achieving the goals. Strategies need to involve four main levels of activity: local government; libraries, community-based organizations and other community anchor institutions; businesses; and individuals. In addition, stakeholders will need to focus on the broader level of strategic activity influencing policy.

City of Portland. (2016). *Digital equity action plan (DEAP).* Retrieved from https://www.portlandoregon.gov/revenue/article/573122

The City of Portland recently adopted a comprehensive *Digital Equity Action Plan* (DEAP). The effort was developed and championed by the city, county and public library. The plan articulates five digital equity goals:

1. **Access** – Ensure access to affordable high-speed Internet and devices for those in need.

2. **Training/support** – Provide training and support to ensure that everyone has the skills to use digital technology to enhance their quality of life.
3. **Leadership/capacity-building** – Empower community partners to bridge the digital divide through funding, co-ordination, training and staff resources.
4. **Connectivity to the digital economy** – Create opportunities for jobs in the digital economy for underserved populations.
5. **Policy** – Build a policy framework that supports digital equity and meaningful Internet adoption, leading to better community outcomes.

Connectivity and Affordability Initiatives

Comcast. (n.d.) *Internet Essentials from Comcast*. Retrieved from https://Internetessentials.com/

Comcast's Internet Essentials provides low-cost Internet access and computers for eligible families that (1) have at least one child who qualifies for the National School Lunch Program, (2) do not have outstanding debt to Comcast that is less than a year old and (3) live in an area where Comcast Internet service is available but have not subscribed to it within the last 90 days. Through a partnership network, free classes on how to use the Internet and more are available in communities.

Comcast. (2016). *Connection is essential: A five year progress report.* Retrieved from http://corporate.comcast.com/images/Internet-essentials-five-year-progress-report.pdf

Internet Essentials has connected 750,000 families, or three million low-income Americans, to the Internet at home over the last five years (51 per cent have a high school education or less). Customers (89 per cent) say they use the Internet every day or almost every day for homework and school projects (98 per cent) and that it helped them or someone in their family (51 per cent) to apply for a job. Internet Essentials claims that $300 million invested by Comcast in digital literacy initiatives has benefitted more than 4.4 million people.

Train the Trainer Models

The Nonprofit Technology Network. (n.d.). *Digital Inclusion Fellowship*. Retrieved from https://www.nten.org/major-initiatives/dif/about/

The Nonprofit Technology Network (NTEN) pairs local community advocates trained by digital inclusion experts with community organizations to figure out what digital literacy needs their communities

have and to build unique classes, programs and resources to address those needs. The projects build sustainable, effective digital literacy programs that can act as the foundation for long-term digital inclusion efforts in their community. The main funder is Google Fiber, which is covering a salary for the local experts, a small grant for the participating city and payment for NTEN's administrative costs.

The Nonprofit Technology Network. (2016). *Digital inclusion toolkit: Resources and case studies from the Digital Inclusion Fellowship*. Retrieved from https://nten.org/NTEN_images/reports/2016.DIF_Toolkit.pdf

This report highlights some of the successes and challenges of the Digital Inclusion Fellowship project, including reflections and strategies to integrate digital literacy with other programs, assess community needs, expand digital literacy programs, identify partners around digital literacy, and build awareness around Internet relevance and digital skills. A toolkit to support practitioners in building digital literacy programs within their organizations and with community partners includes resources on topics such as best practices on volunteer recruitment, classroom logistics, digital literacy resources and partnership development.

Digital Literacy in New York. (n.d.). Retrieved from http://diglitny.org/index.php/trainers

This train-the-trainer program provides teacher training, curriculum, lesson plan and assessment resources to meet the goal of closing the digital divide and increase digital literacy levels in unserved and underserved urban and rural communities. Strategies include the following: (1) develop programs that focus on increasing digital literacy levels for homes at or below the poverty level, (2) adopt statewide digital literacy standards to ensure educational programs incorporate minimum computer proficiency standards and (3) partner with public and private community-based computer training organizations to provide access to training for people without computers in the home or business.

