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The ‘new normal’

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The 'new normal'

The newest student generation, sometimes called "*New Millennial Learners*,"[1] is growing up surrounded by digital media and technologies. For them, the ability to access information and communication technologies (ICT) is increasingly important to effectively participate in the economic, political, and social aspects of the so-called knowledge society.[2]

Digital literacies, which include information literacy, media literacy, and ICT literacy,[3] have been highlighted as a pillar of "21st century skills" in many influential international initiatives.

Technology is also changing the life of schools—it plays an increasingly important role in teaching and learning. New technologies can extend learning to spaces beyond classrooms, allow for new curricula that bring real-world problems into schools, and support new forms of assessment for learning that are both formative and immediate. In many cases, it is already transforming the role of teachers.[4] New technological innovations (e.g., mobile technologies, open content, learning analytics, educational games) are actively being incorporated into education,[5] and when ICT use is tied to good teaching, and informed by research on how people learn, research shows possibilities for substantial benefits for student learning.[6]

While there is widespread acknowledgement of the importance of ICT for today's students and schools, there is little current system-wide data about how—and how widely—technology is being used in Ontario schools.[7] This report presents new data from People for Education's 2014 survey of Ontario's elementary and secondary schools about the availability of technology in schools. We explore how technology is being used by teachers; questions of access and barriers to implementation; how digital technology is transforming learning resources; and the potential for learning 'beyond school walls'.

WHAT ARE DIGITAL LITERACIES?

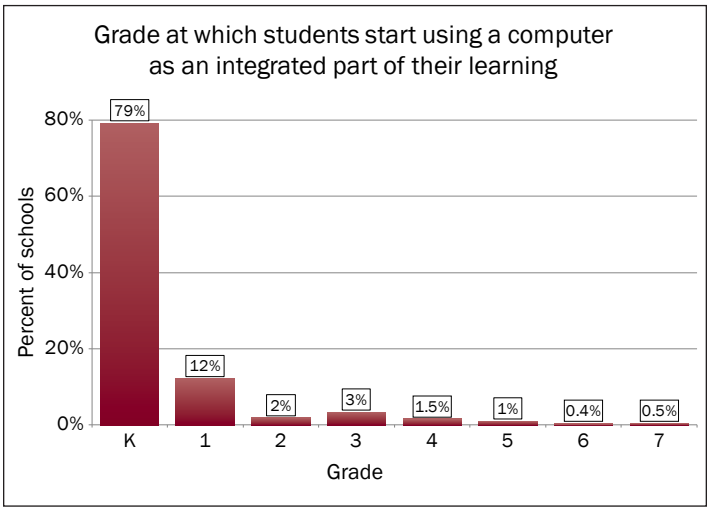
There are many ways of defining digital literacy. Key aspects include:

- *Information literacy:* the capacity to access and evaluate information, and to use and manage it;
- *Media literacy*: the ability to analyze media and to create media products; and,
- *Information and Communication Technologies (ICT) literacy*: the ability to apply technology effectively.[8]

EARLY INTEGRATION OF TECHNOLOGY IN ONTARIO SCHOOLS

In 99% of Ontario elementary and secondary schools, students have access to computers in school.

Perhaps more surprisingly, computer use starts for most students in kindergarten. Principals in 80% of Ontario elementary schools report students start using computers as an integrated part of their learning in kindergarten. Other research shows children may be exposed to technology well before they start school.[9]



We are beginning to integrate the technology more into our teaching and learning as opposed to it being a subject to itself. Students and staff are seeing it more as a tool as opposed to a magical machine.

Elementary school, Thunder Bay Catholic DSB

While some researchers have raised concerns that technology is not always well-integrated into teaching and learning,[10] comments from the surveys suggest that many educators are aware of this issue and report an improvement in the quality of *use* of computers. For example, a Principal in Thunder Bay Catholic DSB said, "We are beginning to integrate the technology more into our teaching and learning as opposed to it being a subject to itself. The Smartboard technology is beginning to be used more. Students and staff are seeing it more as a tool as opposed to a magical machine."

