Chronicling the Impact of the 21st Century Innovation Research Initiative on Students, Teachers, and System

Local Innovation Research Projects in Ontario

Round 6

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Final Report

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Executive Summary

In October 2016, the Ministry of Education and CODE indicated their intention to continue working in partnership for a sixth consecutive Round to support innovation research projects on effective practices for technology-enabled teaching and learning across Ontario. Curriculum Services Canada (CSC) continued to work with the innovation projects in documenting evidence of impact on teaching and learning within a common research framework. In reporting this study, the research team is focusing on changes that have taken place in Ontario schools since the previous Rounds of study, and is looking more specifically at the impact of global competencies and of systemization in order to move forward the agenda of effective teaching and learning practices in technology-enabled classrooms. In this Round 6 study, we highlight information on how this increasing focus is impacting the learning and learning environments of students, teachers, and administrators across the province.

For purposes of this report, the data is amalgamated to present an overall perspective on the 77 district initiatives from each of the participating 72 school boards, 4 school authorities, and a collective led by one of the provincial schools.

Based on the numbers reported, over 405 000 students across the province are involved. In comparison, approximately 265 000 were involved in Round 5. The substantial increase in the direct involvement of students may be an indication of a deliberate increased focus on developing global competencies.

All districts identified broad and extensive involvement by classroom teachers. Based on the numbers reported by projects, almost 25 000 teachers across the province are directly engaged in aspects of the initiative with a median level of involvement of 66 teachers per project.

As well as classroom teachers, projects reported that in total 2589 school administrators (principals, vice-principals) are part of the innovation project. This compares to 1790 and 2285 school administrators in Rounds 4 and 5 respectively. In addition to school administrators, 300 system administrators, and 706 support staff (e.g., information technology staff, program staff) have direct involvement in the project undertakings. The substantial increase in the direct involvement of school leaders in Round 6 supports observations of the field team of the growing commitment to developing school-level leadership as a critical means of systematizing pedagogy-driven use of technology.

One aspect that is particularly striking in Round 6 is the dramatically heighted focus on coding and robotics. There are several common themes evident in the coding and robotics projects. The first is the

clear focus that coding is directly aligned with and supportive of meeting curriculum expectations. Coding is not done in isolation or as an enrichment add-on. Planned and articulated direct links are made to numeracy and literacy, and specifically to the mathematics curricula.

Overall, the quality of the submitted statistical data in Round 6 continues to grow. What is also evident is that more districts are establishing system tools and processes that allow for reliable comparative analysis of change and growth over time. Protocols and procedures are being set to allow for more meaningful long-term measures of student learning and achievement, and as well, for policies and procedures.

Impact on Students

In the reporting for this Round, it is evident that while there are a wide range in the nature and scope of project initiatives, they all exhibit a common focus-the development of global competencies.

The data clearly points to a consistent focus on the process of learning enabled by technology. For example, a number of projects found that, as opportunities for inquiry and problem solving increase, collaboration, communication, and feedback improve and overall interest and engagement is heightened as students work with individual interests, talents, and learning styles.

A significant emphasis on critical thinking and problem solving is evident throughout the projects. Projects reported that critical thinking is encouraged in a number of ways. For example, as students create their own questions and investigate areas of a larger topic of interest, they begin to think critically about how they would find information, whether their research makes sense within the larger schema, and the implications for their overall learning.

A number of projects described collaboration and communication as significant aspects of students' learning. Students demonstrate collaboration, communication, and creativity as they share documents and work together to find ways to present their learning, using cloud-based productivity tools. It was also reported that students could work seamlessly at school and continue their work at home, using these tools. Projects reported that student collaboration with peers and teachers using shared documents results in increased critical thinking, effective communication, and digital citizenship.

Students are seeing themselves as global citizens with a responsibility to enact change in the world. Students are engaged in real-world problems and in collaboratively putting their solutions into possible actions from supporting community causes to exploring places beyond Ontario as they work on inquiry-based projects using technology.

