Advisory Board on English Education

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QUÉBEC SCHOOLS ON LINE:
Opportunities for English-Language Education

Brief presented to the Minister of Education, Recreation and Sports

Québec

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Opportunities for English-Language Education

ADVISORY BOARD ON ENGLISH EDUCATION

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INTRODUCTION

In 1996, The Advisory Board on English Education (ABEE) prepared a brief on the integration of technology into English language schools,[1] noting the particular needs of these schools, especially in rural areas, and making recommendations on accessibility, teacher support, and school organization, among other issues. The current Board notes how much—and how quickly—the technology has changed since 1996 but, based on its strongly held belief that technology is subordinate to pedagogy, it endorses in principle the content of this earlier document. Yet the technology available for classroom use *has* changed, it has done so at a speed unimaginable in 1996, and done so qualitatively as well as quantitatively, making it imperative that a broad-based discussion of technology in teaching take place as part of our changing understanding of teaching and learning. In addition, the problems in English language schools and centres caused by demographics, distance and dispersion have become more acute and more in need of ingenious solutions so that their graduates are prepared for the 21st century, and potential solutions to these problems through Information and Communications Technologies (ICT) merit discussion. This brief addresses both the general issues and those pertinent to the English education system in Québec, and includes a set of recommendations to help in the formulation of MELS orientations.

1.1 What is ICT? Why all the fuss?

Information and Communications Technologies (ICT) defines a set of technological tools that, unlike earlier technologies that have been used in education, have a social dimension. It "... is not a homogeneous 'intervention' but a broad variety of modalities, tools, and strategies for learning."[2] Earlier technologies, such as language laboratories, laser disks, reel-to-reel films, floppy disks, videotapes, and audiocassettes, and the changes they produced in schools are trivial compared with the upheaval experienced by students, teachers, indeed, the whole of society, by the accessibility, pervasiveness, and ease of use of technology such as interactive whiteboards, laptops, tablets and smartphones. New technologies support pedagogy but, more profoundly, they are changing how, what and where children and young adults learn and how, what and where teachers teach.

Students graduating in 2014 have seen a revolution in the technology that surrounds them during their 11 years of formal education and are truly "digital natives,"[3] while educators are still exploring the teaching and learning potential of all these tools. In Prensky's words, "Our students have changed radically. Today's students are no longer the people our educational system was designed to teach."[4] Now that students enter kindergarten with a facility for smartphones and tablets, it is an appropriate time to be asking questions about the impact of ICT on learning, pedagogy, andragogy, teachers, students, socialization, family, teacher-student relationships, privacy and safety. Other jurisdictions are dealing with the same issues, and there is much documentation regarding policy decisions that are being made around the world. In Québec, English school boards have started to grapple with these issues, and it is hoped that we can learn from one another.

1 Advisory Board on English Education, *The Integration of the New Information and Communication Technologies in the English Schools of Québec* (Québec, MELS, 1996), http://www.mels.gouv.qc.ca/en/organismes-relevant-de-la-ministre/abee/reports/the-integration-of-the-nict-in-the-english-schools-of-Québec/

2 S. M. Ross, G. R. Morrison, & D. L. Lowther, "Educational technology research past and present: Balancing rigor and relevance to impact school learning." *Contemporary Educational Technology*, 2010, 51.

3 M. Prenksy, "Digital Natives, Digital Immigrants," *On the Horizon*, *9*, 2001, 1–15

4 Prensky, "Digital Natives,"" *On the Horizon*, *9*,2001, 1.

The Organisation for Economic Co-operation and Development (OECD) has developed a list of 21st century skills and their documentation makes a valuable contribution to this discussion. In brief, it says:

... today's labour force has to be equipped with the set of skills and competencies which are suited to the knowledge economies. Most of them are related to knowledge management, which includes processes related to information selection, acquisition, integration, analysis and sharing in socially networked environments. Not surprisingly, most, if not all, of these competencies, are either supported or enhanced by ICT. For many young people, schools are the only place where such competencies and skills can be learned.[5]

The Advisory Board on English Education welcomes the opportunity to contribute to the discussion, in particular as it relates to the English language sector. The Board does not subscribe to what has been called technological boosterism,[6] a blind faith in technology's capacity to improve education and everything else in society; good pedagogy can – and should – exist with any technology, but it does believe strongly that ICT can contribute to the continuing success of English-language schools and remove some of the inequities that plague them, such as access to professional services, a greater variety of teaching resources, and a wider range of vocational training programs.

This brief is based on an extensive search of the research literature, three focus groups that included 23 teachers, consultants and librarians from seven school boards, input from experts with specialized knowledge derived from their closeness to the reality of the classroom, the Directors General of English school boards and the expertise of Advisory Board members.

Recommendations

- Base any decisions involving the incorporation of ICT on the probable needs of graduates of the 21st century.
- Make MELS' decisions regarding ICT incorporation after considering the experiences of other jurisdictions, such as the OECD recommendations found in "Connected minds: Technology and today's learners," (http://www.slideshare.net/OECDEDU/connected-minds-technology-and- todays-learner), or the European Schoolnet recommendations (http://insight.eun.org/ww/en/pub/insight/misc/specialreports/impact_study.htm), summarized in Appendix 1 of this brief, or, in a Canadian context the work done in Manitoba ("Learning with ICT," Province of Manitoba http://www.edu.gov.mb.ca/k12/tech/lict/index.html (In French: http://www.edu.gov.mb.ca/m12/tic/litteratie/accueil.html), and in Ontario, "A Vision for Teaching and Learning in a Digital Age." http://www.opsba.org/files/OPSBA_AVisionForLearning.pdf

After a year's investigation by the Board, some pervasive themes were: the need to place the student at the centre of any decisions and to have a clear picture of a graduate of the 21st century; the importance of teachers and pedagogy, regardless of the technology used; the need to trust that teachers and administrators are best positioned to know the needs of their students; the need to support teachers through professional development as they learn new skills; the impact on curriculum; the need for flexibility and support from MELS to accommodate the initiatives already in place; the provision of local, rather than centralized, funding, based on local needs and circumstances: concerns about privacy and safety. These themes will be developed in the following sections. Each section includes a series of recommendations to MELS that may be summarized under the following headings:

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5 The Organisation for Economic Co-operation and Development (OECD), "21st century skills and competences for new millennium learners in OECD countries," *EDU working paper No. 41*, p. 5, http://search.oecd.org/officialdocuments/displaydocumentpdf/?cote=EDU/WKP(2009)20&doclanguage=en

6 C. Bigum and J. Kenway, "New information technologies and the ambiguous future of schooling: some possible scenarios," in *International Handbook of Educational Change,* eds. A. Hargreaves, A. Lieberman, and M. Fullan (Berlin: Springer, 1998), 378.

MELS should develop a set of principles on ICT, as other jurisdictions have done, rather than a single policy. These principles should:

- consider the probable needs of graduates of the 21st century
- be based on the successes of other jurisdictions and of the English language school system
- be based on the outcomes of action research on pedagogy and andragogy
- incorporate a consideration of privacy and security issues, and the storage of data
- reduce the content of the existing curriculum to make room for learning higher level skills
- include a discussion of evaluation strategies
- recognize that the cost of equipping classrooms with ICT includes maintenance, replacement, technical support, and professional development, as well as a robust infrastructure

Professional development is a key issue for:

- school board administrators and commissioners who make local policy decisions
- teachers who need the time and opportunity to explore technologies
- teachers who need to adapt their teaching to incorporate technology, when appropriate
- all stakeholders to develop as digital citizens

In particular reference to the English language school system, MELS is encouraged to:

- allow for local initiatives to meet local needs
- establish regulations for teaching materials that take advantage of the quantity of electronic resources available for students in the youth and adult sectors and for students with special needs in both sectors
- fund the development and delivery of appropriate adult education courses through distance education using ICT, especially for English speakers in the underserved regions of the province
- establish a Centre of Excellence in Digital Technology for schools and centres that will:
  - encourage research and the development of expertise;
  - provide technical support to teachers;
  - allow for sharing and dissemination of expertise among school boards;
  - include expertise on the use of adaptive technology for students with special needs in the youth and adult sectors.

2 Levelling the playing field for English language schools

Earlier briefs from the Board have outlined where inequities exist between the French and English school systems[7] and in 2013, the Board reiterated some particularities of the English sector.[8] In summary, these inequities were described under the headings of distinctiveness, distance, diversity, demographics, distribution of funds, and decision-making. They included the large territories of school boards, great distances between schools or centres, a small population of potential students resulting in small schools, the small number of options in adult education and vocational training, the limitations of the current funding model, and the increasing cost and decreasing availability of English textbooks. All these factors affect what schools can offer to students, but introducing ICT and allowing school boards the flexibility to incorporate ICT can contribute to mitigating these problems.

The Board hopes that MELS will consider, in particular, the potential of ICT to minimize inequities within the English education system, and investigate the innovations that English school boards have already adopted to address their specific challenges. These innovations are occurring in pockets, lacking a well-defined vision from MELS, as well as a well-financed and supported infrastructure. Despite this, the Board learned of many examples of innovative practices that could serve as valuable models of practice.

In a local initiative, implemented in the Eastern Townships School Board (ETSB) beginning in 2003, and funded from the ETSB resources, students were provided with laptops and iPads with the goals of improving writing skills, reducing student dropout, and improving communication between schools. Research conducted by Thierry Karsenti and his colleagues is quoted elsewhere in this document, and supports anecdotal observations of changes in teacher behaviour, an increase in the quantity of student writing, improved attendance and motivation, and a concomitant decrease in the student dropout rate.