Adult Literacy Research at Portland State University

Digital Literacy Acquisition and Equity Research Hub. (n.d.). [Blog post]. Retrieved from https://dlaerhub.wordpress.com/

The Literacy, Language & Technology Research Group (LLTR) is a community of faculty, staff and graduate students at Portland State University as well as collaborating colleagues in other institutions. LLTR conducts a wide range of externally funded grant projects centred

on the acquisition of literacy, digital literacy and second languages among adults, especially members of economically vulnerable and socially excluded populations.

Project 1: Advancing Digital Equity in Public Libraries: Assessing Library Patrons' Problem-Solving in Technology Rich Environments

This project is focused on the use of problem-solving in the technology-rich environments domain developed for the international literacy testing program overseen by the Organization for Economic Co-operation and Development (OECD).

Withers E., Castek, J., Fountain, R., Pizzolato, D., Pendell, K., Jacobs, G., & Reder, S. (2015). *Operationalizing success in a digital learning environment designed to support vulnerable adults*. Presented at the AERA. Retrieved from http://pdxscholar.library.pdx.edu/digital_literacy_acquisition_findings/6/

Project 2: Tutor-Facilitated Digital Literacy Acquisition in Hard-to-Serve Populations

Six lead partners developed local networks of community organizations to provide adults with an opportunity to learn to use computers and the Internet. Implementation strategies are different from one program to another but all included curriculum on the Learner Web, an online platform designed specifically for adult learners, in-person tutor support, and the opportunity for learners to work at their own pace and identify their own goals. Project data indicates that the way a program is embedded within a community and interconnected with other organizations and institutions served to stretch limited and underfunded community resources so they could be shared.

Pendell, K., Pizzolato, D., Withers, E., Castek, J., Jacobs, G., & Reder, S. (2015). *Developing digital literacy: A flexible model designed to meet learners' needs.* Presented at the Oregon Library Association Conference. Retrieved from http://pdxscholar.library.pdx.edu/digital_literacy_acquisition_findings/8/

The use of a structured online learning platform with in-person help has proven to be a creative, sustainable approach that was responsive to learners' needs. A learner path sets out three stages: entry (I'm not going to break it), program interaction (I can do it), and skills integration and discovery (This is important to me). With this learning model, many learners develop confidence (general feeling of being capable) and self-efficacy (belief in one's digital literacy skills). Self-paced learning, tutor support and using the Learner Web lead to confidence and self-efficacy.

Pendell, K., Withers, E., Castek, J., & Reder, S. (2013). Tutor-facilitated adult digital literacy learning: Insights from a case study. *Internet Reference Services Quarterly, 18*(2), 105–125. Retrieved from http://dx.doi.org/10.1080/10875301.2013.800013

This case study presents findings on a digital literacy learning model that utilizes a self-paced online platform and in-person volunteer tutors. The researchers found that the learner-tutor relationship is an essential part of the learning process, and that tutors develop a variety of strategies for helping learners. The researchers also identify aspects of effective program implementation.

Jacobs, G., Castek, J., Pizzolato, D., Reder, S., & Pendell, K. D. (2014). Production and consumption: A closer look at adult digital literacy acquisition. *Journal of Adolescent & Adult Literacy*, *57*(8), 624–627. Retrieved from http://archives.pdx.edu/ds/psu/15422

Project 3: Learner Web Project

The Learner Web is a comprehensive online learning platform for vulnerable adults that supports professional development and tutoring, community collaboration and post-secondary access and success. The resources are adaptable to the needs of specific regions and individual learners. Unlike pre-packaged online resources, learners and programs are able to assemble activities and modules to meet their needs. Learners use individualized learning plans and e-portfolios to track their work and accomplishments. The model supports a key finding from the Longitudinal Study of Adult Learning (LSAL) project (highlighted below), in which adults move in and out of programs as they gradually move toward meeting a specific goal.

Project 4: **Longitudinal Study of Adult Learning**

The LSAL is one of the few longitudinal studies of the learning trajectories of adults who did not complete high school. The nearly ten-year study provides invaluable insights into an adult's learning path and the relationship with family life and work, post-secondary access, high school completion, employment and overall literacy proficiency gains (measured using the scores and levelling system developed for international adult literacy assessments used by the OECD).