Even among the 4% of schools that report computer use starting in grade 4 or later, follow-up inquiries showed that in many cases students have computer access earlier, but that it is only in the later grades that the use becomes truly integrated into the learning. In this way, principals are making a distinction between learning the mechanics of working on a computer, and using them as part of students' learning.

As one principal who had reported that students started using technology as an integrated part of their learning in grade 5 explained:

Primary and grade 4 students may do occasional assignments with technology and the teacher may use the SmartBoard at times. The grade 5 to 8 students use it much more regularly, and it is much more visible in their classes—many individual students have SEA [special education] laptops, and the iCarts are regularly moved amongst the grade 5 to 8 classes.

Elementary school, Wellington Catholic DSB

WHERE DO STUDENTS ACCESS TECHNOLOGIES IN SCHOOL?

Survey results reveal most elementary schools provide multiple opportunities for students to use ICT. In Ontario's elementary schools, the most common place for students to access technology today is their own classrooms, followed by libraries, computer labs, and—in a majority of schools—students' own devices.

POINT OF ACCESS	SCHOOLS REPORTING STUDENT ACCESS
In classrooms	96%
In the library	85%
In a lab	76%
On their own devices	58%
No access	1%

The data show the computer lab is becoming less relevant in K–12 schools. This development may be because schools have more computers. In some cases, individual students may have them, or in many cases, schools have "mobile labs" where sets of computers are moved between classrooms. The rise of mobile devices, including smartphones and tablets, among students and their families is also making a difference.

BRING YOUR OWN DEVICE

The 58% of schools reporting that students are "using their own devices" is also worth attention. This indicates the practice of "bring your own device (BYOD)"—common in many workplaces—has extended to education.

A scan of school board practice across the province shows this trend spreading.

Peel DSB encourages its 153,000 public school students to bring their smartphones, iPads, tablets and laptop computers to class so that their access to technologies does not end when they step out of computer labs. In addition, the board has invested in wireless and bandwidth upgrades and purchased devices to ensure equity of access among students.[11]

A Principal in Hastings and Prince Edward County DSB reported that BYOD was helping to improve access to computers for all students:

> **We have purchased iPads for the school to address the inequities of access. We also have classes who use the BYOD model so everyone has a device to use, between school and student-owned devices (iPods, iPads, DS's).**
>
> *Elementary school, Hastings and Prince Edward County DSB*

The Ottawa Catholic DSB reports that the majority of its schools have adopted this BYOD practice,[12] and the Upper Grand and Waterloo Region boards have also launched similar initiatives. Other school boards are watching the progress of the trend.

CHALLENGES WITH ACCESS TO TECHNOLOGY AT SCHOOL

While principals were excited about the changes in the use of technology in their schools, they also report many challenges, including lack of network infrastructure and slow or unstable wireless access. One school in Northern Ontario reported, "We do not have the bandwidth to support a lot of internet activity in our school or in our board. This provides a great challenge for us. We are lagging behind."[13] Many principals commented on the frustrations of using out-of-date technology and the expense of staying current.

> **In an old school it is very difficult to be connected to the internet through wireless. It is a huge expense for a board and while there is a list of when we will have wireless, we are being expected to be technology savvy when the infrastructure is not there.**
>
> *Elementary school, Hamilton-Wentworth DSB*