Some of the actions contributing to the success of the program were the enthusiasm of principals, teachers and parents, investment in technical support, starting the program in elementary school, and allowing teachers the freedom to take risks in trying new things. Teacher confidence to use this freedom was attributed to ETSB's considerable investment in professional development. While this was time-consuming and costly, it involved coaching, one-on-one support, peer coaching and co-learning, and focused on pedagogy and classroom management. It is clear that the ETSB's budget cannot sustain a project of this scope without support from MELS, so the Board wonders about the project's future.

7 See, for example, Advisory Board on English Education, *Educating Today's Québec Anglophone* (Québec: MELS, 2011), http://www.mels.gouv.qc.ca/en/references/publications/results/detail/article/educating-todays-Québec-anglophone/

8 Advisory Board on English Education, *One Size Does Not Fit All: Distinct Solutions for Distinct Needs* (Québec: MELS, 2013), http://www.mels.gouv.qc.ca/fileadmin/site_web/documents/publications/organismes-ministre/CELA/CELA_onesize_A.pdf

The most extreme example of English-language teaching in remote areas must surely be the experience of the Kativik School Board (KSB). Two models of distance delivery of service are the KSB-McGill University teacher education program[9] and "Connect North,"[10] a program that helps Nunavut's youth get psychiatric and educational support through video conferencing with professionals in southern Canada and connects them with students in Ontario schools. Both initiatives help overcome the problems associated with remoteness and, while they are still in an early stage of implementation, both are proving to be popular with participants.

What can MELS do to support the incorporation of ICT to help English education to thrive as it grapples with declining enrolments, expensive infrastructure costs and a threat, via budgetary cuts, to the quality of education offered and delivered? Change is occurring so quickly that we cannot predict what technology will be available for classrooms ten years from now, so any policy must be flexible enough to accommodate the rapid change. Since uniformity often masquerades as equity, the Board believes it would be more appropriate for MELS to develop a set of principles that could be applied to local circumstances, rather than a monolithic policy. Some key questions to inform the development of these principles are: What is the educational objective that can be supported by ICT? What are the needs of future graduates? What is student success? What is the impact of social media on our students and how should it be employed in the classroom? In brief, what do we want our graduating students to be able to do and how can ICT help them to do it?

Finally, as will be described later in this document, MELS must move beyond decisions that restrict hardware and software purchases, decisions that are better made locally, and must take a leadership role in areas such as digital citizenship, privacy concerns, data storage, and monopolies.

Recommendations

- Develop a set of principles, following extensive consultation with the stakeholders, rather than a single policy or model for the whole province.
- Consider and build on the capacity that is developing in English language school boards for the wise use of ICT.
- Study existing examples of technology-based service delivery in the North as potential models for other remote areas.
- Focus MELS orientations on global issues, such as privacy and security.
- Encourage action-based research and learn from its results.

9 S. Rogers, "Nunavik School Board Launches Online Teacher Training," in *Nunatsiaq Online*, 2014, http://www.nunatsiaqonline.ca/stories/article/65674kativik_school_board_launches_online_teacher_training/

10 Market Watch: The Wall Street Journal, *Press Release: April 2014*, " Cisco launches connected north to enhance education and healthcare services in remote northern communities, "http://www.marketwatch.com/story/cisco-launches-connected-north-to-enhance-education-and-healthcare-services-in-remote-northern-communities-2014-04-02?reflink=MW_news_stmp

3 Levelling the playing field with ICT

The geographical area of English language school boards, coupled with the low population density, introduce problems of support and delivery of services that do not always affect their sister French language boards. The Board has heard of ways in which ICT is helping to alleviate some of these problems, such as using videoconferencing to supplement face-to-face meetings, or to allow speech therapists contact with children in remote areas. The Centre Facilitating Research and Innovation in Organizations with Information and Communication Technology (CEFRIO) study[11] on ICT-supported Learning and Networking was based on three key assumptions:

1. ICT is a relevant component of the educational process in the 21st century
2. The most valuable contribution of ICT in learning and teaching revolves around networking:
   - Networking infrastructure
   - Social networking
   - Knowledge networking
3. More effective and productive solutions to the challenge of distance in education are possible when ICT is used wisely.

The first of these assumptions has been adopted by educational authorities worldwide and is now incontrovertible. The second and third are among the key benefits of ICT to English language schools.

3.1 Networking

This heading subsumes several issues including the physical infrastructure afforded by available hardware, such as desktop computers and interactive whiteboards, but increasingly including laptops, tablets and smartphones, and extends to the provision of reliable WiFi connectivity. The Board heard of great variation in the availability of all these forms of infrastructure, including the challenge of providing WiFi in old buildings whose building materials can act as a WiFi filter, providing poor reception or none at all.

Social networking is a tool for teacher-student or teacher-parent communication. Several teachers who were consulted referred to their use of Edmodo for this purpose.

A robust network also allows communication between and among schools and centres that are widely separated geographically, a common occurrence within English school boards. The focus groups conducted by the Board were attended physically by participants located within a reasonable distance from the venue, and attended virtually by participants in more remote locations through ZENLIVE at the Leading English Education and Resource Network (LEARN) facilities. All were able to participate fully at minimal cost. Finally, technology such as videoconferencing makes it easier for school boards to communicate with one another and to facilitate cooperation among them to solve common problems.

Knowledge networking is one of the obvious uses of ICT. Given the specificity of the Québec Education Program and the small size of the English language school system, finding appropriate, high-quality textbooks that meet the approval process has always been a problem. The same problem will occur with electronic resources if MELS plans to apply the same stringent controls as exist for print materials. At the university and CEGEP levels, textbooks are becoming obsolete. Students in schools and centres already make use of a vast array of online resources, refer less to textbooks, and use the potential of ICT to create their own learning materials from the online sources. According to one estimate, about 56% of Web pages are in English, followed by Russian, at 6%.[12] The Board hopes that students will not be barred from accessing appropriate on-line resources because of restrictions to access or licensing demands by textbook publishers as a result of the provisions such as section 7 of the *Education Act*.

Recommendation

- Establish approval regulations for teaching materials that are flexible enough that teachers can take advantage of the diversity of electronic resources available.

11 A.E. Ted Wall, Alain Breuleux & Vincent Tanguay, *IT-Supported Learning and Networking in the Anglophone Educational Community of Québec: Addressing the Challenges of Distance in Education*, Rapport de recherché (Québec: CEFRIO, 2006), http://www.cefrio.qc.ca/media/uploader/2_IT_supported.pdf

12 World Wide Web Technology Surveys, http://w3techs.com/technologies/overview/content_language/all

3.2 Distance education

Three initiatives offered by LEARN and funded by the Canada-Québec Agreement rely heavily on ICT and solve some of the problems faced by remote schools and their students.

"Online Learning" offers courses to students where there are insufficient numbers to justify a full-time on-site teacher. Students are registered in a school, with as many as 15 or as few as three students in one online classroom, and follow the MELS curriculum. The courses are offered synchronously, using a unique blended delivery model based on the ZENLIVE platform (which helps to form a community of learners and helps to mitigate against isolation) to groups of students from across the province. All classes are recorded, so students can review the work covered in a lesson as often as needed.

Students are evaluated regularly and write ministerial examinations. Students' results have been tracked since 1998 and are equal to or better than those of students in a regular classroom.

The "SOS Homework Help" evening program reaches some 1 500 - 2 000 students annually. Students communicate with qualified teachers and ask for help with classroom work that they have not understood.

A Summer School program offered in partnership with the Central Québec School Board (CQSB) for their students, with vacant places offered to other school boards, has helped students to pass ministerial examinations and opened access to Secondary-to-CEGEP bridging courses.

These examples have shown success and potential for expansion. They allow students to be successful, regardless of how remote their school or how small the number of students who want to take the same course. But the offerings are limited and dependent on a technological infrastructure that can be tenuous and unreliable.

Recommendations

- Ensure general access to broadband that is reliable and consistent. WiFi is an essential component of a connected school, along with the technical facilities to support it.
- Develop policy based on principles regarding the purchase of digital resources and on-line content that is flexible enough to allow access to the plethora of English-language resources available.
- Assess the success of distance education projects, such as those undertaken by LEARN and individual school boards; extend them to any Québec student wishing to take a course where there are not enough students to constitute a viable class; and support the courses financially.
- Establish a Centre of Excellence in Digital Technology for schools and centres to allow for sharing and dissemination of expertise among school boards, given the expertise and experience apparent in the English system.

4 Impact of ICT

4.1 Impact on student learning

Since the advent of ICT in education, three decades ago, educationalists have been deliberating the ways in which ICT and educational curricula intertwine to create unique teaching and learning experiences.

Research on the educational benefits of ICT integration into classrooms has yielded contrasting results, as the trend has both outspoken proponents (Prensky,[13] Tapscott[14]), critics such as Selwyn[15] and Healy[16] who believe in technology's potential as long as its integration in education is well justified, as well as scholars who are more pessimistic about the benefits of ICT integration in education (Bauerlein,[17] Bowers[18]).