Connected, Collaborative and Interest Driven Learning

Ito, M., Gutierrez, K., Livingstone, S., Penuel, B., Rhodes, J., Salen, K., ... Craig, W. (2012). *Connected learning: An agenda for research and design*. Retrieved from http://clrn.dmlhub.net/publications/connected-learning-an-agenda-for-research-and-design

This report is a synthesis of ongoing research, design and implementation of an approach to education called "connected learning." It advocates for broadened access to learning that is socially embedded, interest-driven and oriented toward educational, economic or political opportunity — that is, leveraging digital learning opportunities. This model is based on evidence that the most resilient, adaptive and effective learning involves individual interest as well as social support to overcome adversity and provide recognition. This report also offers a design and reform agenda, grounded in a rich understanding of child and youth development and learning, to promote and test connected learning theories. Connected learning environments ideally embody values of equity, social belonging and participation. These environments, when leveraging new media, generally have the following characteristics:

- Production-centred – Digital tools provide opportunities for producing and creating a wide variety of media, knowledge and cultural content in experimental and active ways.
- Shared purpose – Social media and web-based communities provide unprecedented opportunities for cross-generational and cross-cultural learning and connection to unfold and thrive around common goals and interests.
- Openly networked – Online platforms and digital tools can make learning resources abundant, accessible and visible across all learner settings.

Project: Connected Learning Massive Open Online Course

One of the ways that the Connected Learning initiative reaches educators is offering an annual Massive Open Online Course designed to inform, share best practices and help educators and other digital mentors connect with each other.

Digital Promise. (2016). About. Retrieved from http://digital promise.org/

Digital Promise is a non-profit organization authorized by the U.S. Congress to spur innovation in education in order to improve the opportunity to learn for all Americans. Through its work with educators, entrepreneurs, researchers and leading thinkers, Digital Promise supports a comprehensive agenda to benefit lifelong learning and provide Americans with the knowledge and skills needed to compete in the global economy.

Designing for Technology Adult Learners: Applying Adult Learning Theory

This research brief outlines key principles of online instructional design for adult learners: (1) start with personal experience, (2) take a problem-solving orientation, (3) give opportunities for reflection, (4) provide opportunities for adults to control their own learning and (5) support transformative learning.

Designing Technology for Adult Learners: Support and Scaffolding

This companion brief focuses on the technical design elements of online learning for adults: (1) keep lessons short and focused, (2) rely on the visual, (3) supply numerous resources in an accessible way, (4) increase learner-teacher connections and (5) help learners engage with each other.

Educator Innovator. (2016). About. Retrieved from http://educatorinnovator.org/about/

Educator Innovator provides an online meetup for educators who are re-imagining learning. It is both a blog and a growing community of educators, partners and supporters. If we want to educate a generation of young people to be innovators — to create, build, design and use their talents to improve their world — we need to value the creative capacity in the mentors and teachers who support them. Educator Innovator gathers together like-minded colleagues and organizations who value open learning for educators and whose interests and spirits exemplify connected learning: an approach that sees learning as interest-driven, peer supported and oriented toward powerful outcomes. Educator Innovator and its partners support learning opportunities for teachers, youth workers, mentors, librarians and museum educators that are open, re-mixable, typically free or low-cost, and share the goal of more powerful and connected learning for youth. Educator Innovator does not see learning as the province of one institution or service, but rather sees our learning institutions and organizations as a larger ecosystem for learning — one that can be more powerful by being more connected.

United Kingdom

Despite the comprehensive aims of a digital strategy in the U.K., as outlined in key reports, no additional funding or support was provided to address the needs of the U.K.'s vulnerable adults. Instead, the bulk of the responsibility was offloaded to existing adult literacy, language and vocational training programs.

FE Week. (October 2016). Computer skills to be fully funded through existing adult education budget. Retrieved from http://feweek.co

.uk/2016/10/01/it-skills-to-be-fully-funded-through-existing-adult-education-budget/

Rather than providing additional funding to support the development of digital literacy, the U.K. government recently announced that currently funded programs would simply integrate IT courses with existing English and math courses. This announcement was made 13 years after then prime minister and leader of the Labour Party, Tony Blair, tabled the idea of "basic ICT skills becoming a third area of adults' basic skills."