It was reported that students are developing the attributes associated with 'learning to learn' – meta-cognition, self-regulation, self-reflection, and self-advocacy as they become more independent and take more ownership for their learning. There is a growing shift for students toward the processes of learning and a new eagerness to be involved in learning using multiple technologies.

In terms of overall adoption of global competencies, projects reported that students are challenged, more actively involved in assessing their own academic progress, more engaged and resilient when completing activities, and are more independent thinkers. Students' attitude towards learning is more positive, they take more risks, and are more persistent in taking control of their own learning.

Impact on Teachers

In terms of instructional practices, a number of projects reported on the changing role of teachers in technology-enabled classrooms. Projects shared that the use of technology represents a significant power shift in classrooms. Teachers described how they intend to continue to maintain and expand pedagogical shifts, including: leveraging digital learning; building in more student choice and voice in learning; connecting learning tasks to the real world; and integrating new partnerships.

Learning partnerships are forming between classrooms, between schools, and globally as digital learning is being leveraged. Teacher-to-teacher learning partnerships help shift some teachers disposition and perspective regarding their abilities to use technology in the classroom.

Projects reported that technology allows for the deepening of assessment practices, and they highlighted feedback during the learning as a way of thinking about assessment as part of the learning process. It was reported that the way teachers provide feedback is changing and this is having a direct and timely impact on their teaching practices and the students' learning experiences.

Impact on System

Systemization, both local and on a provincial scale, is another important area for inquiry in Round 6 as school districts continue to apply what they are learning in these projects to promote growth in their school communities. Impact evidence suggests the change process includes teachers and system leaders at all levels – principals, central office staff, and administrators – within the system and is becoming integral to board plans for scaling up and sustaining growth.

In terms of leadership, projects reported on policies and procedures regarding technology-enabled learning. The research field team observed multiple examples of professional development for school

principals and school leaders to develop their leadership capacity for technology-enabled learning. Teacher leadership is highlighted as an important aspect of building capacity in school systems. Teachers who were engaged in previous rounds of study are described as showing great leadership with their peers and in their schools, sharing their passion for digital learning with others.

Some project reports reflected the importance of research as part of the ongoing digital learning they are undertaking. These projects reported that the results are a deeper understanding of data-informed decision making related to technology acquisition, planning, and use.

Changes to learning environments are described as having an impact on the system. Computer labs are being phased out and replaced with more mobile and adaptable digital technologies. Reliance on specific types of hardware has become less relevant as students now use multiple wireless devices.

As the Ontario school system continues to embrace technology-enhanced teaching and learning beyond the important Rounds of study provided through the Technology and Learning Fund Initiative, the research team anticipates that these perspectives will be woven into the professional fabric of schools and system to enhance innovation going forward into the future.

Prologue

Extending the Mountain Climbing Metaphor

During the previous Rounds of study (2011-2012; 2012-2013; 2013-2014; 2014-2015), the research team adopted the metaphor of mountain climbing to provide a detailed picture of the impact of technology-enhanced skills and attributes necessary for a planned and confident ascent toward increasing student success. In this Round 6 study, we continue with the mountain climbing metaphor as we demarcate the development of global competencies as well as focused efforts for systemization as Ontario schools move forward in their climb. While much success and growth were noted in previous Rounds, our expectation is that districts are continuing to climb toward the peak with greater expertise, using the strategies and tools they have amassed over the years of engaging in these projects.

Utilizing the mountain climbing metaphor allows us to draw parallels between the skills needed by the climbing community and by those in our education community and, that are also described in the international literature as essential skills for 21st Century teaching and learning. For example, collaboration and communication among and between learners, as with climbers who are in close proximity or at a distance, support the notion of rich and meaningful dialogue being an important source for securing new knowledge. Learners, like climbers, engage in creative and critical thinking as part of successful planning and engagement. Community is formed by those involved in a learning culture. By being actively involved in a learning community, learners can become fully participating global citizens who are able to transfer their acquired competencies to life in an ever widening digital world.