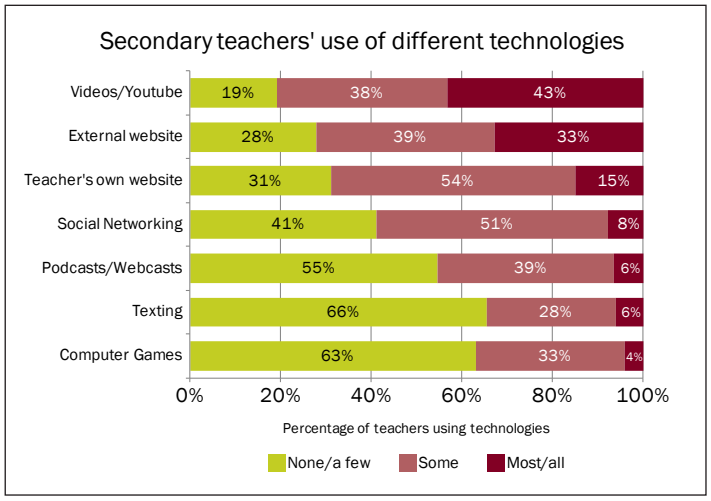
Many principals expressed concern over the cost of technology within their school budgets. Elementary and secondary principals report that they struggle to keep up with technological innovation, and even the cost of maintenance was a major concern.

> **We do not have the bandwidth to support a lot of internet activity in our school or in our board. This provides a great challenge for us. We are lagging behind.**
>
> *Secondary school, Superior-Greenstone DSB*

TECHNOLOGY USE IN SECONDARY SCHOOLS

In secondary schools, 44% of principals report that most or all of their teachers use videos or Youtube for instruction, and 33% report that most or all teachers use external websites for instruction.

On the other hand, far fewer schools report their teachers use technologies such as gaming or social networking, despite the fact that these forms of ICT are widely seen as holding significant pedagogical potential.[14] Only 4% of principals reported most/all of their teachers use gaming, and only 8% report that most or all of their teachers use social networking tools for instruction. A considerable portion of teachers are experimenting with social media—51% principals report *some* of their teachers are using them—but they are still not widely used for teaching.



Not all staff is on the same page with technology, some staff members even fear it.

Secondary school, CDSC de Nouvel-Ontario

Our results demonstrate wide variation in the level of technology use within schools. While it is clear that technology *is* being widely used, there is no technology that the majority of principals report "most" or "all" of their teachers are using. This variation is reflected in comments from principals which suggest technology use remains dependent on individual teachers. One principal commented, "Teachers who are newer to the profession (and sometimes this corresponds with age), are more apt to use social media, websites, blogs, podcasts, Twitter, YouTube, etc. and other technologies to teach/deliver curriculum."[15] Another remarked, "getting staff to buy in to using technology to engage kids is a mixed front but coming along."[16] A principal from CDSC de Nouvel-Ontario remarked, "Not all staff is on the same page with technology, some staff members even fear it."

The underuse of some forms of ICT may in part be due to lack of teacher experience or training. In Larry Cuban's influential book, *Oversold and Underused: Computers in the Classroom*, he identified a gap in the systematic implementation of meaningful and rigorous professional development in relation to ICT-based instruction, either for pre-service or in-service teachers.[17]

Other studies have found that even if educators are well-prepared by their pre-service education, they are still likely to face significant barriers to integrate ICT, including curricular constraints, constraints around access, lack of technical support and preparation time.[18]

Many principals in our study identified the need for professional development, along with the need for technical support. A number of principals commented on strategies that made a difference in improving ICT use: support of resource staff at the board level to help identify ways to use technology, and mentorship between teachers within the school were both identified by several principals as being useful.

A DIGITAL DIVIDE?

Not all students have the same kinds of access to digital technologies. The "digital divide" refers to the gap between the privileged and underprivileged members of society in terms of their ability to access digital tools and the Internet.

In Canada, 83% of households have access to the internet at home, but a closer look at the numbers shows a stark divide between the top and bottom quartiles of family income. 98% of families in the top quartile have internet access, compared to only 58% of those in the bottom quartile (with average family incomes below $30,000).[19]

In our surveys, 73% of elementary school principals and 74% of secondary school principals report that at least some students in their school do not have access to a computer or mobile device with the internet at home; a further 15% did not know whether they had students without access at home.

Principals in schools with lower family incomes, fewer students, or in more remote regions were more likely to report they have students without access to technology at home, though many principals noted that there were only a few families in their school in this situation.