A UK description of existing international studies showed that motivation was generally increased when technology was used, but that it was more difficult to attribute improvements in attainment to technology:

It should be noted that it is not possible to control for all the variables in school environments so the research does not allow unequivocal conclusions to be drawn regarding the impact of technology on attainment (Underwood, 2009).[19] *The research is often correlational, so cause and effect can not be implied.*[20]

Two research projects in Québec are worth noting. Teachers studied by CEFRIO[21] reported that students were learning at a deeper level with ICT because of the opportunities provided for a variety of authentic presentation formats, for student explanation and elaboration of their ideas, and for informed feedback. Research on the newer technological devices, such as tablets, is still limited and necessarily short term. Karsenti's and Collin's[22] survey showed that laptop usage in Québec elementary and secondary schools improved student learning in the areas of writing, creativity, work methods, communication, cooperation and critical judgment, as well as demonstrating higher student engagement, increased self-competence, and access to a plethora of information and resources. These successes were mitigated by a lack of up-to-date technological equipment and increased problems in managing classrooms.

It seems that the novelty value is a double-edged sword. On one hand, the novelty is motivating. On the other hand, the devices are distracting to students.

A study involving an even larger sample of students using iPads did not show such dramatic benefits.[23] The iPads demonstrated "cognitive potential," student enjoyment, access to information and the affordance of communication and collaboration

Reported disadvantages included students being distracted by the iPads, increased preparation time for teachers, and students' disinclination to write lengthy texts without the editing tools provided by computer programs.

Many of these results were echoed by teachers, consultants and librarians who participated in the three focus groups initiated by ABEE. Teachers who participated repeatedly used the word "engagement:"

… engagement level increases with technology… they begin producing better results.

…using technology and images and videos we saw dramatic changes and engagement levels.

We have noticed a higher engagement level but maybe because we have no consistent usage, we don't see any concrete behaviour change, necessarily.

If you give them opportunity to engage creatively, the results are amazing and retention levels are amazing. You can engage the whole class. It is amazing.

Engagement is important. We see the enthusiasm of the children and engagement is part of success.

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13 Prenksy, "Digital Natives, 1-15.
14 D. Tapscott, *Grown Up Digital: How the Net Generation Is Changing Your World* (New York: McGraw-Hill, 2008).
15 N. Selwyn, *Distrusting Educational Technology* (New York: Routledge, 2014).
16 J. Healy, *Failure to connect: How computers affect our children's minds - For better and worse* (Canada: Simon & Schuster, 1998).
17 M. Bauerlein, *The dumbest generation: How the digital age stupefies young Americans and jeopardizes our future* (New York: Tarcher, 2008).
18 C. Bowers, *Let them eat data: How computers affect education, cultural diversity, and the prospects of ecological sustainability* (Athens: The University of Georgia Press, 2000).
19 J. Underwood, *The impact of digital technology,* A review of the evidence on digital technologies on formal education, British Educational Communications and Technology Agency, http://dera.ioe.ac.uk/id/eprint/10491
20 UK Department for Education, *What is the evidence on technology supported learning?* December 2011, 10.
21 CEFRIO, *IT-Supported Learning and Networking in the Anglophone Educational Community of Québec: Addressing the Challenges of Distance in Education.* Rapport de recherché (Québec: CEFRIO, 2006), http://www.cefrio.qc.ca/media/uploader/2_IT_supported.pdf
22 T. Karsenti and S. Collin, *Avantages et défis inhérents à l'usage des ordinateurs au primaire et au secondaire : 2e enquête auprès de la Commission scolaire Eastern Townships*, Synthèse des principaux résultats, http://etsb.crifpe.ca/files/synthese_fre.pdf
23 T. Karsenti and A. Fievez, *The iPad in education: uses, benefits, and challenges – A survey of 6,057 students and 302 teachers in Québec, Canada* (Montréal, QC: CRIFPE, 2013), http://karsenti.ca/ipad/pdf/iPad_report_Karsenti-Fievez_EN.pdf

In these quotations, the participants are supporting the literature that links increased engagement with ICT use.[24] None of the focus group participants claimed that ICT usage improved performance, again echoing the findings of researchers, although there is some evidence that achievement is linked to engagement.[25] It is too early in the adoption of ICT for large effects in improved student performance to be observed in the long term.

Students are motivated by external factors—if they know their work will be published in some form, such as on YouTube, they will work harder at it. Two Board members watched Grade 3 and 4 students writing storyboards, building Plasticene figures and filming their stories using stop-motion photography with iPads. When they subsequently showed their films to their peers on YouTube, their motivation, engagement and excitement were palpable. In these and other classes visited by Board members, student engagement was clearly apparent, the students were on task, and the teachers clearly in control of their students, the curriculum and the technology.

Recommendation

- Base any principles on a thorough analysis of international research on the impact and effect of technology usage in pedagogy and andragogy.

4.2 Potential for students with special needs

Students with handicaps, learning disabilities or difficulty adjusting to school may use a learning aid based in ICT to perform an otherwise challenging task. The aid may allow them to learn more effectively, or in a different way, although it may be the same tool as the rest of the class is using.[26]

Assistive technologies are especially important to the English sector where, as noted in an earlier Advisory Board brief,[27] most students with special needs are integrated into "regular" classes, rather that being segregated into "special" classes, and where it is often difficult to find support professionals, especially in remote regions. A classroom fully equipped with electronic tablets allows each child, whether gifted or in need of special support, to work at an appropriate level without being singled out.

As with all good pedagogy, the teacher must determine and monitor the learning strategies used and the child—not the device—must be the focus of the decision-making. The technology also provides teachers with other tools to more appropriately target student learning styles and multiple intelligences. In this way, ICT levels the playing field for students with special needs and allows the teacher to differentiate instruction in her classroom as needed by all the students in the class.

There is a breathtaking range of free or inexpensive applications available for students with special needs. This "embarrassment of riches" makes the teacher's job simultaneously easier (there is more chance of finding a tool appropriate for a particular child) and more difficult (teachers have little time to research so many resources.) This makes it important for teachers to share with each other and to be supported by a knowledgeable resource person.

The Board heard of examples of severely handicapped, non-verbal students who could communicate and learn through technology that translates between speech and text. Blind students can be helped by the text-to-speech application available on the iPhone or other devices. Two Board members saw a severely dyslexic child using a widely available speech-to-text application to write stories on an iPad. Without this support, which his teacher said he had taught himself, he would have had little chance to succeed in the classroom. In another case, the combined power of a communication tool and a dedicated special needs consultant have enabled a boy—whose handicaps are so severe he can only use head movements to control his communication device—to graduate from high school.

Apart from these dramatic examples, there are many more that are less dramatic but equally pertinent to student success. Students with special needs who use ICT become more independent and confident. Instead of being frustrated by low-level tasks that the technology can do for them, they are able to share their ideas more easily. In the words of one expert who was consulted by the Board: "Students who are on the cusp are finally tipping over into success."

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24 See, for example, C. Dede, "Planning for Neomillennial Learning Styles," *Educause Quarterly*, 2005, 7-12; D. Oblinger, "Boomers, Gen-Xers, and Millennials: Understanding the New Students," *Educause Review*, 2003, 36-40.

25 See, for example, A. Klem, and J. Connell, "Relationships matter: Linking teacher support to student engagement and achievement," *Journal of School Health*, 2004, 262-273; H. Marks, "Student engagement in instructional activity: Patterns in the elementary, middle, and high school years," *American Educational Research Journal*, 2000, 153-184.

26 Adapted from http://www.learnquebec.ca/en/content/pedagogy/insight/intech/assistive_technology/index.html

27 Advisory Board on English Education, *The Importance of Complementary Educational Services for School Success* (Québec, MELS 2012) www.mels.gouv.qc.ca/abee

Another example involves school boards' and schools' use of on-line student data in evidence-based practice to identify or flag students at-risk of failing or dropping out. If students are identified in this manner, appropriate help can be given immediately.

Recommendations

- Extend the availability and funding of assistive and adaptive technologies, according to the requests of particular school boards.
- Provide teachers with time and opportunity to research effective ICT resources and to share them with each other.
- Include expertise on the use of adaptive technology for students in the youth and adult sectors with special needs within a Centre of Excellence for Digital Technology.

4.3 Impact on teachers

4.3.1 Teacher use of ICT

The Board notes a wide range in the level of incorporation of ICT into classroom practice, matching the levels proposed by two models that are commonly cited: the new version of Bloom's taxonomy, reproduced in Appendix 2 and the SAMR model.

The SAMR model, developed by Puentedura,[28] is a valuable framework to describe the extent to which technology is being integrated into K-12 education (see Appendix 3). The lowest level of ICT implementation in the classroom is *substitution*. It is achieved when technology directly replaces other tools but with no functional variation. *Augmentation* means that technology replaces other tools with functional enhancement. *Modification* occurs when technology makes it possible to completely redesign a given task. The highest level, *redefinition*, is achieved when technology makes possible new tasks that were impossible to perform before. Puentedura[29] notes that reaching the highest level of the SAMR model demands not only financial and human resources but also time, taking sometimes up to three years of investment in time, structure, technical support and security for real change to occur in the classroom. Given these requirements, the Board has been impressed by the energy and enthusiasm of many teachers who have redefined their pedagogy to make good use of technologies.

The focus group participants were enthusiastic users of ICT and demonstrated a range of uses, regardless of the hardware that was available to them:

PowerPoint presentations, videos, demonstrations, mirroring,

…presentations in various technology platforms like Prezi, for example, research, tutorial videos.

…instant feedback on their performance in physical education.

…basic concepts… research and typing.

I let them video themselves and see themselves. It helps them.

We also use social media with parents to communicate with them.