In this Round 6 study, metaphorically we continue our move up the mountain, bringing all the strategies and evolving visions gained in previous Rounds to advance technology-enhanced pedagogical practices and the development of global competencies by learners across Ontario.

Chapter 1

Looking up from the Tree Line: Background, Purpose, and Research Considerations for the Round 6 Projects

The Ministry of Education and the Council of Directors of Education (CODE) committed to continuing to fund research documenting changes in teaching and learning under the auspices of the Technology and Learning Fund Innovation Research Initiative for Round 6.

Overall Goals of the Round 6 Research Initiative

The goals for Round 6 are to:

- promote local innovation and leadership for 21st Century (next generation) teaching and learning
- support evidence and research-informed decision making that is focused on the instructional core
- situate Ontario's local innovation efforts within the wider context of current international research on the features of strong districts, whole system reform that integrates effective technology-enabled pedagogy, and, emerging evidence on '21st Century effectiveness,' in innovation learning environments
- promote sector-wide engagement, foster common understanding, and support capacity building and knowledge mobilization in moving to scale-up pedagogy-driven, technology-enabled practices for optimizing learning

Background

In October 2016, the Ministry of Education and CODE indicated their intention to continue working in partnership for a sixth consecutive Round to support innovation research projects on effective practices for technology-enabled teaching and learning across Ontario. Curriculum Services Canada (CSC) continues to work with the innovation projects in documenting evidence of impact on teaching and learning within a common research framework. In this study, the research team is focusing on changes that have taken place in Ontario schools since the previous Rounds of study, and is looking more specifically at the impact of global competencies and of systemization in order to move forward the agenda of effective teaching and learning practices in technology-enabled classrooms.

Lessons learned from the Round 3 (2013-2014) and 4 (2014-2015) and 5 (2015-2016) projects are consistent with both international trends in 21st Century next generation learning and with Ontario's education strategy (April, 2014). Focusing on both local and provincial visions that can impact whole

system change provides a strong footing for furthering learning through the *21st Century Innovation Research Initiative (Round 6)*.

Research that Impacts Technology-enabled Pedagogy

As in the previous Rounds of study, the research team continues to consider a broad range of international literature pertaining to technology-enabled pedagogy. Much has been learned through research and reported upon globally about the necessary shift in teaching and learning practices for the 21st Century. For example, many researchers and educational organizations around the world have identified skills such as collaboration, creativity, critical thinking, building community, and awareness of culture and citizenship as being of central importance for teaching practice in schools and districts (Dede, 2008, 2015; Fullan & Langworthy, 2014; Fullan & Scott, 2014; Council of Ministers of Education Canada, 2016).

Over the previous Rounds of study, the research team reported increasing competence in these skill areas as they become more central to learning in Ontario schools. In Round 6, we highlight information on how this increasing focus and confidence are impacting the learning and learning environments of students, teachers, and administrators across the province. Systemization, both local and on a provincial scale, is another important area for inquiry in Round 6 as school districts continue to apply what they are learning in these projects to promote growth in their school communities.

Over the last number of years, pedagogical features that have their roots in the work of constructivist theorists such as Dewey (1938); Vygotsky, (1978); Bruner, (1987, 1990) and more recently Splitter (2009) and Shapiro (2011), highlighted the importance of teachers and students bringing their past experience and evolving understanding to the task of creating new meaning. In a constructivist view, learning is best accomplished in socially interactive settings where dialogue forms the basis of new understanding for continued learning. The construction of knowledge refers to the process of individuals and groups working together to formulate learning procedures and outcomes together – it is the opposite of a traditional model of learning where teachers lead and students follow.

At the heart of all the new grounding in education for global competence is the need for inquiry where students can learn in classrooms and schools that provide an environment where the identified aspects of deeper learning and pedagogies that are described in the literature are central to the meaning-making process.