To tackle this challenge, some schools try to provide access at school as much as possible, or provide affordable technology for families to purchase for home/school use.

For example, Peel Region DSB has a $55 tablet available. Some schools lend portable devices to students to bring home; others report that students have access to computers at school (this was more common); several schools rely on students accessing internet at public libraries. Many principals said that they ensure students don't have to use a computer for homework if one is not available.

Despite this documented divide, most of the data available for Ontario points to very wide access to computers by the vast majority of students. For example, in 2012 student surveys conducted by the Education Quality and Accountability Office (EQAO), 90% of grade 6 students reported they used the Internet either before or after school.[20]

The school is in a rural community where access to high speed is expensive so many families have dial-up or nothing.

Elementary school, Kawartha Pine Ridge DSB

HOME–SCHOOL COMMUNICATION

There is growing research suggesting that digital communications are an important aspect of improving home–school communication. Whether it is a teacher's blog, an e-newsletter from the school, a website, Facebook pages or Twitter accounts run by the school or school council, there are more ways to keep parents involved and informed about what is happening at their children's school and in their classrooms.[21] Some forms of electronic communication also facilitate two-way communication between home and school, so it's easier for parents—especially those who can't get to the school on a regular basis—to access information about their child's education.

Teacher blogs are a particularly important form of online communication, because they help prompt conversations at home about school—one of the forms of parent involvement most clearly linked to achievement.[22] Blogs are beginning to catch on across Ontario, but only 17% of elementary schools report that most or all teachers are using a blog to communicate with parents or students, and more than half of schools report that none or only a few teachers are using it. Many schools in our survey report that paper copies of communications are sent home to ensure that families without internet service get information.

TEACHERS USE BLOGS OR ONLINE COMMUNICATION TO COMMUNICATE WITH PARENTS OR STUDENTS	PERCENTAGE OF ELEMENTARY SCHOOLS
None	12%
A few	40%
Some	31%
Most	15%
All	2%

The schools that report most or all of their teachers use blogs, were more likely to be schools with higher average family incomes. It is not clear whether this trend reflects concerns about access to technology, or whether it reflects different expectations on the part of more affluent parents about home-school communication.

DIGITAL RESOURCES—IS COST CUTTING AFFECTING QUALITY AND ACCESS TO CANADIAN RESOURCES?

Digital technologies are not only about communication and teaching methods. Access to technology is also having a significant impact on the materials used in elementary and secondary schools.

WHEN TEACHERS AT YOUR SCHOOL NEED NEW LEARNING RESOURCES ARE THEY MOST LIKELY TO ...	ELEMENTARY	SECONDARY
Acquire print textbooks or materials	31%	33%
Use online resources developed by publishers	19%	22%
Use free online materials	36%	25%
Other	14%	20%

In 36% of elementary and 25% of secondary schools, principals report that teachers are most likely to use free online resources when they need new learning resources. This marks a significant change from the days of assuming that every course requires a textbook. As one principal noted, "textbooks are not purchased very often anymore."[23] Another commented, "we are moving away from textbook dependence."[24]

The choice about materials greatly depends on teachers' preferences, knowledge and comfort levels. As one principal noted, in some cases, "teachers are very resourceful."[25]

> **We are moving away from textbook dependence.**
>
> *Secondary school, Lambton Kent DSB*

On the one hand, educators demand digital resources, and increasingly use digital resources. On the other hand, they do not yet tend to buy digital resources in preference to print resources. They do, however, use more digital resources than they buy. Some [resources] they create themselves, individually or collaboratively, sometimes from borrowed content sourced on the web or scanned from print resources. Some they acquire from repositories created and maintained at the district, board, ministry or regional level.

Publishers who have responded to requests to develop "born-digital" resources report that sales continue to be weak, and that revenues from these resources have not come close to replacing lost revenues from declining print sales.