…Edmodo

An adult education language teacher said: *…I record myself saying their presentation on their phone so that they can practise and listen to pronunciation. I encourage them to record themselves and it is working because they keep erasing and recording again to get it right. I focused on oral (skills) because that is what my students need in the real world.*

A vocational training teacher described the potential of iPhones to present three-dimensional plans of buildings that his students could view and manipulate. The focus group participants supported the literature connecting ICT to the needs of adult learners in the areas of taking learning out of the classroom, access to information tools, and individualizing instruction.[30]

Not all teachers are as enthusiastic about ICT as these. A European study[31] identified three barriers to the uptake of technology at three different levels. The first of these barriers was:

Teacher-level barriers: *Teachers' poor ICT competence and lack of confidence in using new technologies in teaching are two very significant determinants of their levels of engagement in ICT. These are directly related to the quality and quantity of teacher training programmes.*

(The second and third barriers will be addressed in Section 5.0)

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28 R. Puentedura, *Transformation, Technology, and Education.* Presentation given on August 18, 2006 as part of the Strengthening Your District Through Technology workshops, Maine, US. Retrieved from http://hippasus.com/resources/tte/part1.html

29 R. Puentedura, *Thinking About Change in Learning and Technology.* Presentation given September 25, 2012 at the 1st Global Mobile Learning Conference, Al Ain, UAE. Retrieved from http://www.hippasus.com/rrpweblog/archives/2012/04/10/iPad_Intro.pdf.

30 M. Knowles, *The Adult Learner* (New York: Routledge, 2012).

31 A. Balanskat and R. Blamire, «ICT in schools: Trends, innovations and issues in 2006-2007,» produced for *EUN's Steering Committee and stakeholders* (European Schoolnet, June 2007), http://www.eun.org/c/document_library/get_file?uuid=5f013769-cce3-47e8-b011-dc0a5b1292c6&groupId=43887

Some experienced teachers may be so-called "digital immigrants"[32] and reluctant to change their practice from well-authenticated strategies. These teachers are aware of the technology but struggle to incorporate it to build on lessons they already have. Given that students are often more adept with technical tools, teachers must be prepared for the difficult task of releasing agency to students. We caution here that while students may be more adept and confident with the tools and with social networking, their understanding of ICT is generally shallow and they are certainly not as able to use ICT for learning. They need teacher guidance for learning to occur, as they would in a non-ICT enabled classroom. Younger teachers may be more computer literate than their older colleagues, but may also be too inexperienced to have a back-up plan if the technology fails to work as needed, and often have no technical support to deal with these failures. One of the teachers interviewed by Karsenti made the plaintive comment: "...one time the Internet was down ...and none of my students had access to their book... I had 32 students in front of me who didn't know what to do... and neither did I!"[33] This level of system failure is many orders of magnitude more serious that a filmstrip breaking.

The process of ICT integration should be a stepwise process and omitting steps does not help. Teachers are hungry for support, and this support is different for teachers at different stages of their careers.

Not all teachers will adopt technology *unreservedly*, nor at the same time, making the one-shot-workshop training model a poor idea. Encouraging teachers to incorporate ICT should be based on incremental change, starting with the enthusiastic early adopters, celebrating their accomplishments, encouraging them to act as teacher leaders with their colleagues, and supporting their work, so that a critical mass is established. Several authorities in the English sector have shown greater success by ensuring that teachers had access to new technological tools before the students, with enough time, opportunity and support to explore their use before they had to incorporate them into their classroom practice.

This leads to a consideration of professional development.

4.3.2 Professional development

One consistent statement from all the individuals and groups consulted by the Board was the need for professional development if ICT is to be used to the best advantage.

... the statement that is repeated by all the pedagogues; "The 21st century learner." That's great, but I believe we need to focus on the ***21st century teacher*** *first.*

Karsenti advises[34] that teachers must be "techno reflective" rather than technophiles. Teachers who responded to his survey listed three general areas where they needed support: training and resources; policies for classroom use; classroom management tools. This list should not be surprising to anyone who has been involved with teacher education or teacher support: it is the same list of requests that is usually made by good teachers faced with any new innovation.

Several guests told the Board that there is no substitute for good teaching. One guest said: "Good teaching is good teaching, regardless of the technology used, [and] some pedagogy may be better without technology than with it." The advice of another guest was: "Let the computers take care of the computable, let teachers take care of the meaningful." Both these comments suggest the theme repeated in other discussions on this topic: the need for well-prepared and in-serviced teachers, a thought echoed in a 2011 survey conducted in the Eastern Shores School Board.[35]

One outcome of the CEFRIO[36] report was the "Building Community through Telecollaboration project" (BCT) that provided professional development within a community of practice, both face to face and online. Teachers learned to connect with each other, share knowledge, and collaborate. The outcomes of BCT were positive and reminiscent of other successful implementation strategies, including teacher-led professional development, in-school leadership, strong support from educational services personnel, access to a reliable and up-to-date infrastructure, effective support (in this case for IT) as needed, and sufficient funding.

The BCT project was mentioned positively by several participants in the focus group interviews, but they also described both the least effective professional development: one-shot workshops to groups of teachers with no individualization, nor follow-up; and the most effective: one-on-one and peer-driven. This type of professional development was also observed at the recent "EdCamp," held at the Eastern Townships School Board, where teachers came together on a Saturday to learn from one another

32 Prenksy, "Digital Natives," 1-15.
33 Karsenti and Fievez, *The iPad in Education*, 2013, 31), http://karsenti.ca/ipad/pdf/iPad_report_Karsenti-Fievez_EN.pdf.
34 Ibid
35 R. Venables, «*Needs Assessment for the Integration of Information and Communication Technologies in the Eastern Shores School Board,*» (Québec: RÉCIT, 2011)
36 CEFRIO, *IT-Supported Learning and Networking in the Anglophone Educational Community of Québec: Addressing the Challenges of Distance in Education.* Rapport de recherché (Québec: CEFRIO, 2006), http://www.cefrio.qc.ca/media/uploader/2_IT_supported.pdf

by discussing issues, such as digital citizenship, and through the sharing of ideas and experiences.

Two key components for effective professional development are funding to release teachers to participate in relevant, timely sessions and ongoing accompaniment in class, especially during the implementation phase.

We have 2 PD days per year for ICT use in classrooms. We also implement learning circles where we meet once a month and during those roles, we explore ICT integration into the classroom and teachers get to practise what they are going to do... with feedback from each other.

We used to do more personalized PD and things were moving around. Now it is one size fits all and it seems that it does not help because you have many levels of teachers. Most effective is one on one, like a coaching situation.

...one on one, informal. Most of the time, teachers just come to me and ask me specific questions. A one-size PD workshop is usually not a good thing unless we work on a specific theme that we know the teachers need.

We do give workshops to let teachers go beyond the "wow!" effect of technology... we don't want technology to become an electronic book. Many teachers are asking for our help... but I think we still have a lot to do.

We discovered that teachers need to be comfortable with technology and integrate it in an effective way, it takes them a good 3 to 4 years... experimenting in the classroom with it... using it for different purposes.

In summary, the Board found that teachers are asking for professional development, that different teachers have different needs for professional development, but that they all need time, encouragement, and personalized assistance. This assistance is better served by individualized help, locally designed, and delivered "just in time," rather than by large-scale workshops. Meaningful change in practice happens gradually and needs long-term, carefully devised professional development in instruction, curriculum, or simply classroom management, as well as ongoing support.

Several interveners in the Board's deliberations echoed the European study cited earlier and criticized the preparation of beginning teachers. They proposed that the universities' teacher education programs should do more to prepare their graduates for the digital classroom.

Recommendations

- Study earlier examples of successful professional development as possible models for implementation of new strategies and modify them to be appropriate to the implementation of the current technology.
- Ask teachers what pedagogical support they need and involve them in the decision-making process regarding this support.
- Provide teachers with up-to-date resources and give them enough lead time to learn to use them before being asked to incorporate them into their teaching.
- Give teachers on-going support (*accompagnement*) and time to develop teaching strategies that use ICT to the best advantage.
- Examine teacher education programs for opportunities to model situations where ICT can be incorporated so that newly graduated teachers are better prepared to use technology appropriately in their classrooms.

4.3.3 RÉCIT

One valuable techno-pedagogical resource in the English sector is the *Réseau de personnes-ressources pour le développement des compétences des élèves par l'intégration des technologies* (RÉCIT), which began in 2000, replacing earlier support groups and initiatives that had been operating in the English sector since the 1980s. It is a network of resource persons working together to share expertise and to advance pedagogy through technology by supporting teachers as they help learners. Each school board received per capita funding for a local RÉCIT resource person, and the percentage of that person's workload is determined according to the funding received.

The school board determines the structure, planning and evaluation for this local service, sending an annual report to MELS. Smaller boards, such as the New Frontiers School Board, receive funding for 0.5 of a position, but estimates that three positions are needed to support teachers adequately and to cooperate with subject consultants in combining technology and pedagogy. In the French sector, provincial level RÉCITs were established by granting provincial service mandates to specific boards for different target groups: vocational and technical education, special education and preschool education, as well as the subject areas.

The English sector also has two other RÉCITs for Adult Education and for Vocational Training, both funded by the Canada-Québec Agreement. LEARN houses the sole provincial service site for

Anglophones in the youth sector. Known as LEARN-RÉCIT, it provides services in all the subject areas, as well as preschool and special education. There is a history of very close collaboration between the provincial level LEARN-RÉCIT and the local level RÉCITs. In the Adult and Vocational Training sectors, there is close collaboration between the RECITs and the Provincial Organization of Continuing Education Directors, English (PROCEDE).

Teachers who take on the role of RÉCIT consultant for more than two years lose their tenure, and are reluctant to do so for a position that seems tenuous, depending as it does on Canada-Québec Agreement funding, rather than on more secure MELS funding.