In recent years, research has used the phrase "deeper learning" when identifying what is needed for present-day teaching and learning. For example, Fullan & Langworthy (2013) defining deep learning

write: *"We need our learning systems to encourage youth to develop their own visions about what it means to connect and flourish in their constantly emerging world, and equip them with skills to pursue those visions. This expansive notion, encompassing the broader idea of human flourishing, is what we mean by "deep learning"* (p. 2).

Dede & Frumin (2016) write that: *"Deeper learning is a 21st century instructional approach that equips students with the necessary skills for success in social, economic, and civic life"* (p. 6). They note: *"deeper learning empowers students to create knowledge through content mastery, open-ended, authentic problem solving, and reflective practice, supported by teachers serving as facilitators, guides and coaches…Deeper learning strives to integrate what is known about how people (and experts) learn and what is required for successful participation in contemporary society"* (p. 6).

Fullan and Langworthy (2014) define what they term 'new pedagogies for deep learning' as: *"a new model of learning partnerships between and among students and teachers, aiming toward deep learning goals and enabled by pervasive digital access"* (p. 2). These 'new pedagogies' include building competence in areas such as learning through inquiry, collaboration, communication, and creativity in both a small and large scale to fully engage in 21st Century technology-enabled learning.

Fullan & Donnelly (2013) write that: *"a lot more has to be done in fleshing out the nature of effective pedagogy in its own right, as well as how it relates to the use of technology to accelerate and deepen learning"* (p. 11).

Knowledge Mobilization

Mobilizing the knowledge being amassed by national and international researchers for technology-enabled teaching and learning is a key factor in moving the agenda for transformations that will ensure Ontario graduates are prepared for a more competitive, globally connected, and technologically engaged knowledge society and economy. The projects reported upon in this study represent a seismic shift in epistemology in terms of how teachers teach and learners learn, as Dede (2008) describes.

Dede (1999) describes the concept of knowledge mobilization as marking a shift from "islands of innovation" that local research initiatives represent to becoming a mainland of collective experience that can impact the educational community on a much larger scale. He notes three important points that can enhance or impede knowledge mobilization: 1) Emerging information technologies enable a shift from the transfer and assimilation of information to the creation, sharing, and mastery of knowledge; 2) Dissemination efforts must include all the information necessary for successful

implementation of an exemplary practice, imparting a set of related innovations that mutually reinforce overall systemic change; 3) A major challenge in generalizing and scaling up an educational innovation is helping practitioners *"unlearn the beliefs, values, assumptions, and culture underlying their organization's standard operating practices"* (p. 2).

Much like the attributes necessary to persist with the climb in our mountain climbing metaphor, Fullan & Langworthy (2014) write that: *"Mobilizing whole systems toward new pedagogies is not a small undertaking. It requires nothing less than addressing the fundamental challenges and new potential of education systems in our age"* (p. 75).

Global Competencies

In 2005, the Organization for Economic Co-operation and Development (OECD) wrote that: *"Globalization and modernization are creating an increasingly diverse and interconnected world. To make sense of and function well in this world, individuals need for example to master changing technologies and to make sense of large amounts of information. They also face collective challenges as societies – such as balancing economic growth with environmental sustainability, and prosperity with social equity. In these contexts, the competencies that individuals need to meet their goals …require more than mastery of certain narrowly defined skills"* (p. 4).

They also note that: *"… competencies are understood to cover knowledge, skills, attitudes and values"* (p. 4). Thus, as Lombardi (2007) describes: *"… students need to cultivate skills such as making judgments, having the patience to follow longer arguments, to synthesize diverse information, and to build the flexibility to work across disciplinary and cultural boundaries to find novel solutions"* (p. 3).

The Ontario Foundation Document for Discussion (2016): *Towards defining 21st century competencies for Ontario*, includes the most prominent competencies found in the international literature (i.e., critical thinking, communication, collaboration, creativity and innovation) (p. 12-13). This document includes competencies as highlighted in the work of Fullan & Langworthy (2013), who note that citizenship and character education are necessary for present-day learners to amass. Further this document identifies the need for meta-cognitive and interpersonal and intrapersonal skill development.