Consultation On K To 12 Educational Publishing In Canada, 2012, p. 43

Cost is also a major driver in the move to free online materials. The Ministry of Education has cut funding for learning resources and textbooks by 15% over the last five years.[26] According to one principal, "Each year we purchase textbooks and materials as needed—but we do prioritize what we purchase due to budget constraints. Furthermore, staff will frequently find other good quality materials and resources that are free."[27] Another commented, "We use all of the above. Money for textbooks is limited. Where appropriate we purchase or ask staff to use online resources."[28]

There are currently no similar processes to ensure free online resources meet quality requirements.

The materials teachers are accessing for free online fall outside the scope of resources that are approved by the Ministry of Education in its *Trillium List*, which boards and teachers are required to use to select textbooks.[29]

The Trillium List includes textbooks either in print or online, that are approved based on their quality, congruence with the curriculum, a "Canadian orientation," and freedom from bias.[30] The list is updated regularly.

Typically, free online materials are chosen by teachers based on their professional judgment. While some principals referenced receiving support from the Board, or from colleagues for choosing online resources, there is not a well-established system for vetting the quality of the free online resources that is widely used. To assemble good-quality materials using free online sources makes considerable demands of teachers' time and expertise—most are not trained to develop curriculum.

The Ontario Educational Resource Bank (OERB) does provide Ontario teachers with online teaching resources contributed by their colleagues.[31] These teacher-shared resources may be very useful but they do not answer the question of how the education system is ensuring the quality of free online resources, and we have not been able to determine how extensively the Resource Bank is being used.

WHAT *IS* A TEXTBOOK IN THE DIGITAL AGE?

The province defines a textbook as:

> *A comprehensive learning resource that is in print or electronic form, or that consists of any combination of print, electronic and non-print materials collectively designed to support a substantial portion of the Ontario curriculum expectations for a specific grade and subject in elementary school, or for a course in secondary school, or a substantial portion of the expectations for a learning area in the Ontario Kindergarten program.*
>
> *Such a resource is intended for use by an entire class or group of students.*
>
> *A supplementary resource is defined as a resource that supports only a limited number of curriculum expectations...* [34]

Canadian publishers have also raised concerns that, as funding for resources is reduced and as boards feel less obligation to pay copyright fees, publishers' capacity to provide high quality resources that are specifically Canadian and that are tailored for the Ontario curriculum is reduced.[32]

Another challenge faced by publishers is the increasingly diverse forms of digital content. Publishers have started to convert textbooks into their digital or online forms, but this practice is already in danger of becoming outdated. There are hundreds if not thousands of companies who see a lucrative market in providing new apps, software, more integrated resources, multimedia learning content, and new "learning management systems,"[33] to schools and boards.

The issue now is how teachers, principals and school boards can evaluate the resources flooding in from the education technology market.

LEARNING BEYOND SCHOOL WALLS

Another important role played by learning technologies is to extend learning opportunities beyond the walls of schools. There has been significant attention to the potential for distance education over the internet.[35] Distance education is making waves in post-secondary education, reflected by the sudden popularity of MOOCs (Massive Open Online Courses) since 2011,[36] and policy initiatives such as the creation of a centralized hub for online learning in postsecondary institutions.[37]

The trend is also visible in K–12 education. A number of principals in our survey reported on innovative 'beyond the wall' practices such as "flipped classrooms," where students watch streamed lectures at home, then use class time for group work and one-on-one assistance. Some schools use technology-enabled projects to build relationships with students in other countries or communities. The Ministry of Education funds at least one innovation project in each board, many of which were designed to help support learning beyond the school walls.[38]

We have a sister school in Kasechewan, Ontario. We have regular communication with our sister school. We are seeking to increase our communication through technology.

Elementary school, Windsor-Essex CDSB

One important component of the provincial E-learning strategy is to offer e-learning credit courses for students who cannot be in the physical classroom to learn or wish to access courses during different periods of the day.[39] Although there are 125 courses to choose from, there is still very limited enrolment in these courses. This year, less than half of Ontario secondary schools (48%) have any students earning credits through e-learning. In the schools where students are taking e-learning credits, on average, only 3% of students are enrolled in distance courses. Students in smaller schools are more likely to earn credits through e-learning, as are students in the southwest and northern regions. This likely helps improve access to a broader curriculum for students in schools with more limited course offerings.