Recommendations

- Guarantee MELS funding of the RÉCIT network.
- Situate and manage the RÉCITs for Adult Education and Vocational Training in the English Language school boards and ensure that they have MELS funding.
- Maintain and strengthen collaboration between the RÉCITs and the adult and vocational sectors of the English school boards.
- Expand the mandate of the RÉCITs to become Centres of Excellence in Digital Technology where they would research large scale issues as well as support local needs in both the youth and the adult sectors.

4.3.4 Technical support

Strong technical support is crucial for the successful incorporation of ICT. Only the two most populous English language boards (English Montreal School Board and Lester B. Pearson School Board) have enough funds to support their own ICT consultants. Small boards can only afford a part-time post and rely on the RÉCIT consultant for technical as well as techno-pedagogical support, but the needs are just as varied, no matter what size the board. Indeed, a case may be made that they are more pressing in the less populous boards, where travelling from school to school to maintain or update computers takes up so much time. As one focus group participant said:

It is a cause of celebration when we see the technician in our school.

According to other focus group participants:

We can ask the IT guy, yes, but often that means missing class time. So oftentimes what we do is try to find other teachers or groups of teachers that group themselves and discuss a specific topic.

Our tech support have scheduled times that they come to our school and if you can't catch them during those times, you are out of luck. In other centres we don't even have scheduled days, they just write emails and wait. We give a lot of PD and ask our teachers to fix their own problems. A lot of times, children fix IT problems too.

Teachers are prevented from updating (software). They have to wait for the board's technician to do it. What this says is: we don't trust you with your own machine.

Yet there are teachers and students with enough knowledge of equipment to be able to resolve many of the problems that occur in the wired classroom. Board members saw a Grade 6 girl leave her seat to solve a connection problem that occurred between the computer and the whiteboard without being asked to do so. It was clear that she knew what she was doing—and had done it before.

Finally, some participants described a disconnection between the beliefs of pedagogues and IT support staff:

Very often we have IT dictating also what we can use, which is not logical.

Sometimes our IT guy makes pedagogical decisions... That's why we are looking at BYOD model, to let go of the fact that IT technicians maintain everything when they cannot do it quickly.

The Board investigated another type of technical support: the administrative support provided by the *Gestion du réseau informatique des commissions scolaires* (GRICS). This network of over 300 employees provides support to all school boards in payroll management, timetabling, and examination questions among other things, and is a one-stop source for much of the administrative support needed by the school boards.

As the sole provider of these services, GRICS is in the enviable position of being able to set its own price for its services. Part of its funding comes from MELS, but it also receives $700 000 from the Entente Canada-Québec (ECQ) as a contribution to its English language services and school boards pay for services on a per capita basis. (In the pedagogical aspects of its mission, GRICS collaborates with LEARN through the provision of VoDZone). In the case of one board, this was about $43 per student. Small boards find it difficult to afford extensive use of GRICS products and services.

School board managers value the availability of GRICS support, and rate some of them as "essential," but it was difficult for the Board to obtain a clear picture of the benefits elsewhere in the English system. Some school boards complain that it is difficult to obtain services in English in a timely manner; some do not use the bank of evaluation questions provided by the *Banque des instruments de mesure* (BIM); some complain that although they provide personnel to develop the BIM questions and the translation is funded by ECQ, GRICS holds authoring rights to the questions and does not permit timely reuse of examination questions. These issues cause resentment and suspicion and, at the very least, there should be better communication between GRICS and the English school boards.

Recommendations

- Make technical support readily available and financed by appropriate budgets.
- Ensure that English boards have full access to GRICS products and services through adequate funding.

4.4 Financing

Incorporation of technology is expensive. The purchase and maintenance of technological tools is an expensive item in a school board's budget, compounded by the fact that we cannot predict the next technologies: obsolescence is a reality and this should be reflected in any decisions regarding purchasing. This was well-expressed by one of the focus group participants:

I don't think ICT integration is a one-time thing. As teachers and as professionals we have to keep on learning the new things. Tech changes so quickly that each system we put in place will be replaced by a new one very quickly, and we have to keep track of new additions.

Some clear implications of this are that MELS should build in flexibility in purchasing and replacing hardware and software, and that investing in specific technologies and tools for all schools is uneconomical and short sighted. We may cite the example of the allocation of funding specifically for the purchase of interactive whiteboards at a time when more than 80% of English schools already had them, often financed through parent support. When MELS introduces a budgetary measure, the measure must include a recognition that technology is changing quickly. It must allow for replacement and maintenance of hardware purchased (one fifth of the total budget has been suggested as appropriate)[37], as well as the cost of technicians.

Investment in ICT should involve not only purchasing new equipment and software but also developing school infrastructures by installing robust Wi-Fi access, adapting classroom settings, where necessary, and refurbishing and maintaining existing equipment. Older classrooms were not designed to incorporate ICT.

Participants noted: *We suffer and struggle with broadband so that ICT keeps on functioning and doesn't crash. Access in our centres is pretty tricky,* and: *I have only one outlet in my class. It is connected to the plug in the hall, as well as my neighbour... our school buildings are simply too old to support technology.*

37 J. Healy, *Failure to connect: How computers affect our children's minds—For better and worse* (Canada: Simon & Schuster, 1998).

Given the cost of technology,[38] uniformity in purchasing, or group buying, can certainly produce economies of scale, but it surprised the Board that the Apple iPad is the tablet of choice for more than 90% of Canada's educational market.[39] One reason is that Apple provides training on the functioning of the devices. Yet iPads in schools have been bought through donations or fund-raising efforts as they have not been on the MELS' approved list. MELS and school boards must do due diligence to ensure that money is being spent to the greatest benefit of the students and teachers.

The Board is pleased to hear that MELS is now opening up the budgetary measure to allow boards to purchase any type of tool that the teacher deems to be useful and congratulates MELS on its openness to variability among Boards, schools and classrooms. Different communities and their schools have different needs.

If pedagogy is the driver, then the school and its personnel are closer to the local needs and should choose the most appropriate technology. Teachers should decide what is appropriate for their students and should be trusted to make learning meaningful for their students with tools appropriate for that learning.

Giving more responsibility to the school boards to make purchasing decisions places more onus on school board administrators and commissioners. It is clear that they will need accurate and thoughtful information to help the process.

Recommendations

- Allow for local initiatives within a broadly defined framework, rather than mandate any particular technology for the whole province.
- Recognize that the cost of ICT does not end with the purchase of hardware and must budget for on-going maintenance, repair, replacement and technical support for hardware and software.
- Ensure adequate funding for the ongoing maintenance and replacement of ICT in schools and centres.
- Allow school boards, schools and centres to continue to determine their particular needs and request funding from MELS to buy materials to serve the local needs.
- Make available to school board administrators and commissioners pertinent information about the appropriateness of technological tools to pedagogy.
- Recognize the importance of professional development and consider buying from companies that provide both technical and pedagogical professional development.
- Ensure that money is available to release teachers for professional development and to develop resources.

38 See, for example, N. Postman, *The end of education: Redefining the value of school* (New York: Knopf, 1995); R. Shanks, *Educational outrage: are computers the bad guys in education?* Online Column #11, July, 2000, http://www.ils.nwu.edu/edoutrage/edoutrage11.html; M. Apple and H. Bromley, *Education, technology, power: Educational computing as a social practice* (Albany: State University of New York Press, 1998).

39 Karsenti and Fievez, *The iPad in Education*, 2013, http://karsenti.ca/ipad/pdf/iPad_report_Karsenti-Fievez_EN.pdf

5 System level issues

The second and third barriers to the uptake of technology identified in a European study[40] cited in Section 4.3.1 (http://insight.eun.org) were:

- ***School level barriers:*** *Limited access to ICT (due to a lack or poor organisation of ICT resources), poor quality and inadequate maintenance of hardware as well as unsuitable educational software are also defining elements in teachers' levels of ICT use. Moreover, the absence of an ICT dimension in the overall schools' strategies and their limited experience with project-oriented activities supported by ICT, are decisive in determining levels of ICT use by teachers.*
- ***System-level barriers:*** *In some countries it is the educational system itself and its rigid assessment structures that impede the integration of ICT into everyday learning activities.*

We have already addressed issues stemming from the second of these barriers in this brief. The next section will deal with the system-level barriers under the control of MELS.

5.1 Impact on Curriculum

Where is the wisdom we have lost in knowledge?

Where is the knowledge we have lost in information?

(The Rock, T.S. Eliot, 1934)

Technology releases teachers and students from the constraints of a "one size fits all" model of curriculum and opens doors to personalized learning. Students and teachers are turning to non-traditional sources of information and the availability of information sources and the abundance of resources no longer restricts them to what is available in the classroom or school library. They are using ICT to go beyond the defined content and teachers are no longer the keepers of content. Students must be given more agency over their own learning and encouraged to be independent learners, rather than consumers of packaged information. Teachers must be given more agency over their own teaching and encouraged to be professionally autonomous.

Technology provides unlimited information: students must learn how to use the information as they build it into a knowledge framework. Moreover, the curriculum cycle may be as long as 15 to 20 years. Much of the technology available in today's classroom was not even imagined when the last curriculum reform occurred in Québec. Since the beginning of that reform there has grown a great disconnect between the curriculum and the skills needed for the 21st century. In the words of one of the Board's guests: "Presently we are running a rocket on the back of a stage coach," and of another: "Our learners today are different and we can no longer teach them the way we used to. We are still preparing them for the world that used to be." More than ever, educators need to think about what we are trying to teach students, how we do it and why we do it.