Claxton & Lucas (2013) divide commonly desired outcomes of 21st Century education into two areas: 1) prosocial and 2) epistemic. Prosocial includes attributes such as kindness, generosity, tolerance, trustworthiness and moral bravery, while epistemic attributes are such things as being inquisitive, resilient, imaginative, thoughtful, skeptical and collaborative (p. 9).

Systemization

In a paper entitled *Shifting Minds 3.0: Redefining the Learning Landscape in Canada (2015)*, there is a call for traditional schooling to be replaced by a transformational view. The authors note that: *"learning is a social process, with teachers and students working together in partnership with each other and with experts beyond school, supported by digital technologies … the learning environment … is purposely designed for students to think, research, analyze, develop and improve their ideas, and demonstrate deep understanding through the work they produce"* (p. 9). This transformational view involves change across the educational spectrum, from change in the way teachers teach; to change in the way school staffs conceive of pedagogy; to change in the way districts shift policy and funds for professional learning and deployment of staff. It is as Fullan & Donnelly (2013) note: *"… a fundamental shift in the culture of schooling on almost every dimension imaginable: the roles of students, teachers and administrators; the culture of the school in terms of collaborative learning; the culture of the district and the larger infrastructure … the relationship to parents, the community and business…"* (p. 20).

In previous Rounds, the research team reported a progressive scaling up of ongoing changes at the system level that promote technology-enabled teaching and learning. It is clear that involvement in the change process includes teachers and system leaders at all levels – principals, central office staff, and administrators – if changes are to be sustainable over time. Fullan & Quinn (2016) note that leadership requires a four-fold perspective: focusing direction, cultivating collaborative cultures, securing accountability, and deepening learning (p. 129).

Fullan, McEachen & Quinn (2017) reporting on cross-case lessons found in their study on district-wide learning, describe a number of points that emerge from their data. Among them is that:

- a culture of learning and innovation is the foundation for affecting deep, positive, and lasting change, along with intentional growth
- practice-embedded collaborative inquiry, anchored by the deep learning suite of tools, processes, and facilitators, is the cornerstone of deep professional learning
- new leadership and ongoing support and challenge are needed
- new learning partnerships are extending to parents, families, and the community
- … system change [is] bubbling up within large districts, and beyond districts (p. 13-14)

These points are consistent with what projects reported in this Round 6 study.

Assessment Practices

School districts in many localities around the world are shifting their focus to implementing pedagogies required to develop student competence in a global context. Assessing those skills requires a re-thinking of how to measure progress in both formative and summative terms. Fullan & Donnelly (2013) say that: *"Assessments that provide questions, collect responses and then feedback their correctness to the learner are solid traditional models. However, the next generation of assessments will likely focus on activities which result in a product or performance. In this model, the assessment system should be able to identify features of student behavior and make observations on it, not in terms of binary correctness, but in the form of useful information on the ways in which the learner has engaged in the activity"* (p. 17).

Burns (2017) writing about summative and formative assessments, notes that: *"Summative tests can give teachers and districts a general feel for the effectiveness of teaching practices and curriculum material. It does not give the actionable data teachers can use to inform their instruction to meet the immediate needs of students"* (p. 10). Her work includes *"… building on the foundation of best practices for formative assessment [in order to] integrate technology tools to make [formative assessments] more meaningful, sustainable, and scalable"* (p. 11).

Fullan & Langworthy (2014) describe the importance of aligning assessment practices with pedagogies to support deeper learning. They write: *"… these embedded and authentic approaches to the assessment of students' work require a high level of assessment competency on the part of teachers. Such competency is hard to develop, especially when many teachers around the world have been trained to rely on assessments developed externally, by curriculum boards or textbook providers. Assessment approaches also need to become comparable across different types of tasks, subjects, schools and systems"* (p. 42).