CONCLUSION

Information and Communications Technologies are changing the world in which students live, and changing schools.

Students begin interacting with computers at school from the earliest grades, and access to the internet at school is all but universal. Most of the time, computers are available in students' classrooms, and principals increasingly report that technology is integrated as a part of students' learning.

However, the use of computers continues to vary considerably among teachers, many principals are concerned about the expense of technology, and some report significant technical barriers to implementation. In secondary school, the use of cutting edge pedagogies such as gaming and social media is still relatively limited.

Digital learning brings with it other challenges as well. While the potential to access new resources is now nearly limitless, it remains a concern that at least part of what drives schools to look for free materials is the decline in provincial funding for learning resources. Free online materials are not necessarily subject to review for quality, relevance or Canadian content and the use of these materials makes considerable demands on teachers' time and presumed expertise. This important development needs conscious policy.

Technology is the new normal in Ontario schools and the life of students. As technology becomes more pervasive, it is placing considerable pressure on systems to keep up and develop necessary tools to ensure both quality and equity in learning resources and experiences for students. While the potential for technology to improve learning is real, particular trends or products still run considerable risks of being 'oversold and underused.'

Our data make clear that teachers' professional knowledge and judgment is absolutely critical in the system we have. It is also important to make sure ICT use is supported with appropriate professional development and infrastructure, and supplemented to ensure system-level concerns about equity, quality and value are part of this revolution.

RECOMMENDATIONS

Digital learning is built in to students' education in Ontario schools.

Develop a working definition of digital literacy

- The extent to which teachers incorporate technology into their teaching and learning is going to vary considerably for the foreseeable future; technology is not a prerequisite to effective teaching. However, digital literacy is a prerequisite for students' participation in adult life. The province needs a definition of the core capacities of digital literacy—ability to access, evaluate and use information and media, and apply technology—and an explicit strategy to ensure that every student has access to the opportunities to develop these capacities.

Establish a framework for evaluation of quality and value of ICT investments

- While information and computer technology has considerable potential, it is also a major expense. Working with boards, the Ministry should develop a clear public process to assess the quality and value of technology products being purchased and used by schools.

Support teachers' digital professional development

- The wide variation in teachers' use of technology suggests there is an ongoing need for high quality professional development to help teachers, particularly those who are not 'digital natives', use ICT to support learning where appropriate.

Bridge the digital divide

- The 'digital divide' in terms of advantaged and disadvantaged students' access to technology is evolving. A large majority of students have access to internet at home—additional research is required to ensure that schools' efforts to ensure that technology is being used in an inclusive way.

Develop policy to ensure quality learning resources

- The increasing use of free online materials by teachers in schools requires active policy work to ensure students have access to materials that support the curriculum, reflect a Canadian perspective and are responsive to the Ontario context.

METHODOLOGY

Where not otherwise cited, the statistics in this report are from People for Education's 17th annual survey of resources in Ontario elementary schools and 14th annual survey of secondary schools (2013-2014). The survey acts as an information tool for parents and Ontario citizens. It focuses on quantifiable resources available in schools across the province, tracking any changes that occur. The resulting data provide an annual picture of the effects of education policy and funding shifts. Copies of the surveys in English and French are available in the back of our Annual Report on Schools: http://www.peopleforeducation.ca/research/annual-report/

In October 2013, surveys were mailed to principals in every publicly funded secondary school in Ontario. Surveys could also be completed online. Translated surveys were sent to French-language schools. Reminders were emailed in November and December. Confidentiality of all survey responses is guaranteed. Only aggregated school data are shared.

This year's sample of 1,349 elementary and secondary schools equals 28% of the province's schools. All of the province's 72 school boards participated.

