

**Report to Committee of the Whole  
March 24, 2014**



**Waterloo Region  
District School Board**

*Inspired Learners – Tomorrow's Leaders*

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**SUBJECT: Technology Plan Update**

**ORIGINATOR:** This report was prepared Marilyn Allen, Executive Superintendent of Business Services, Mark Carbone, Chief Information Officer and Michael Morgan, Senior IT Manager, in consultation with Executive Committee.

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**PURPOSE/STRATEGIC PLAN:**

This technology plan update provides additional detail regarding strategies to move the Waterloo Region District School Board forward regarding the use of technology for learning and business needs in the areas of mobile technologies and digital resources and seeks approval for a Board policy, "Access to Digital Resources and Technology."

This report relates to the strategic direction of forward thinking. It illustrates the technology plan to ensure that students are prepared for the future in which they will live. As such, it focusses on the areas of student achievement and success for all. The report also presents information on how the Board monitors developments in areas affecting student health and well-being.

**BACKGROUND:**

This report is an addition to the presentation at the November 25, 2013 Board meeting and additionally addresses the use of Wi-Fi in our schools to enable learning.

**The Learning Context**

We live in a rapidly changing technology enabled world. It is important to understand and appreciate the changes that technology has brought to our everyday lives. Even more critical is the strategic work we need to do to ensure that we prepare our students for the future world in which they will live.

The 2013-2014 Board Improvement Plan for Student Achievement (BIPSA) clearly defines our vision of a student. Specific areas of focus including collaboration, communication, creative thinking and critical thinking are emphasized in the learning journey of becoming positive, engaged and contributing citizens. It is recognized that these identified skill sets must extend to the digital world.

Under the leadership of Superintendent Mark Harper, the Waterloo Region District School Board Digital Learning Steering committee, with representation from Learning Services and Information Technology Services (IT), has developed a formal digital learning plan which states:

"The Waterloo Region District School Board Digital Learning Strategy is intended as a systemic approach to improve learning and instruction, particularly as it relates to the enabling power of technology. The Waterloo Region District School Board Digital Learning Strategy involves system thinking and learning with a focus on a few projects to examine and better understand the change process and the conditions for improved learning and instruction. This is intended to assist by improving conditions and processes so that more staff can better utilize technology to improve learning and instruction and achieve the overall Board Improvement Plan for Student Achievement (BIPSA) goal of optimizing learning and achievement for all students."

There are many excellent projects currently underway in our system where technology is being used as an effective vehicle to support learning in new ways.

- the iPads for Full Day Kindergarten students
- the Futures Forum Project
- the eLearning and blended learning programs

The effective use of technology addresses a wide range of learning needs and opportunities that are simply not possible to accomplish in a paper and pencil world.

### **Technology Enabled Learning**

In his new publication, “A Rich Seam” Dr. Michael Fullan states that “the ‘new pedagogies’ are not just instructional strategies. They are powerful models of teaching and learning, enabled and accelerated by increasingly pervasive digital tools and resources”. When combined with powerful teaching strategies, “digital tools and resources have the potential to enable, expand and accelerate learning in ways previously unimaginable.”

Fullan’s publication articulates powerful next steps which essentially build on the premise of learning with technology as described in the Ontario Public School Board Association (OPSBA) document titled “What If?” which states that, “Rapid technological change, global competitive pressures and new patterns of work are demanding a more sophisticated set of transferable skills such as problem-solving, communication, decision-making, teamwork, leadership, entrepreneurship and adaptability.” Additionally, the OPSBA document states that, “ If we accept that there is no debate about how technology has revolutionized the way we live, it should be an easy step to embracing how technology should revolutionize what learning looks like not only today but five and ten years out.”