At this point in time, many researchers or groups have listed or described attributes of necessary skills under each of the competencies noted for success in a global environment. (Ontario Foundation Document for Discussion: *Towards defining 21ˢᵗ century competencies for Ontario, 2016; Council of Ministers of Education, 2016*; Fullan and Donnelly, 2013; Fullan & Langworthy, 2014; People for Education, 2014). The question of how to measure global competencies formatively and summatively, is one that many teachers, principals, school districts, researchers, and organizations are addressing. As Fullan, McEachen & Quinn (2017) report in their cross-case study: *"Data is not yet available to evaluate*

whether or not deep learning is having a positive impact on student performance on conventional measures of achievement" (p. 8).

It is clear that the scope of assessment practices in a global sense is far reaching and involves many skills and attitudes. As noted in a recent OECD document (2017) that outlines a new assessment strategy to begin in 2018: *"The Pisa [The Programme for International Student Assessment] aims to build a single scale that measures to what extent students are able to use their knowledge, and understand, recognize relationships and perspectives, and think critically about a specific global or intercultural issue"* (p. 8).

Similar to the importance of a strong climbing rope in our mountain climbing metaphor, all the components noted above must be tightly woven together to support all participants in reaching a successful outcome. Across Ontario, projects reported upon in this study are making these strong connections for advancing student achievement.

Chapter 2

Continuing the Climb: Methodology and Methods

Like the ongoing preparations of a mountain climbing team, much has gone on behind the scenes to help make this research process a successful venture. Drawing on the perspective that trust and safe passage are increased when teams continue to work together over time, for this Round 6 study, Curriculum Services Canada organized the same field team members as in the previous Rounds to liaise with innovation project leaders and offer support as they gather and record data.

Since the field and research team has been comprised of the same educators over several Rounds of these projects, a community of learners formed that displays many of the attributes of global competencies. Communication has been ongoing over time as the field researchers checked in on a regular basis with project leads, and project leads followed up on the invitation to contact the research team as needed with questions, or to dialogue about their project. Field researchers visited project sites and were invited to attend district-organized events related to the project focus. Because dialogue and interaction was ongoing, collaborative relationships developed between individuals, strengthening the data gathering process and the reporting of results.

During the collaborative interactions with the field team, project leads, and participants expressed increasing confidence in supporting student learning through technology-enabled instruction. The field team noted that there is continuing knowledge mobilization through networking and other opportunities for sharing information in areas such as classroom experiences, whole district perspectives, experts in the field, and for the cross-fertilization of ideas and perspectives.

Methodology

Case Study

In this Round 6 study, the research team continues to utilize case study methodology for the purpose of consistency in reporting data over time, and because case study lends itself to both qualitative and quantitative analysis.

Case study research is well established in disciplines such as law and medicine, as well as education (Sacks, 1990, 1995, 2010; Coles, 1993; Hartley, 2005; Yin, 2009, Flyvbjerg, 2011), as a means of gathering and explaining particularities about individual cases, and also what may be common across cases. Case study focuses on both the process of gathering data, and the final report (Stenhouse, 1984). Yin (2009)

notes: *"… the case studies' unique strength is its ability to deal with a variety of evidence – documents, artefacts, interviews and observations"* (p. 11). All of these kinds of evidence are part of the data submitted by projects in their final results. Ultimately, the depth and breadth of data is dependent on information received from individual sites, so this array of data continues to provide a rich source of understanding for the research team.

Methods

To be congruent with the purposes of the study, data was collected within a common research structure, using a comprehensive self-reporting template constructed by the research team. The research team focused its interactions and reporting tools on gathering hard evidence of the impact technology-enabled instruction and learning has on students, on teacher practice, and on the system, making strong and evident connections to global competencies and systemization.