ANALYSES

The analyses in this report are based on both descriptive (such as frequency distribution) and inferential statistics (e.g., correlation, t-tests, analysis of variance). The descriptive statistical analysis is carried out to summarize and present numerical information in a manner that is illuminating and useful. In the few instances where inferential statistical analysis is used it is to examine correlations and associations between variables and to compare means of different variables. The data in this study were analyzed using R.

REPORTING

Calculations have been rounded to the nearest whole number and therefore do not always add up to 100%. Student-to-staff ratios were calculated for schools that reported both the total number of students and the full-time equivalent for staff positions. The student-to-staff ratio for the province is the mean of the distribution of the student-to-staff ratios of reporting schools.

Comments from principals are used to enhance, elaborate or explain the quantitative results and broaden the issues discussed and explored in the report.

Schools were sorted according to their postal codes into geographic regions. For the most part, the distribution of respondent schools is representative of their distribution in Ontario.

OTHER PROVINCIAL DATA

The Education Quality and Accountability Office (EQAO) generously shared its data with People for Education. EQAO's demographic data are based on an analysis of the Statistics Canada 2006 census. People for Education combined our school survey data with EQAO's demographic data on a school-by-school basis. We integrated the information into our own elementary and secondary school survey data to make examine patterns of technology use and access based on average family income.

NOTES

1 Pedró, F. (2006). *The new millennium learners: Challenging our views on ICT and learning*. Paris: OECD. Retrieved from http://www.oecd.org/edu/ceri/38358359.pdf.

2 See e.g., Drucker, P. (1994). The Age of Social Transformation. *The Atlantic Monthly, 274(5)*, 53–80.

3 Information literacy: access and evaluate information, use and manage information; media literacy: analyze media, create media products; ICT literacy: apply technology effectively. More details can be found in: Partnership for 21st Century Skills. (2009). *P21 Framework Definitions*. Retrieved from http://www.p21.org/storage/documents/P21_Framework_Definitions.pdf.

4 Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience, and School: Expanded Edition*. Washington, DC: The National Academies Press.

5 Johnson, L., Adams Becker, S., Cummins, M., V., E., Freeman, A., & Ludgate, H. (2013). *NMC Horizon Report: 2013 K-12 Edition*. New Media Consortium: Austin, Texas, retrieved from http://www.nmc.org/pdf/2013-horizon-report-k12.pdf.

6 See, for example, Sawyer, R. K. (Ed.). (2006). *The Cambridge handbook of the learning sciences*. New York, USA: Cambridge University Press.

7 An important early study was Looker, D., & Thiessen, V. (2003). *The digital divide in Canadian schools: Factors affecting student access to and use of information technology*. Ottawa: Statistics Canada; but due to the rate of change in this sector it is important to have up to date information, and a clear focus on Ontario schools.

8 For more information, see e.g., Partnership for 21st Century Skills. (2009). P21 Framework Definitions. Retrieved from http://www.p21.org/storage/documents/P21_Framework_Definitions.pdf.

9 Rideout, V., Vandewater, E., & Wartella, E. (2003). *Zero to Six: Electronic Media in the Lives of Infants, Toddlers and Preschoolers*. Menlo Park, CA: Henry J. Kaiser Family Foundation.

10 See e.g. Jenson, J., Taylor, N., & Fisher, S. (2010) *Critical Review and Analysis of the Issue of "Skills, Technology and Learning"*. Toronto: Ontario Ministry of Education. Retrieved from http://www.edu.gov.on.ca/eng/research/jenson_reporteng.pdf.

11 Peel District School Board, http://www.peelschools.org/aboutus/21stCentury/byod/Pages/default.aspx; K. Rushowy, "In Peel the policy is byod", March 28, 2012, retrieved from http://www.thestar.com/life/parent/2012/03/28/in_peel_schools_the_policy_is_byod_bring_your_own_device.html.