House of Lords. (2014). ***Make or break: The UK's digital future.*** **Select Committee on Digital Skills, Report of Session 2014–15. Retrieved from http://www.publications.parliament.uk/pa/ld201415/ldselect/lddigital/111/111.pdf**

Despite the comprehensive aims of a digital strategy, as outlined in this report and one below, no additional funding or support was provided to address the needs of the U.K.'s vulnerable adults.

The report argues that adults need more opportunities to learn throughout their lives to adjust to a world changing in ways as yet unknown. Education needs a greater emphasis on providing every citizen with adaptable digital skills. In the exhaustive summary of conclusions and recommendations, the core preconditions for the Digital Agenda deserve mention: (1) provide universal coverage of hard infrastructure; (2) define the Internet as a utility service that is available for all to access and use; (3) accelerate the attainment of digital literacy across the population; (4) increase the number of women in digital and STEM (science, technology, engineering and mathematics), and engage girls earlier and across all education levels; (5) train and deploy people with a level of ability in cyber risk management; and (6) increase the level of awareness amongst the population regarding online safety and personal risk management.

Azad, S., Gurum, A., Koss, V., & Rosenthal, E. (2012). ***This is for everyone: The case for universal digitisation.*** **Booz & Company. Retrieved from http://www.strategyand.pwc.com/reports/this-everyone-case-universal-digitisation**

Written with the well-known cross-sector charity Go ON UK, this report presents the socio-economic case for universal digitization, particularly in the U.K. Based on quantitative research, it highlights the socio-economic case for improving the digital infrastructure and promoting usage as only those online can benefit from this improvement. Report authors write the potential benefits include enjoying a better quality of life through improved education, health, wealth and well-being,

including the potential to reduce social isolation by enabling people to stay connected to family and friends. They also outline potential benefits for small and medium-sized businesses, the non-profit sector, and government, particularly the ability to reduce costs.

Catherdale College. (2017). Citizen Maths. Retrieved from https://www.citizenmaths.com/

Citizen Maths is a free online math course designed to help adults "learn maths in a new way." The course is designed for independent learning outside the context of a formal course or program. The activities are focused on solving practical problems in five areas: proportion, uncertainty, representation, pattern and measurement. Each section take five to ten hours to complete and is built around short video lessons combined with demonstrations and online apps to try out new problem-solving activities.

What is the DiAL-e? (n.d.). Retrieved from https://dial-e.net/what-is-the-dial-e/

DiAL-e is a comprehensive learning design framework to support teachers and curriculum developers to develop learning opportunities around digital artefacts (often video) that could be used in a variety of learning environments. It was developed jointly by two university researchers in the U.K.

Ireland

Ireland developed a very broad strategy with some short-term funding for existing community and non-profit programs to teach adults basic digital skills. The funding period ended June 2016.

Department of Communications, Climate Action & Environment. (2013). *Doing more with digital: National Digital Strategy.* Retrieved from http://www.dccae.gov.ie/communications/Lists/Publications%20Documents/National%20Digital%20Strategy%20July%202013%20compressed.pdftional-Digital-Strategy-for-Ireland.aspx

Ireland developed a comprehensive National Digital Strategy (NDS), presenting research findings and goals for more and better digital engagement by citizens and small business, and in education. Within the overall strategy are a suite of complementary national measures, including a national broadband plan, the e-government strategy, the e-health strategy and a jobs plan. A key aspect is what is called "citizenship engagement," with the goal to get half of the existing "non-liners" (people who have not yet engaged with the Internet) online. To do

this, they developed an awareness campaign to convey to "non-liners" what they could do online and to highlight to existing users other ways they could use and benefit from further digital engagement. The government also used an existing funding mechanism (BenefIT training grants) to provide training in communities and developed an online mapping resource to help people find courses.