### **Ontario Based Research**

“A Synopsis of the Final Research Report - *A Pilot Study of Local Innovations in Ontario School Boards (September 2013)*,” prepared by Dr. Carmen Shields, Schulich School of Education, Nipissing University, includes overall observations from field researchers following their school board interviews for this pilot study and indicated a number of changes in teaching practice. They noted that:

- technology seems to impact all aspects of teaching and learning.
- the teacher’s role seems to be shifting to that of facilitator who supports and guides learning.
- teachers who use technology increasingly see themselves as co-learners.
- teachers seem to believe that they now have the tools and strategies to better reach and engage every student.
- technology seems to promote more collaboration among teachers and among students.
- technology seems to provide partnerships with parents by giving them access to information so that they can support their children’s learning.
- technology is providing opportunities for cross-curricular learning in manageable and efficient ways.
- school cultures seem to be shifting to where teachers respect the differences in the ways students gain knowledge and skills in today’s digital world.

### **The Technology Context: The Internet of Things**

Respected technology research companies such as Info-Tech Research Group (*the world's fastest growing information technology research and advisory company*) and Gartner (*the world's leading information technology research and advisory company*) are clearly stating that technology is an unstoppable force.

According to Infotech, “Developing our ITS strategy with an underlying understanding of the exponential nature of technology growth will result in a much more accurate view of how technology, and IT, will enable school board innovation one, two, five, ten years forward.”

David Evans of Cisco, a worldwide leader in networking that transforms how people connect, communicate and collaborate, states that, “The Internet is going to be everywhere. It's going to be inside you, it's going to be in your clothing, it's going to be driving your car, it's going to be connecting smart cities together, it's going to be managing all of our utilities, and it's going to be in our livestock. We're moving from 10 billion to 50 billion devices over the next decade being connected to the Internet.”

The evolving Waterloo Region District School Board technology framework must prepare our students for the rapid shift that is occurring. Our plan must be sustainable, scalable and aggressively paced in order to marry technology changes with learning and business needs. The five critical and unstoppable trends that will impact us are: mobility, cloud, social media, security and big data.

**Info-Tech Research states that: “The PC will be dead by 2020.** Phones, tablets, and yet-to-be-revealed form factors will make the clunky desktop PC a dinosaur. Even laptops will be rare, reserved for very specific use cases. In the future, the idea of having to work in a specific place at tied-down devices will seem quaint.”

**STATUS:**

The technology areas outlined in this next section are critical for our path forward.

**1. The network is the thing:** Our network must be designed for both business security and a “socialist” use that supports a variety of needs (communicating, collaborating, creating, critical thinking, citizenship, access to resources etc.) We must begin preparation for an end view where each and every student and staff member will access services. Currently, 40,000 networked devices (Board and personally owned) access information over our network each day. Wireless internet provides ubiquitous access for all technology within our school sites. Wireless internet provides flexible use within the learning space.

Favourable pricing will allow us to enhance opportunities for students. A cost comparison to service connectivity for 50 students at current market prices indicates:

Wired (including switches, cabling, plugs) at \$13,500 versus Wireless (switch port, 1 blue cable) at \$2,142. Wireless Network is 84% less expensive to install and maintain, thereby allowing access to more students for the same former cost.

Infotech Research states that, “All cables will eventually curl up and die. By 2021, improving wireless standards will make physical connections rare, even in the data centre. If wireless power can be cracked, an entirely cable-free enterprise will be within view.” In other words, we are rapidly moving to a mobile and wireless world only. Enterprise access networks, like ours, will be almost entirely wireless and operating at a rate 10 times faster than current capabilities.

**2. Mobilize a new hardware strategy:** We have already started down the path of implementing the “sliders model” - replacing a group of desktops with a mix of hardware. Currently one third of our elementary schools are engaged in this process as early adopters. It is recognized that a mix of hardware, web and software/applications are needed to properly support student learning. Netbooks, tablets, iPads and Chromebooks are being used in our system. These devices are dependent on wireless technology to operate.

Hardware planning and equipment allocations must also address new business needs such as web based attendance which will replace the current scanning system over the next two years.