12 Ottawa Catholic School Board, http://www.ocsb.ca/board/administration/departments/learning-technologies.

13 Secondary school, Superior-Greenstone DSB.

14 *NMC Horizon Report: 2012 K-12 Edition*, see note 5.

15 Secondary school, Toronto DSB.

16 Secondary school, Peel DSB.

17 Cuban, L. (2003). *Oversold and Underused: Computers in the Classroom*. Cambridge, MA: Harvard University Press.

18 Hammond, M., Fragkouli, E., et al. (2009). What happens as student teachers who made very good use of ICT during pre-service training enter their first year of teaching? Teacher Development, 13(2), 93-106; Hixon, E., & Buckenmeyer, J. (2009). Revisiting technology integration in schools: Implications for professional development. Computers in the Schools, 26(2), 130-146.

19 Statistics Canada. (2013) Canadian Internet use survey 2012. The Daily, November 26, 2013. http://www.statcan.gc.ca/daily-quotidien/131126/dq131126d-eng.htm.

20 EQAO Assessment of Reading, Writing and Mathematics (Junior Division) 2012-13, Student Questionnaire Results. Retrieved from http://www.eqao.com/pdf_e/provquestionnaire/1213/G6_2013_SQ_P01.PDF.

21 See e.g., Jenson, note 9 above; Johns Hopkins Centre for School, Family and Community Partnerships. (2011a) Beyond access: Helping families use the computers they have, and (2013) Beyond access 2: Using technology to strengthen communication. Baltimore: author, retrieved from http://www.csos.jhu.edu/p2000/Research/type2_research_briefs/TOC_Type2_ResearchBriefs.htm.

22 People for Education. (2011) *Doing what matters most: How parents can help their children succeed in school*. Toronto: author.

23 Elementary school, Peel DSB.

24 Secondary school, Lambton Kent DSB

25 Elementary principal, Toronto DSB.

26 Ontario Ministry of Education (2008) Technical paper—Funding 2008-09. Toronto: author; Ontario Ministry of Education (2013) Technical paper—Funding 2013-14. Toronto: author.

27 Elementary school, Upper Grand DSB.

28 Secondary school, Toronto DSB.

29 Rollans, G., & Jocas, S. De. (2012). *Consultation in K to 12 Educational Publishing in Canada*. Canadian Heritage.

30 Ontario Ministry of Education. (n.d.)Trillium List, retrieved from http://www.edu.gov.on.ca/trilliumlist and see Ontario Ministry of Education. (2006). Guidelines for the Selection of Textbooks. Toronto: author, retrieved from http://www.edu.gov.on.ca/trilliumlist/guide.pdf.

31 E-Learning Ontario, http://ontario.ca/elearning.

32 See e.g., http://arts.nationalpost.com/2010/12/07/photocopied-education-canadian-textbook-publishers-fear-copyright-changes-will-kill-their-market/.

33 Rollans, G., & Jocas, S. De. (2012). *Consultation in K to 12 Educational Publishing in Canada*. Canadian Heritage.

34 Ontario Ministry of Education, Guidelines for the selection of textbooks, Retrieved from http://www.edu.gov.on.ca/trilliumlist/guide.pdf.

35 Collins, A. & Halverson, R. (2009). Rethinking Education in the Age of Technology: The Digital Revolution and the Schools. New York: Teachers College Press.

36 Laura Pappano, "The Year of the MOOC", New York Times, November 2, 2012: retrieved from http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html.

37 Government of Ontario, press release, January 13, 2014, http://news.ontario.ca/tcu/en/2014/01/province-improving-online-learning.html.

38 Beggs, P. Shields, C., Telfer, S., Bernard, J.L. (2013) Extending the landscape and enlarging the vision: Pedagogy, Technology, and the Digital World. Pilot study of local innovations in Ontario school boards. Toronto: Government of Ontario. http://www.edugains.ca/resources21CL/Research/CSC_ShiftingLandscape_ResearchReport.pdf.

39 E-Learning Ontario - Online Classroom, http://www.edu.gov.on.ca/elearning/courses.html.

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