The BenefIT Programme: BenefIT enables basic digital literacy training to be delivered to citizens. Retrieved from http://www.dccae.gov.ie/communications/en-ie/Digital-Strategy/Pages/Basic-IT-Training.aspx

Starting in 2008, the BenefIT program provided funding to community, voluntary and not-for-profit organizations to provide basic digital literacy training. Over 156,000 training places were provided in over 700 locations across Ireland. The program closed in June 2016 with plans to develop a replacement. Courses were a minimum of eight hours with a maximum class size of ten. It was also possible to provide one-on-one support. Mandatory course topics included sending emails, Internet searches, making an online purchase, use of social networking and use of online TV. Elective topics included safety and security, digital photography, online banking, use of government e-services, use of apps, buying items online and topics of interest to the trainee.

Scotland

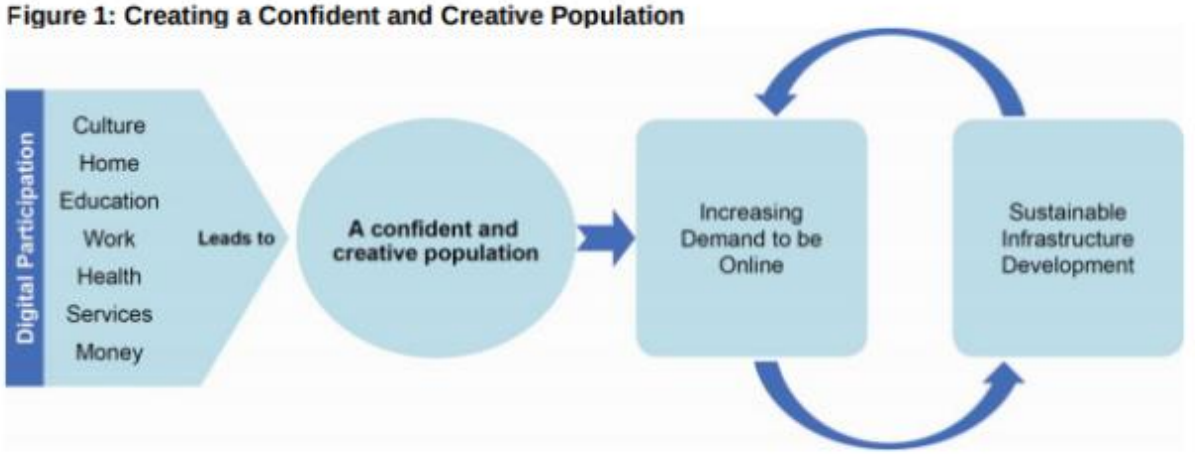
The Scottish government's digital strategy was set out in *Scotland's Digital Future: A Strategy for Scotland*, published in March 2011. This sets out the actions required to ensure that Scotland is able to take advantage of the opportunities of the digital age. The strategy consists of four interrelated strands: infrastructure, participation, economy and public services. The Scottish government has established a single, integrated digital directorate to oversee and ensure the delivery of this strategy in a co-ordinated manner. The recently launched Digital Scotland website (www.digitalscotland.org) summarizes the progress that is being made with each element of the strategy.

Government of Scotland. (2014). *Digital participation: A national framework for local action*. Retrieved from http://www.gov.scot/Resource/0044/00448804.pdf

This report contextualizes a proposed framework of improving digital participation in strong partnerships with communities, businesses, the third sector and public bodies to create a positive digital culture where best practice is shared and embedded. Investment in infrastructure allows people to be digitally connected, however the real benefits of the

Internet — for people, for businesses and indeed for governments — will only be realized if we have a digitally confident, creative and skilled population that is able to make full use of any time, any place, anywhere connectivity. This will maximize the benefits people can derive from technology and will, in turn, increase demand for digital services, drive demand for increasingly faster connectivity and attract further investment in digital infrastructure. (p. 3)

Figure 1: Creating a Confident and Creative Population



Royal Society of Edinburgh. (2014). *Spreading the benefits of digital participation.* Retrieved from https://www.royalsoced.org.uk/cms/files/advice-papers/inquiry/digitalparticipation/pages/j321440/j321440.pdf

Royal Society of Edinburgh describes access to the Internet as a "right." The report articulates a number of key recommendations for the government, including access to affordable and fit-for-purpose digital infrastructure and ensuring that the population has the digital skills required through formal education, workplace training and lifelong and community learning.