**3. Establish a new print strategy:** Significant savings can be achieved by establishing practices for increased use of electronic document and workflow strategies for administrative purposes and shifting staff and students to greater use of digital resources.

The tools needed to achieve this are already in place; the LaserFiche electronic document management system and Google Apps for Educators (GAFE). Moving forward requires a system approach to remove printers and promote paperless strategies for learning and working.

**4. Data storage review:** Learning and working in a mobile world requires easy access to digital resources and files. Cloud storage through our Google Apps for Educators environment offers significant storage on a per user basis at no charge and provides “anywhere, anytime” access.

Critical corporate data and Waterloo Region District School Board server data would continue to be housed and backed up locally.

**5. Staff training:** Digital resources include materials required for training purposes. A hybrid model of self-paced, self-directed online modules with custom internal resources, as needed would provide a more cost effective approach.

In order to support digital inclusion, critical learning opportunities for Board students and staff and providing a robust network, wireless access is the only option.

Appendix A is a draft policy addressing, “Access to Digital Resources and Technology.” It illustrates the Board’s strategic vision to encourage and support the use of technology in our schools. This prepares our students for the world in which they will live.

Nonetheless, as we move forward with the use of wireless technology, we must attend to the safety and well-being of our staff and students. To do this we monitor industry research and developments. This is consistent with our practice as we monitor all products to which staff and students are exposed.

There is much conflicting and unsubstantiated research available about the effects of Wi-Fi. We do not have the local expertise to assess any dangers which may be apparent with the use of Wi-Fi. Neither do we have the ability to understand the very complex research that is widely available to the public.

Instead we take our lead from recognized, reputable agencies charged with world and community safety. The World Health Organization in their statement on Electromagnetic Fields states that, “considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak radio frequency (RF) signals from base stations and wireless networks cause adverse health effects.” Health Canada states that, “based on scientific evidence they have determined that low-level exposure to RF energy from Wi-Fi equipment is not dangerous to the public. This conclusion is consistent with the findings of other international bodies and regulators.” Further, they state that, “there is no convincing scientific evidence that emissions from this equipment are dangerous to school children or to Canadians in general.”

The Chief Medical Officer of Health for Ontario says, “I want to reassure Ontarians that the use of wireless communication systems does not pose a public health risk.”

Region of Waterloo Public Health states, “while some of these technologies are new, the use of the radiofrequency band for communications and other applications is not. Widespread public exposure to these frequencies has occurred for decades. For example, the radiofrequency energy given off by cell phones and Wi-Fi is similar to the energy used in AM/FM radios, TV broadcast signals, home cordless phones and microwave ovens.”

Many other school boards have addressed the issue of Wi-Fi in schools and are following the same approach as the Waterloo Region District School Board with respect to the safety issue. In response to concerns, for example, the Bluewater District School Board commissioned an outside testing lab to measure radiofrequency levels in two schools. Their conclusion was that there was no health and safety reason to

discontinue use.

**COMMUNICATIONS:**

The Board will continue to expand and communicate its vision for technology through advancing its use. Included in Appendix B are a series of Questions and Answers on Wi-Fi for posting to the website to inform the community.

**FINANCIAL IMPLICATIONS:**

Board budgets will include provision for enabling the continued and expanded use of technology as funds are available.

**RECOMMENDATION:**

It is recommended:

**That the Waterloo Region District School Board approve Policy (number to be assigned), Access to Digital Resources and Technology.**

 **Director of Education**



## ACCESS TO DIGITAL RESOURCES AND TECHNOLOGY

Legal References:

Related References: *AP4070 – Responsible Use Procedure for Information, Communication and Collaboration Technologies*

Effective Date: *March 2014*

Revisions:

Reviewed:

### 1. Preamble

- 1.1 The Waterloo Region District School Board Policies will provide a technology environment that allows networked access for staff and students for the purposes of learning, conducting business and participating in training and professional development through the use of desktop computers and mobile devices. Access will be provisioned to allow staff and students to use personally owned technology on the WRDSB network (BYOD).
- 1.2 The Board recognizes the importance of access to information, research, digital resources, internet based resources and a variety of online tools to facilitate learning and Board business.
- 1.3 The Board's Technology Plan is designed to guide and support the expanding use of technology tools to equip our students with the necessary tools to develop 21<sup>st</sup> Century skills necessary in our modern society. As evidenced through research findings the Board acknowledges that the use of technology facilitates and enhances learning through communication, collaboration, creativity, citizenship and critical questioning/thinking.