At the outset of Round 6, the projects submitted a 'Project Profile' with a description of their innovation research, areas of focus, and anticipated participation numbers. The field research team used this information in its ongoing conversations with the project leads. To further focus the projects in providing impact evidence, the research team prepared templates for the final report submission in June and for the artefacts that visually portray the impact of the innovation research project in a context that gives meaning to their efforts. To further demonstrate the impact that the innovation research project is making, their artefact narrative provides a context for the concrete examples and for sharing their efforts collectively and broadly.

Innovation project leads indicated that the ongoing interactions with the field research team was a significant support in clarifying requirements for reporting on their initiatives.

Chapter 3

Chronicling Participants and Projects

In March 2017, districts submitted Project Profile data, using the reporting guidelines and template distributed by Curriculum Services Canada. This profile information described each project's participation data and identified the direction and areas of focus of their planned research. The data presented in this chapter is based on the data provided by districts, and is intended to present an overall provincial perspective of the participants, settings, and guiding themes and actions identified by the 2016-17 innovation research initiatives.

In the reporting data, one district described two distinct projects within their larger system report. For purposes of this report, the data from the two projects within that system is amalgamated to present an overall perspective on the 77 district initiatives from each of the participating 72 school boards, 4 school authorities, and a collective led by one of the provincial schools. Though there is predictable disparity in the focus and scope of project activities across the province, the districts, as in all previous Rounds, made consistently strong efforts to gather and submit relevant data that informed the research team's understanding of the project activities and their educational impacts on students, teachers, and system.

The following charts and graphs provide an overview of numerical and contextual data submitted by 64 English-language districts and 12 French-language districts. One English-language district did not submit requested numerical data.

1. Projects by School Organization

	English	French
	(64 districts)	(12 districts)
Elementary Schools only	22	3
Secondary Schools only	5	1
Both Elementary and Secondary Schools	37	8

Projects by School Organization (percentages across all English-language and French-language projects)
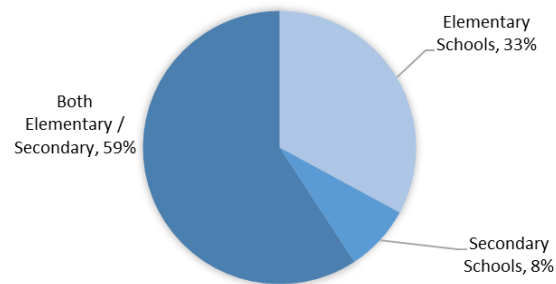
The percentage of district projects by school organization as shown on the graph is consistent with the distributions found in previous Rounds of the initiative.

Of the seventy-six (76) district projects, thirty-nine (39) projects are targeted at a specific range of grades or the specific content taught at identified grade levels. Thirty-seven (37) projects, or 49% of projects, have a general system focus (JK-12) without restrictions to grades or divisions – a substantial increase over what was seen in all previous Rounds. This is evidence of a broadened involvement across grade levels of project activities in Round 6.

## 2.   Projects by Level of Student Involvement

Districts were asked to report on the number of students who are directly engaged in aspects of the Round 6 innovation research initiative. Knowing that there are varying levels of engagement, a pattern of increasing student involvement over the six Rounds of the initiative is clearly evident. In Round 6, over 405 000 students across the province are reported to be involved. In comparison, approximately 265 000 were involved in Round 5, 170 000 students were involved in Round 4, and approximately 160 000 students were involved in Round 3. The substantial increase in the direct involvement of students may be an indication of a deliberate increased focus on developing global competencies.

The number of students in each project varied widely by the nature and scope of the project activities, with over 1330 students per project being the median level of involvement. In Round 5, the median level of involvement was 1100 students per project. In Rounds 1, 2, 3, and 4 the median levels were 400, 450, 500, and 680 students per project respectively.

All 76 districts that reported included students in their investigations. Forty-eight (48) district projects (63%) identified that supporting students with special needs or examining the requisite assistive technologies is an element of their initiative. This is a substantial increase from Rounds 3, 4, and 5 in which 14%, 18%, and 35% of projects respectively identified support for students with special needs or exploring assistive technologies. No comparable data was collected in Rounds 1 and 2.