Scottish Council for Voluntary Organisations. (n.d.). *One Digital: Building digital skills in the charity and voluntary sector.* Retrieved from http://digital.scvo.org.uk/participation/one-digital/

In this innovative project, over 1,000 staff and volunteers participated in a series of digital inclusion and participation workshops in order to become champions and support access and learning opportunities for the vulnerable adults they work with. They participated in three one-day workshops: (1) Action Learning, to help senior leaders identify and address digital issues and problems, (2) Making Digital Everyday, focused on ways to support literacy development with clients by

embedding digital use in everyday encounters and 3) Making Digital Work, focused on training staff in third-sector organizations to disseminate basic digital skills within their work environment.

McGillivray, D., Jenkins, N., & Mamattah, S. (2016). *One Digital Scotland programme: Evaluation report*. School of Media, Culture & Society, University of the West of Scotland. Retrieved from http://digital.scvo.org.uk/files/MCS%20SCVO%20Report%20WEB.pdf

Based on the data collected, the One Digital project in Scotland appears to have been successful in implementing supported learning activities that stimulated capacity for digital skills development. The report presents the following conclusions: (1) action learning sets have produced strong peer support networks but these will need to be supported through ongoing activity and perhaps financially resourced if they are to be sustainable in the longer term, (2) senior leaders have increased knowledge and understanding about the potential of digital, (3) senior leaders have been able to translate their increased knowledge and understanding about the potential of digital into tangible outputs, (4) participants using materials and approaches contained within the training pass on digital skills to the organization's end-users and (5) participants who are looking to develop their organization's strategic approach to digital skills are likely to be a key ingredient in producing long-term positive outcomes.

White, D. (2013). *Across the divide: Tackling digital exclusion in Glasgow*. Carnegie UK Trust. Retrieved from http://www.carnegieuktrust.org.uk/carnegieuktrust/wp-content/uploads/sites/64/2016/02/pub1455011597.pdf

This report highlights that while digital exclusion is a significant problem, there is evidence of low take-up in Glasgow, Scotland. Recommendations state that a newly established Digital Participation Glasgow group should provide strategic oversight and leadership to the goal of tackling digital exclusion by (1) tackling the barriers to digital participation for those citizens who currently have no access to the Internet at home; (2) adding to its membership organizations with a stake in improving digital access in the city and that can play a leading role in helping to achieve this objective; (3) considering how the group links in with other digital participation structures locally and nationally; (4) helping co-ordinate the activities of its different members specifically around digital participation and identifying opportunities for shared initiatives to maximize impact; (5) conducting a comprehensive mapping exercise to identify the full range of different digital participation

initiatives currently being offered; (6) seeking to establish a Digital Participation Fund that could be used to support joint initiatives to improve digital participation; (7) creating a single "brand" as a badge for all initiatives focused on tackling digital exclusion that emphasizes the benefits and opportunities digital participation might offer, focuses on different "hooks" to help to engage different groups of citizens and gives consideration to the role that local "role models" or "digital champions" can play; and (8) seeking to identify how trusted intermediaries (such as voluntary workers, community development workers, health professionals, librarians, social workers and housing officers) can help to deliver the personalized, differentiated approach that is needed to help different groups of citizens.

European Union

The European Union (EU) has developed a comprehensive strategy with funding supports to ensure equitable digital access and inclusion for all.

European Commission. (2016). *Digital inclusion for a better EU society*. Retrieved from https://ec.europa.eu/digital-single-market/en/digital-inclusion-better-eu-society#Article

Digital inclusion for a better EU society aims to make ICT more accessible for all and foster new methodologies for technology development (design for all). Funded projects include technologies for the blind, deaf, hard-of-hearing and learning-disabled, along with web accessibility initiatives and social inclusion robotics apps. In addition, projects target youth and the NEETs (Not in Employment, nor in Education or Training), the economically inactive, immigrants and the elderly.

European Commission. EU Science Hub (2016). *The digital competence framework*. Retrieved from https://ec.europa.eu/jrc/communities/community/hr-circle-community and https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework

DigComp 2.0 identifies the key components of digital competence in five areas: (1) information and data literacy, (2) communication and collaboration, (3) digital content creation, (4) safety and (5) problem-solving. The DigComp conceptual reference model elaborates a second dimension of these competence areas in detail, articulating digital technology knowledge and skills. The DigComp framework has been endorsed by EU member states, and several member states already use DigComp in different ways. It has various European-wide implementations.