### 2. Network Access and Monitoring:

- 2.1 Provide networked access in hardwires and wireless configurations.
- 2.2 Govern access to the network by provisioning user accounts to all staff and students.
- 2.3 Expect that staff and students will use the network in accordance with governing protocols including:
  - AP4070, Responsible Use Procedure for Information, Communication and Collaboration Technologies;
  - the WRDSB Digital Code of Conduct;
  - the WRDSB Digital Citizenship framework;
  - the WRDSB Character Development framework
- 2.4 Monitor the network for:
  - Appropriate use and, when necessary, take appropriate action to maintain the safety and privacy of WRDSB staff, students and assets.
  - Data traffic congestion and take action to increase capacity as funds and resources are available.
- 2.5 Use equipment that complies with CSA and Health Canada and World Health standards, Safety Code 6.
  - Conduct periodic reviews of equipment as needed to ensure compliance.
  - Check with relevant health agencies for updated advisories.

**WATERLOO REGION DISTRICT SCHOOL BOARD**  
**March 24, 2014**

**Wi-Fi in Schools**

As guardians of the safety of our staff and students, the Waterloo Region District School Board turns to many expert bodies entrusted with the study and research of various products and services. For example, with the purchase of equipment we insist on CSA (Canadian Standards Association). This is necessary because we lack the expertise to make pronouncements of this nature as they are outside the scope of our organization. These governing bodies are charged with having the requisite knowledge concerning products.

Similarly, when it comes to Wi-Fi or wireless technology, the Waterloo Region District School Board relies on the subject experts. Trustees have received updates from staff on two previous occasions (March 15, 2012 and September 18, 2013) with respect to the Safety of Wi-Fi in schools.

As the use of technology increases, exposure to various radiofrequency fields predominate our environment wherever we find ourselves. The safety of our staff and students is of the utmost concern and our staff monitor developments in the industry and employ caution in all of our installations of equipment.

The Waterloo Region District School Board uses Meru 320 Access Points (APs) also known as base stations. All equipment conforms to: Federal Communications Commission (FCC); Information technology equipment safety (60950-1) from Underwriters Laboratories (UL), Canadian Standards Association (CAN/CSA-C22.2) and Commission Electrotechnique Internationale (IEC).

In order to ensure safety, equipment must meet safety standards as outlined by Health Canada, the FCC (Federal Communications Commission), UL (Underwriters Laboratories) or ULC (Underwriters Laboratories of Canada) and CSA (Canadian Standards Association).

The following excerpt is from the World Health Organization's 2006 fact sheet on electromagnetic fields and public health:

From all evidence accumulated so far, no adverse short- or long-term health effects have been shown to occur from the radiofrequency RF signals produced by base stations. Since wireless networks produce generally lower RF signals than base stations, no adverse health effects are expected from exposure to them.

Health Canada's Radiofrequency Energy Guidelines (Safety Code 6) state the following: *The typical levels of RF energy that you find coming from base stations, including cell phone towers, are thousands of times below the limits for public exposure.*

Also from the Health Canada Guidelines:

*Based on information to date and the weight from ongoing scientific literature reviewed by Health Canada scientists, the Department is confident that Canada's RF exposure limits remain current and valid.*

Public Health Ontario has completed a research review of the potential impact of Wi-Fi in schools. Their conclusion is that:

“Wi-Fi exposure are not only well within recommended limits, but are only a small fraction (less than 1%) of what is received during typical use of cell phones. For this reason much of the research on possible effects of radio frequency (RF) energy has been focused, and will likely continue to focus, on exposures from cell phones rather than the lower exposures associated with RF uses such as Wi-Fi.”