This clearly has great impact on both curriculum and pedagogical decisions. The intended curriculum as laid out in MELS documents and assessed in uniform examinations is necessarily conforming. Yet the enacted curriculum is more divergent in a technology-enabled classroom and the learned curriculum is more unpredictable than ever.

Quoting again from the OECD document on 21st century skills:

…governments should make an effort to properly identify and conceptualise the set of skills and competencies required so as to incorporate them into the educational standards that every student should be able reach by the end of compulsory schooling.[41]

Recommendation

- Modify the existing curriculum to make its prescribed content more flexible and adaptable and to emphasize higher level skills (e.g. Appendix 2 and 3).

5.1.1 Programming

There are many examples of high school student successes in the building and control of robots, often coached by volunteer teachers in after-school clubs. Another way that students can become active makers rather than passive consumers of technology is by controlling the actions of a computer through coding, already a feature of curricula in other countries, such as the United Kingdom and the United States.

The Board was impressed by the potential of such simple programming tools as Scratch[42] for their accessibility to even young children. Furthermore, the skills learned through coding, including problem solving, visualization, accuracy, communication are truly cross-disciplinary competencies, and thus should not be restricted to a particular subject. In addition, coding should not be an additional subject in an already overburdened curriculum, but a component of existing content.

40 Balanskat and Blamire, «ICT in Schools,» June 2007), http://www.eun.org/c/document_library/get_file?uuid=5f013769-cce3-47e8-b011-dc0a5b1292c6&groupId=43887
41 OECD, "21st Century Skills," No. 41, 5, http://search.oecd.org/officialdocuments/displaydocumentpdf/?cote=EDU/WKP(2009)20&doclanguage=en
42 Scratch, a project of the Lifelong Kindergarten Group at the MIT Media Lab, http://scratch.mit.edu/about/

Recommendation

- Integrate computer programming into the curriculum using programming tools appropriate to the age of the student and incorporated into project-based learning.

5.1.2 Adult education and vocational training

Teachers working in adult education and vocational training report using a variety of social media and ICT in their teaching (see section 4.3.1). However, there are disappointingly few courses available in English for adult learners or in vocational training via distance education, although this has great potential for the population of English-speaking adults. Adult learners are usually more motivated than young learners to work independently at home. They have more obstacles preventing their involvement in school-based classes, even when the school is near their homes, often having family commitments or part-time jobs with erratic hours. The problem of accessibility is compounded for the English sector because the small numbers of candidates for courses mean that many options are not offered at all. The possibility of asynchronous course delivery would be an ideal solution for offering a more varied selection of courses, as long as learners are supported by teachers as they are in a blended delivery model.

Western Québec School Board (WQSB) offers an accounting program delivered totally by distance education that has been shared with Eastern Shores School Board. WQSB also offered a successful Home Care program by blended delivery to five aboriginal communities. Seventeen of twenty-two students completed this program that combined person-to-person contact with distance delivery.

A problem arises because the funding for distance education for adults represents one third of in-class funding, which does not take into account the fact that the school board has to provide technical maintenance and staff support. The Distance Education E-Learning Steering Committee established by the Provincial Interlevel Table for the English Sector (TIPSA) in 2013 is presently conducting a two-year research project on distance education being offered by centres and colleges. Research findings and recommendations will examine the possibilities of providing the English community with greater accessibility to distance delivery of vocational and technical training options. At present, the Centres of Expertise Network (CEN), an initiative of PROCEDE, supports the professional development of vocational teachers by sharing support, advice, and best practices among colleagues.

It also promotes closer ties between the teachers and industry, MELS program coordinators and the technical programs offered at the CEGEP level.

Recommendations

- Fund the development and delivery of appropriate adult education courses through distance education using ICT, especially for English speakers in the underserved regions of the province.
- Include expertise on the use of ICT for adult learners in a Centre of Excellence in Digital Technology.
- Incorporate technology as a way of supporting students with special needs in adult and vocational programs.

5.2 Impact on evaluation

Evaluations need to allow for technology integration as well! We talk about technology for learning but when evaluation comes along, we go back to paper and pencil. We should be allowed to use technology in terms of creating evaluations…

Evaluation strategies have not kept pace with the implementation of ICT practices in schools, a point noted by the Québec English School Boards Association's (QESBA) submission to the *Conseil Supérieur de l'éducation* in October 2013.[43] This has introduced some strange anomalies: speech-to-text technology is not allowed on an examination, whereas text-to-speech is; spell-checkers are banned from examinations, although they are used by everyone in the "real world" (and what is being evaluated? Are the examinations measuring knowledge and creativity, or are they spelling tests?) Even when the use of technology is permitted for students with special needs during examinations, irritating problems may occur. There have been incidents where examinations have been presented in a format that the available, old, computers in the schools could not read. When the digital examination is sent out only 24 hours before the examination is to take place, there is not enough time to update existing computers, or to find more modern ones.

43 Québec English School Boards Association, *The Curriculum and programs reform, more than 15 years after the Estates General*. October 29, 2013, section 2.2 (a)

The Board was told that the MELS plans that in three years, students will log in to a MELS Web site and complete their examinations online. This is an intriguing idea, but totally unrealistic in the proposed timeframe. It will place impossible demands on infrastructure in terms of hardware and connectivity, unless large amounts of money are injected into the project.

Recommendations

- Ensure that any set of principles related to the incorporation of technology includes a discussion of evaluation strategies.
- Consult schools, centres, and school boards regarding the formats that can be accommodated for digital examinations.
- Ensure that the Sanction d'études matches with pedagogy and evaluation and with the existing situation in schools and centres.

5.3 Digital citizenship

Digital citizenship, also called digital wellness or digital ethics, is defined as the norms of appropriate, responsible technology use. (see Appendix 4). The need for well-educated digital citizens grows as technology increasingly pervades everyday life and applies equally to students, parents and teachers. Some teachers need instruction in digital citizenship before they can educate their students. For example, it seems inappropriate for teachers to open their personal Facebook pages to students, although it is easy to apply privacy restrictions and use Facebook as a useful tool for communication and discussion.

The OECD has identified online risks faced by students, including: consumer-related risks (such as online marketing and deceptive transactions), content and contact risks (cyber bullying and cyber pornography), as well as privacy and security risks (such as the persistence of digital footprints).[44] Students have a false concept of privacy and their safety on the Internet. It is essential that they become aware of the potential hazards of "sexting" and the legal issues surrounding cyber-bullying. These are issues that may occur within school, but are equally common outside school. Thus, it is important for parents to be involved with teachers in this conversation with students. In Québec, the LCEEQ has started studying these issues and made them the focus of their 2014 conference.[45]

Educating students about the wise use of technology is not a task that can be restricted to the classroom, since much of a student's interaction with ICT takes place outside the classroom. The implication of this is that students and their parents should all be included in discussions and decisions regarding ICT usage policies, and parents should be given the tools to help them guide their children about rights and responsibilities, and legal and privacy issues.

New Frontiers School Board involved parents at the beginning of its digital citizenship initiative through evening sessions and newsletters supported by the Board and based on the Canadian program "MediaSmarts." This was well received and well attended by parents.

This kind of parent education has also been undertaken by Lester B. Pearson School Board and Riverside School Board, and could be conducted by governing boards, Parent Participation Organizations (PPOs), the Home and School Association or the Community Learning Centre, when appropriate.

The Board heard about several different initiatives to establish digital citizenship programs in schools. In each case, the content is not a stand-alone course, but is integrated into the existing program when it is appropriate. For example, a discussion of plagiarism fits well into the Language Arts curriculum. Yet this strategy also raises the possibility that a discussion of digital citizenship might fall through the cracks of the curriculum. While this might seem like duplication of effort, the design of content to meet local needs is a positive feature and removes the need for a mandated MELS program, although development of such content by other boards might be helped if MELS produced guidelines for each cycle. Finally, the Board heard a strong belief from the community that MELS should take the lead in promoting digital citizenship, including the responsibility for disseminating information about existing laws.

Recommendations

- Make digital literacy, broadly defined, a cross-curricular competency and entrench its content at all grade levels.
- Provide resources to help parents and teachers supervise children's use of technology.

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44 Organisation for Economic Co-operation and Development (OECD). "*Connected Minds: Technology and Today's Learners,*" (Paris: OECD, 2012), http://www.oecd-ilibrary.org/education/connected-minds_9789264111011-en

45 The Leadership Committee for English Education in Québec, «Communicate, Collaborate, Create: Critical thinking in the age of social media - impact on teaching and learning,» *(LCEEQ, 2014* Annual Conference), https://lceeq.ca/en/lceeq-annual-conference-information-0

5.3.1 Security and privacy issues

There is a larger issue of security that impinges more closely on school activities based on the increase in cloud computing. Cloud computing is a technology that uses the Internet and central remote servers to maintain data and applications.

Cloud computing allows students and teachers to use applications without installing them on their computers and also allows access to saved files from any computer with an Internet connection. For example, text generated in Evernote is not encrypted and is stored on a remote server. Hardware such as Google Chromebook does not need to store data and is therefore less expensive than other devices, making it popular for school use, but making student data accessible in the cloud. Many servers exist for the storage of data and many of them are located outside Canada. This may seem like a trivial issue, but in a recent article about the Canadian government's concerns about the US Patriot Act and its plans to store data on servers within the country, Michael Geist wrote:

...Cloud computing services offer the promise of convenience and cost savings, but at a price of reduced control over your own content, reliance on third-party providers and potential privacy risks should the data "hosted in the cloud" be disclosed to law enforcement agencies without appropriate disclosure or oversight.[46]

Recommendation

- Establish the location of cloud servers and ensure that servers used by schools are situated in Canada.