Germany's Public Licensing Fees

Beitragsservice von ARD, ZDF und Deutschlandradio. (n.d.). In *Wikipedia*. Retrieved December 29, 2016, from https://en.wikipedia.org/wiki/Beitragsservice_von_ARD,_ZDF_und_Deutschlandradio

The Beitragsservice von ARD, ZDF und Deutschlandradio (the fee collection service of ARD, ZDF and Deutschlandradio that is commonly referred to simply as Beitragsservice), is a joint organization of Germany's public broadcasting institutions ZDF, Deutschlandradio and the ARD state broadcasting institution that is located in Cologne. The Beitragsservice is responsible for collecting licence fees. Mandatory licence fees for every household are set in the Rundfunkfinanzierungsstaatsvertrag (state treaty on the financing of broadcasting). Since 2013, these fees must be paid by every household in Germany, regardless of whether the household actually has the capability to receive the broadcasts themselves. Until 2013, it was known as GEZ, short for Gebühreneinzugszentrale der öffentlich-rechtlichen Rundfunkanstalten in der Bundesrepublik Deutschland.

There is reference to the right to free access to information, regardless of whether public providers are accessed via TV, radio, mobile phone or Internet. There is nothing specific about broadband infrastructure funding, it is however important for equitable access to quality content.

ARD ZDF Deutschlandradio Beitragsservice. (2016). *Licence fee for citizens.* Retrieved from http://www.rundfunkbeitrag.de/e175/e198/Informationsflyer_Buergerinnen_und_Buerger_englisch.pdf

The licence fee is not linked to a broadcasting device. It is irrelevant how many TVs, radios or computers there are at a residence. The licence fee is €17.50 per month and is only paid once per residence. The fee only has to be paid by people of legal age. Vehicles for private use are also covered by this fee. The fee model exempts those receiving social welfare payments that are dependent on income. They can apply for an exemption. People with disabilities pay a reduced fee.

Australia

Roy Morgan Research. (2016). *Measuring Australia's digital divide: The Australian Digital Inclusion Index 2016.* Retrieved from http://digitalinclusionindex.org.au/wp-content/uploads/2016/08/Australian-Digital-Inclusion-Index-2016.pdf

The Australian Digital Inclusion Index (ADII) has been created to measure the level of digital inclusion across the Australian population

and to monitor this level over time. The tool reveals the following: (1) digital inclusion is about social and economic participation, (2) digital ability is an area for further improvement, (3) affordability is a challenge for some groups and (4) digital inclusion is low for those with a disability and for indigenous peoples.

New Zealand

20/20 Trust New Zealand. (n.d.). Retrieved from http://2020.org.nz/about-us/

The 20/20 Trust is a non-profit organization dedicated to addressing issues resulting from the increasing use of information and communication technologies (ICTs) in order to initiate the development of community-based solutions. For two decades, it has played a key role in identifying and scaling up the widespread adoption of solutions that prove worthwhile. Some initiatives have become mainstream, some are taken up by other organizations, while others continue to be managed by 20/20 Trust. Still others have proven to be unsustainable.

The 20/20 Trust provides funding in partnership with several agencies, including the New Zealand Ministry of Education and a network of organizations in local communities throughout New Zealand, especially those at risk of digital exclusion. Programs include the following:

- Computers in Homes provides training, technical support, refurbished computers and home Internet to students' families in low-decile schools — helping 1,760 families in 2014–15. http://computersinhomes.nz/
- Digital Technologies in Schools research program provides critical information on the state of ICT infrastructure development and the use of digital technologies in schools. The program has run since 1993 and provides a comprehensive time series of data that spans some 21 years. http://2020.org.nz/resources/digital-technologies-schools/
- ICDL is a leading digital literacy program giving an internationally recognized qualification — the International Computer Driving Licence. For over a decade, ICDL has offered online training and online testing in New Zealand. The associated KiwiSkills program makes ICDL freely available to job seekers. http://icdl.nz/
- KiwiSkills is free online training to help getting a job. With KiwiSkills, job seekers learn important digital skills wanted by

employers and get an internationally recognized ICDL certificate to prove it. http://kiwiskills.nz/