“RF exposures to the public, including school children, from Wi-Fi are far lower than occur with cell phone use and to date there is no plausible evidence that would indicate current public exposures to Wi-Fi are causing adverse effects on health.”

The full report is available at:

[http://www.oahpp.ca/resources/documents/10-09-2010\\_Wireless\\_technology\\_and\\_health\\_outcomes\\_v2.pdf](http://www.oahpp.ca/resources/documents/10-09-2010_Wireless_technology_and_health_outcomes_v2.pdf)

Ontario’s Chief Medical Officer of Health stated:

*“I think the important thing for parents and others to hear is that the conclusion, at this point in time, is that the wireless communications systems do not pose a public health risk.”*

We continue to monitor developments in the industry and to apply vigilance to our installations. In this area we will continue to rely on the expertise of organizations such as Health Canada and the World Health Organization to inform our decision.

Much of the apparent confusion revolves around the difference between cell phones (where the device is held directly to the head) and wireless routers which have significant differences in the levels of emission.

In order to ensure that we engage our community in educating them about Wi-Fi, we have prepared a series of Questions and Answers to Frequently Asked Questions on Wireless Technology.

## Frequently Asked Questions on Wireless Technology

**Q: What is the difference between the phrases *Wireless Technology* and *Wi-Fi*?**

**A:** Both are similar and are used interchangeably.

**Q: Why has the Waterloo Region District School Board installed Wi-Fi in schools?**

**A:** The Board's Instructional Technology Plan is designed to guide and support the expanding use of technology in our schools. The plan addresses the growing need to equip our students with the technological tools to develop the 21st century skills necessary in our modern society.

The Instructional Technology Plan improves access to technology for students and teachers. Through wireless technology, teachers and students can engage with the world in new and innovative learning environments, through modern classroom tools, that help students to grow and experience success.

**Q: Is wireless technology new?**

**A:** No. Wireless technology is commonplace and prevalent throughout society, within all aspects of modern life: places of work, schools, hospitals, libraries, cafés, and in many, many homes. Similar wireless signals for AM/FM radio and television have been present everywhere in our school board jurisdiction for many years, as have cellular phone signals.

**Q: Is wireless technology safe?**

**A:** Yes. Health Canada, the World Health Organization, numerous international, provincial and local health authorities have all concluded that the use of wireless technology does not pose a public health risk.

**Q: Do other school boards use wireless technology?**

**A:** Yes. Wireless technology has been in place in school boards, universities and other public institutions, including hospitals, for years. Many of our education partners all across Ontario have had ubiquitous (pervasive everywhere) wireless coverage in their schools since 2006.

**Q: What is Safety Code 6?**

**A:** Safety Code 6 (2009) is Health Canada's established standards for protecting human health from radiofrequency electromagnetic energy. These safety guidelines have set limits for safe human exposure to electromagnetic energy from all radiofrequency (RF) devices, including the base stations used in wireless networking.

Health Canada states "there is at present no scientific basis for the premise of health risks from radiofrequency electromagnetic energy at levels below the limits within this safety code."

**Q: How do the levels of electromagnetic energy within wireless classrooms compare to Safety Code 6 standards?**

**A:** Health Canada's Safety Code 6 establishes 10 W/m<sup>2</sup> as the limit for all Wi-Fi equipment. The average readings we have tested within schools are 1,000 to 10,000 times lower than the Safety Code 6 threshold. With a concentration of 15 laptops streaming video at the same time, the highest reading recorded near an access point was 0.015 W/m<sup>2</sup> or 0.15% of the limit established by Health Canada. For comparison, measurements taken from a cell phone streaming video were 0.0605 W/m<sup>2</sup> or 0.6% of the limit established by Health Canada. Measurements taken directly at a microwave oven set at high for 30 seconds resulted in readings of 0.956 W/m<sup>2</sup> or 9.56% of Health Canada's limit.