5.3.2 School policies for technology usage

According to comments that emerged in the focus groups, the school boards are attempting to develop policies for ICT usage while the technologies are actually being introduced. This is probably a result of the speed at which the available technologies and the teachers' and students' needs are changing, while the boards are trying to deal with technical issues, such as those introduced when teachers and students use their own devices (BYOD) to supplement what is provided to them. If the school boards are provided with a set of principles by MELS, they should then be able to develop their short- and medium-term strategies to adhere to those principles. The lack of an overall goal or the mismatch between policy and action leads to some contradictions, as the teachers in the focus groups observed:

Unfortunately our school board has blocked Twitter. That is a problem. Teachers would be much more engaged if they had that access.

Our students are not allowed to get their own devices, neither are teachers.

We have BYOD networks and students use their phones in the hallways. Facebook is blocked. Twitter is unblocked. Students use Twitter in elementary classes.

The adult education teachers in the focus groups found ingenious ways to circumvent Board policies that hindered their pedagogy:

Our school board has same policy for all, including adult education. So we only have Twitter. All other social media mediums are closed. My adult ed. students use their 3G through their phones and we use all sorts of social media. That's how we go around the ban of social media.

Most sites are blocked, but students and teachers access them through their phones.

Facebook is not allowed, but students get around these blocks

We encourage students to use their phones as much as possible.

It's interesting to note that even though Facebook is blocked, we do have a Facebook page for our classes in adult ed. Even the school board has a Facebook page, but still no access in schools for Facebook.

It is clearly pointless to ban the use of ICT devices when they are such a pervasive factor in students' lives. Rather, the devices create an opportunity for teachers and parents to teach students about their safe use.

Recommendations

- Allow each school board to develop its own local policies, based on local needs and supported by a strong vision statement by MELS
- Encourage school boards to open up accessibility to sites that are currently blocked, providing support for the teachers in managing their use by students.

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46 M. Giest, "Time for consumers to think local for cloud computing," *The Toronto Star*, March 7, 2014, http://www.thestar.com/business/2014/03/07/time_for_consumers_to_think_local_for_cloud_computing_geist.html

6 Conclusion

The expectation of a public education system is to offer a level playing field for each and every student. Thus, the role of the MELS is:

- to provide a legal and regulatory framework for the education system
- to provide funding to the school boards to enable them to carry out their mandate
- to institute accountability measures to ensure that the system is allowing all students to reach their potential
- to establish educational policies and orientations and a common core curriculum accessible to all

The Board would add that, in regard to ICT, this role would be best achieved if MELS were to establish a vision for 21st century learning outcomes and skills, such as those proposed by the OECD, and allow enough leeway for local initiatives to accomplish them. Once the Ministry provides direction, school boards are best placed to assess local needs and must be trusted to do so.

It has been clear to the Board that integration of ICT is benefiting students in English language schools, but that the extent and depth of integration varies from school to school and from teacher to teacher. Teachers need to have appropriate technological tools made available to them and be given the time to become familiar with their use. They then need adequate technical support and, most importantly, professional development activities that are timely, readily available and tailored to their individual needs. The best professional development is on-site, on-demand, and on-going.

In the absence of a vision from MELS, school boards are developing their own sets of principles. One school board had a vision that encapsulates much of what has been proposed in this brief:

The digital school should be a school where all students have access to state-of-the-art technology, where all the teaching personnel have been trained to use technology as a tool to enhance, and even transform, learning. Technology will never replace a teacher but rather complement it. In a digital school, students will learn the "ins and outs" of living in a digital world, making sense of good, safe practices, as well as digital etiquette. They have the tools and skills to create a positive digital footprint. The digital school is one that will try to foresee what the "graduating student" should look like, and align its teaching practices with that in mind...

Professional development issues, in our case, pertain mostly to the scarcity of resources for such a large territory. Our IT consultant is extremely knowledgeable; however, it is difficult for her to keep up with the demand from the schools.

There are neither positives nor negatives attached to any technology. Its value lies in how it is used. The Board contends that ICT, if properly funded, deployed, and implemented, holds the possibility of diminishing some of the inequities and disparities that presently exist both within the English public education sector and across the education system in Québec.

ICT has the potential to level the playing field for all students, schools, centres, and school boards through curriculum that prepares students for the 21st century; through connectivity, collaboration, and networking among the English language school boards; through access to improved resources; through improved access to specialist teachers and resource personnel for remote areas; through alternative delivery models. In these ways, ICT would mitigate against the challenges faced by the English sector: distinctiveness, distance, diversity, demographics, and distribution of funds.

APPENDIX

Appendix 1 - European Schoolnet recommendations to policymakers

1. Plan for transformation and for ICT

Support the transformation process and management of change, of which ICT is an enabler and amplifier. The key word is transformation. If the organisational and institutional context does not support new working methods, educational practices will not change. Taking into account that most teachers embrace new technologies in a step by step process, systematically but slowly, any change should be supplemented by process management and connected to realistic visions. This means allowing schools to experiment within given boundaries. The same holds true for more drastic changes, which are more difficult to achieve.

2. Include new competencies in the curricula and in assessment schemes

Most of the reviewed studies show that ICT impacts on competency development – specifically team work, independent learning and higher order thinking skills – that are not yet recognised by many education systems. These competencies should be formally included in the curricula and ways of assessing them explored. They are important outcomes of a new and changed educational context.

3. Implement new forms of continuous professional development in a workplace environment and as part of a culture of lifelong and peer learning

New approaches to teacher training should be much more related to the concept of lifelong learning, knowledge sharing and peer learning. To be confident teachers must be able to upgrade their ICT skills and gain more pedagogical knowledge and this in a much more active way than previously. Teachers have to become active shapers of their own learning process which requires a professional environment and culture that allows teachers to do so. An experimental approach using ICT in everyday practice is an important factor in increasing teachers' pedagogical competence. Training programmes should be more school-based and adapted to the particular needs of teachers and fit to personal and subject specific needs, or project related needs. Continuous professional development should be in the foreground enabling teachers to learn how to upgrade their skills. Up-front sessions should be replaced by practice oriented projects in the practical working environment. Initial teacher training for ICT, not tackled in this review, is also seen as an important area for improvement in the future, next to concrete measure for improving in service teacher training.

4. Build up a clear political will and invest in ICT consolidation

The countries analysed in this study did benefit from high ICT investments and a strong political will to foster ICT in education. Without that wider impact on teaching and learning can not be achieved. The evidence showing that ICT impacts most with e-mature schools and teachers suggests that there is a take-off or tipping point in ICT use. Before that point, little change appears to be happening and investments seem to have little pay-off.

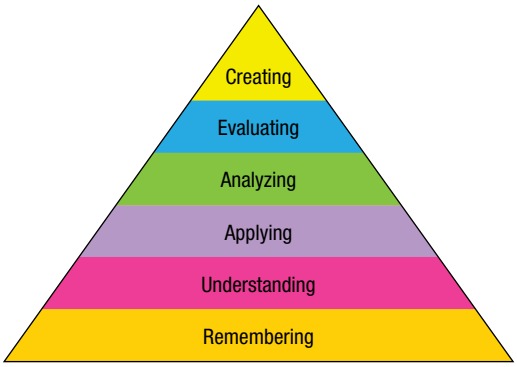
Once the change occurs the benefits accrue. Work towards ensuring the majority of schools (80 per cent by 2010 for example), not just the early adopters, reach the point of e-maturity. One way forward is to make use of the existing potential of e-confident users (students, teachers, head teachers, ICT support) in and around schools (parents, community centres, librarians, museums). A second important issue for ICT consolidation is the focus on content and support services in schools. The value of access to good interactive digital content is essential for the successful implementation of ICT. The lack of access to appropriate digital content, related copyright issues and costs of licenses was identified as a major barrier for ICT use in schools and more actions and solutions are needed on national and European level. One recommendation is to join together the paper-based and digital content market, and harmonising licences approaches and accreditation of content. There are ways to reconcile aggregated purchases while maintaining autonomy and independence of individual institutions (e.g. a framework agreement based on actual usage). Sufficient ICT support services and maintenance contracts ensuring quality equipment for schools are indispensable conditions to achieve wider impact with ICT in teaching and learning.

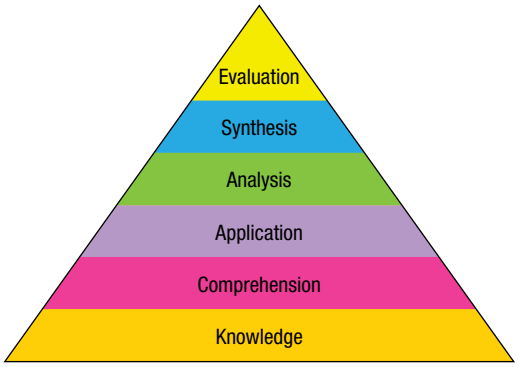
5. Motivate and reward teachers to use ICT

As the survey has shown, in addition to access to infrastructure and content and having the requisite skills, teachers' motivation is a critical factor in ICT adoption, and this is often neglected. On a European level, there are considerable discrepancies with regards to motivating teachers. Actions should be built into policies that encourage teachers to use ICT more – and more effectively. Policies in this area should include measures raising the confidence levels of teachers (sufficient on-site support, appropriate in-service and initial teacher training in ICT) but also means of incentivising, recognising and rewarding the use of ICT (such as appraisal schemes, making good ICT use part of career paths, or time benefits for teachers engaged in ICT related projects).