- Stepping UP began in 2009 as a partnership between 20/20 Trust and Microsoft's Unlimited Potential program. It teaches people practical computer skills that help them at work and at home, with a series of two-hour training modules ("digital steps") available in their own community. Since 2012, all Computers in Homes graduates have been invited to participate in four digital steps to continue their digital learning journey. Altogether, 1,315 individuals participated in Stepping UP in 2014–15, over 850 in 2015–2016, and over 900 in the first seven months of 2016. http://steppingup.nz/

Despite the work of 20/20 Trust, a digital divide persists. The following resource explores why more than a series of initiatives is needed to address the digital divide.

Williams, J. (2014). New Zealand online: What's happened to our digital strategy? In E. Dodson & E. Papoutsaki (Eds.) ***Communication issues in Aotearoa New Zealand: A collection of research essays*** **(pp. 80–94). ePress Unitec. Retrieved from http://www.unitec.ac.nz/epress/wp-content/uploads/2014/12/New-Zealand-Online_Whats-happened-to-our-Digital-Strategy-by-J.-Williams.pdf**

This essay traces the evolution of a digital strategy in New Zealand, explores reasons why a digital divide persists in spite of it, and invites the reader to consider the importance of the social context for ICTs and social interaction that facilitates learning, at least as much as the technologies themselves.

- A set of conditions that are necessary for successfully embedding Internet use in a community.
- Digital inclusion depends on existing networks of support and leadership at a local community level, a context that can be described as socially cohesive. Governments have been prioritizing policy that serves social cohesion for some time, as well as expressing the belief that closing the digital divide will help to build it.
- Sufficient funding to fully support the "social facilitation" dimension that plays a key role in ensuring novice Internet users stay online and continue to develop their digital literacy in socially supported ways, including at home in a family context, remains a challenge.

The thinking behind the Digital Strategy has always been that it works on the basis of collaboration and partnerships. The Digital Strategy explicitly identified a role for the voluntary and community sector, alongside government and business, in making the strategy work.

Sweden and Singapore

Sweden and Singapore are recognized as the top two digital countries in the Digital Evolution Index of 2013 providing access and infrastructure, and fostering entrepreneurship, skill and "social media savviness" — all of which support innovation. In addition, both countries have strategies in place that extend opportunities to all, particularly those who are vulnerable or on the margins of digital engagement and opportunities. (Canada is in eighth place according to the index.)

Singapore

Soon, C. (October 2016). Leave no one behind in move to digital economy. *Asia One*. Retrieved from http://news.asiaone.com /news/asian-opinions/leave-no-one-behind-move-digital-economy

The Digital Inclusion Fund and the Silver Infocomm Initiative were set up to target low-income households and senior citizens respectively. Dr Jakob Nielsen, who studies and writes about making the Internet easier to use, says that a usability divide and an empowerment divide exist. While the former refers to inequality caused by the disparity in people's skills to utilize technology's capabilities, the latter refers to the gap that results from people's different propensities to harness ICT opportunities. The Singapore government will work with three social service organizations to connect with more needy households and teach them how to use their tablets through starter kits and classes. Another approach is aimed at helping users overcome the propensity barrier and motivating them to embrace ICT for learning, play and work.

Sweden

Government Offices of Sweden. (2011). *ICT for everyone: A digital agenda for Sweden*. Retrieved from http://www.government.se /contentassets/8512aaa8012941deaee5cf9594e50ef4/ict-for-everyone---a-digital-agenda-for-sweden

One of the four strategic areas addressed in their comprehensive strategy is digital inclusion. This includes ensuring the following conditions are addressed and met:

- Sustained access to a computer and a fixed or mobile connection that is sufficient for individual needs.
- Access to assistance to address problems.

- Full access and engagement for everyone who wants it.
- Better access to and usability of government e-services, including those with disabilities.
- Digital skills for all to support employment and entrepreneurship.
- Supporting digital skill development beyond schools so it is fostered at work and in other organizations.
- Building security awareness and trust for those who are hesitant to use ICT services.