**Q: Hasn't the World Health Organization recently raised concerns regarding the use of wireless technology?**

**A:** No. On the basis of limited human studies and inadequate other studies the WHO/International Agency for Research on Cancer (IARC) classified radiofrequency electromagnetic fields, associated with cellphone use, as a Group 2B Agent and possibly carcinogenic. They are not saying it *does* cause cancer, or that it *probably* causes cancer, only that on the basis of very limited studies it is a possibility. It is almost impossible to prove a negative and so this was placed in the same category with respect to their possible cancer risk as many other substances such as coffee, lead and pickled vegetables. In the report, Dr. Jonathan Samet, (University of Southern California, USA), Chairman of the Working Group, suggests that this conclusion "means that there could be some risk and therefore we need to keep a close watch for a link between cell phones and cancer risk."

**Q: Is wireless technology the same as using a cellular phone?**

**A:** No. Wireless technology or Wi-Fi is not the same as cell phones. Wi-Fi in schools is 1,000 times less powerful than cell phone use and is used much, much farther away from the body. Cell phone users are at a significantly greater risk than anyone connecting via Wi-Fi.

**Q: What Wi-Fi technology will the Waterloo Region District School Board be using in its schools?**

**A:** The Waterloo Region District School Board has undergone an open and fair request for proposal (RFP) process and has selected Meru Networks as its standard equipment. The Meru AP832 access point will be used in Waterloo Region District School Board schools. Meru wireless equipment complies with current health standards and requirements.

**Q: Is the Wi-Fi technology being used in Waterloo Region District School Board Schools the same as what is used in most homes today?**

**A:** Yes, the Wi-Fi technology used in Waterloo Region District School Board schools operates on similar frequencies and is subject to the same safety standards as the technology presently used in homes.

**Q: Is there such thing as "industrial strength" Wi-Fi?**

**A:** No, all Wi-Fi technology in Canada must abide to Health Canada Safety Code 6 standards. There are industrial wireless models that have special external enclosures to protect against the elements (heat, snow, ice), but these models are still subject to the same safety standards.

**Q: When will Wi-Fi be installed in Waterloo Region District School Board schools and available for teachers and students to use?**

**A:** Ubiquitous (pervasive everywhere) Wi-Fi has been available in all of our schools since the 2010-2011 school year.

**Q: Is it possible to have a Wi-Fi free area in a school?**

**A:** Wi-Fi is everywhere. The reality is no, since we cannot control the Wi-Fi devices on private property near our schools. In many cases, Wi-Fi signals from nearby home owners reach to our schools and classrooms.

It is also noted, the Canadian government is increasing funding to make Wi-Fi more accessible. In fact, an Ontario provincial tender is currently underway.

**Useful General Information Links:**

Ontario Agency for Health Protection and Promotion - [www.oahpp.ca](http://www.oahpp.ca)

Ontario Ministry of Education - [www.edu.gov.on.ca/eng](http://www.edu.gov.on.ca/eng)

Public Health Protection and Prevention Branch, Ontario Ministry of Health and Long Term Care - [www.health.gov.on.ca/en](http://www.health.gov.on.ca/en)

World Health Organization (WHO) - [www.who.int](http://www.who.int)

Industry Canada - [www.ic.gc.ca](http://www.ic.gc.ca)

International Commission on Non-Ionizing Radiation Protection (ICNIRP) - [www.icnirp.de](http://www.icnirp.de)  
[http://www.hc-sc.gc.ca/hl-vs/alt\\_formats/pdf/iyh-vsv/prod/wifi-eng.pdf](http://www.hc-sc.gc.ca/hl-vs/alt_formats/pdf/iyh-vsv/prod/wifi-eng.pdf)