Source: http://colcct.colfinder.org/sites/default/files/ict_impact_report_0.pdf

Appendix 2 - Bloom's Taxonomy: Original and revised versions

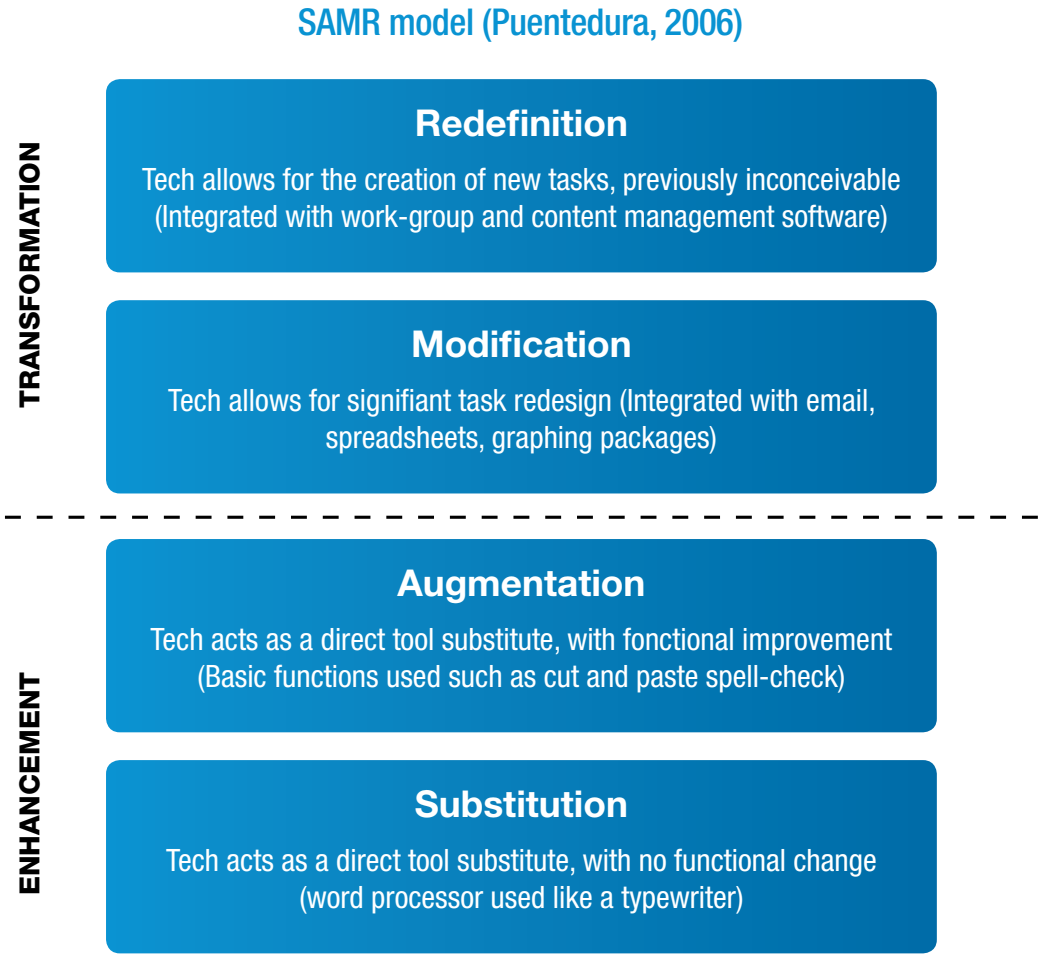




New Version		Old Version
In 1956, Benjamin Bloom headed a group of educational psychologists who developed a classification of levels of intellectual behavior important in learning. During the 1990's a new group of cognitive psychologists, lead by Lorin Anderson (a former student of Bloom), updated the taxonomy to reflect relevance to 21st century work. The two graphics show the revised and original Taxonomy. Note the change from nouns to verbs associated with each level. *Note that the top two levels are essentially exchanged from the traditional to the new version.*		
Remembering:	can the student recall or remember the information?	define, duplicate, list, memorize, recall, repeat, reproduce state
Understanding:	can the student explain ideas or concepts?	classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase
Applying:	can the student use the information in a new way?	choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write.
Analyzing:	can the student distinguish between the different parts?	appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.
Evaluating:	can the student justify a stand or decision?	appraise, argue, defend, judge, select, support, value, evaluate
Creating:	can the student create new product or point of view?	assemble, construct, create, design, develop, formulate, write.

Appendix 3 - Puentedura's SAMR model

SAMR Model for Transformation, Thecnology and Education: Technological Levels of Use



Appendix 4 - Nine Themes of Digital Citizenship

Digital citizenship can be defined as the norms of appropriate, responsible behavior with regard to technology use.

1. Digital Access:

full electronic participation in society.

Technology users need to be aware that not everyone has the same opportunities when it comes to technology. Working toward equal digital rights and supporting electronic access is the starting point of Digital Citizenship. Digital exclusion makes it difficult to grow as a society increasingly using these tools. Helping to provide and expand access to technology should be goal of all digital citizens. Users need to keep in mind that there are some that may have limited access, so other resources may need to be provided. To become productive citizens, we need to be committed to make sure that no one is denied digital access.

2. Digital Commerce:

electronic buying and selling of goods.

Technology users need to understand that a large share of market economy is being done electronically. Legitimate and legal exchanges are occurring, but the buyer or seller needs to be aware of the issues associated with it. The mainstream availability of Internet purchases of toys, clothing, cars, food, etc. has become commonplace to many users. At the same time, an equal amount of goods and services which are in conflict with the laws or morals of some countries are surfacing (which might include activities such as illegal downloading, pornography, and gambling). Users need to learn about how to be effective consumers in a new digital economy.

3. Digital Communication:

electronic exchange of information.

One of the significant changes within the digital revolution is a person's ability to communicate with other people. In the 19th century, forms of communication were limited. In the 21st century, communication options have exploded to offer a wide variety of choices (e.g., e-mail, cellular phones, instant messaging). The expanding digital communication options have changed everything because people are able to keep in constant communication with anyone else. Now everyone has the opportunity to communicate and collaborate with anyone from anywhere and anytime. Unfortunately, many users have not been taught how to make appropriate decisions when faced with so many different digital communication options.

4. Digital Literacy:

process of teaching and learning about technology and the use of technology.

While schools have made great progress in the area of technology infusion, much remains to be done. A renewed focus must be made on what technologies must be taught as well as how it should be used. New technologies are finding their way into the work place that are not being used in schools (e.g., Videoconferencing, online sharing spaces such as wikis). In addition, workers in many different occupations need immediate information (just-in-time information). This process requires sophisticated searching and processing skills (i.e., information literacy). Learners must be taught how to learn in a digital society. In other words, learners must be taught to learn anything, anytime, anywhere. Business, military, and medicine are excellent examples of how technology is being used differently in the 21st century. As new technologies emerge, learners need to learn how to use that technology quickly and appropriately. Digital Citizenship involves educating people in a new way— these individuals need a high degree of information literacy skills.

5. Digital Etiquette:
electronic standards of conduct or procedure.

Technology users often see this area as one of the most pressing problems when dealing with Digital Citizenship. We recognize inappropriate behavior when we see it, but before people use technology they do not learn digital etiquette (i.e., appropriate conduct). Many people feel uncomfortable talking to others about their digital etiquette. Often rules and regulations are created or the technology is simply banned to stop inappropriate use. It is not enough to create rules and policy, we must teach everyone to become responsible digital citizens in this new society.

6. Digital Law:
electronic responsibility for actions and deeds

Digital law deals with the ethics of technology within a society. Unethical use manifests itself in form of theft and/or crime. Ethical use manifests itself in the form of abiding by the laws of society. Users need to understand that stealing or causing damage to other people's work, identity, or property online is a crime. There are certain rules of society that users need to be aware in an ethical society. These laws apply to anyone who works or plays online. Hacking into others information, downloading illegal music, plagiarizing, creating destructive worms, viruses or creating Trojan Horses, sending spam, or stealing anyone's identify or property is unethical.

7. Digital Rights & Responsibilities:
those freedoms extended to everyone in a digital world.

Just as in the American Constitution where there is a Bill of Rights, there is a basic set of rights extended to every digital citizen. Digital citizens have the right to privacy, free speech, etc. Basic digital rights must be addressed, discussed, and understood in the digital world. With these rights also come responsibilities as well. Users must help define how the technology is to be used in an appropriate manner. In a digital society these two areas must work together for everyone to be productive.

8. Digital Health & Wellness:
physical and psychological well-being in a digital technology world.

Eye safety, repetitive stress syndrome, and sound ergonomic practices are issues that need to be addressed in a new technological world. Beyond the physical issues are those of the psychological issues that are becoming more prevalent such as Internet addiction. Users need to be taught that there inherent dangers of technology. Digital Citizenship includes a culture where technology users are taught how to protect themselves through education and training.

9. Digital Security (self-protection):
electronic precautions to guarantee safety.

In any society, there are individuals who steal, deface, or disrupt other people. The same is true for the digital community. It is not enough to trust other members in the community for our own safety. In our own homes, we put locks on our doors and fire alarms in our houses to provide some level of protection. The same must be true for the digital security. We need to have virus protection, backups of data, and surge control of our equipment. As responsible citizens, we must protect our information from outside forces that might cause disruption or harm.

Digital Citizenship, http://www.digitalcitizenship.net

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