	English	French
	(64 districts)	(12 districts)
Projects with 0 – 100 students involved	2	3
Projects with 101 – 500 students involved	15	4
Projects with 501 – 1000 students involved	9	2
Projects with 1001 – 5000 students involved	24	3
Projects with over 5000 students involved	14	0

Projects: Level of Student Involvement by District Project (percentages across all English-language and French-language projects)
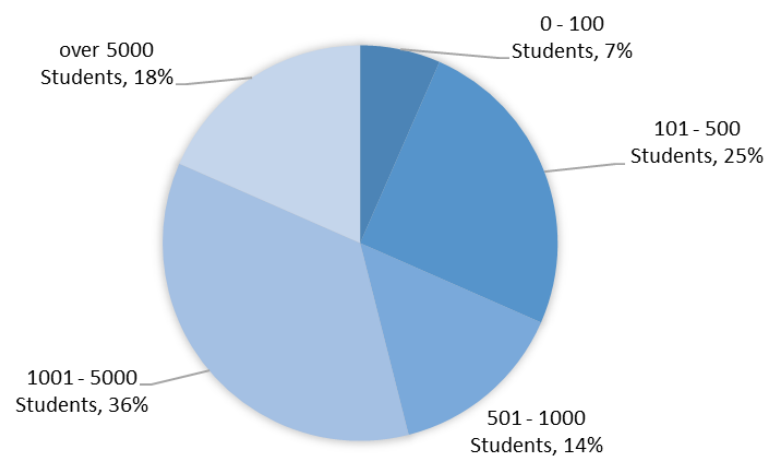
The graph highlights the high percentage of district projects that involved over 500 students.

Projects: Percentage of Involved Students by Division (percentages across all English-language and French-language projects)
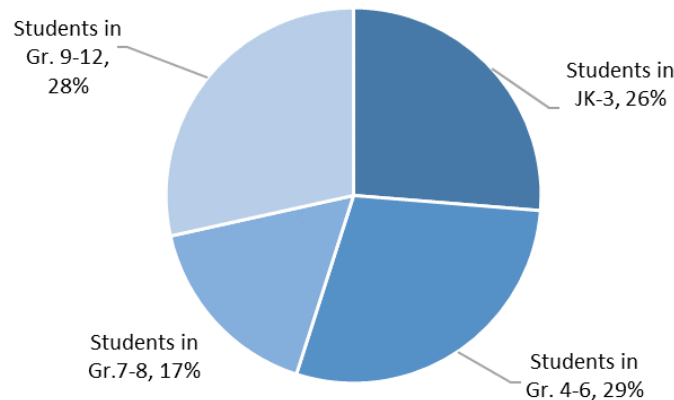
The graph indicates that there is a balanced distribution of student participation across divisions.

3. Projects by Level of Educator Involvement

All districts identified broad and extensive involvement by classroom teachers. Based on the numbers reported by projects, almost 25 000 teachers across the province are directly engaged in aspects of the initiative with a median level of involvement of 66 teachers per project. Round 6 data show a substantial increase in the level of teacher involvement when compared to all previous Rounds. In Round 5, approximately 15 000 teachers were involved and the median level of involvement was 60 teachers per project. In Rounds 3 and 4, the median level of teacher involvement was 24 and 58 teachers per project respectively. In both Rounds 1 and 2, the median level of involvement was less than 20 teachers per project.

The teacher involvement data highlights the broadening attention on instructional practices and the deliberate scaling up of technology-enabled teaching and learning through 21st Century innovation research initiatives.

	English	French
	(64 districts)	(12 districts)
Projects with 0 – 9 teachers involved..	2	4
Projects with 10 - 30 teachers involved	15	3
Projects with 31 – 75 teachers involved..	14	3
Projects with 76 – 150 teachers involved	11	2
Projects with 150 or more teachers involved	22	0

Projects: Level of Teacher Involvement by District Project (percentages across all English-language and French-language projects)
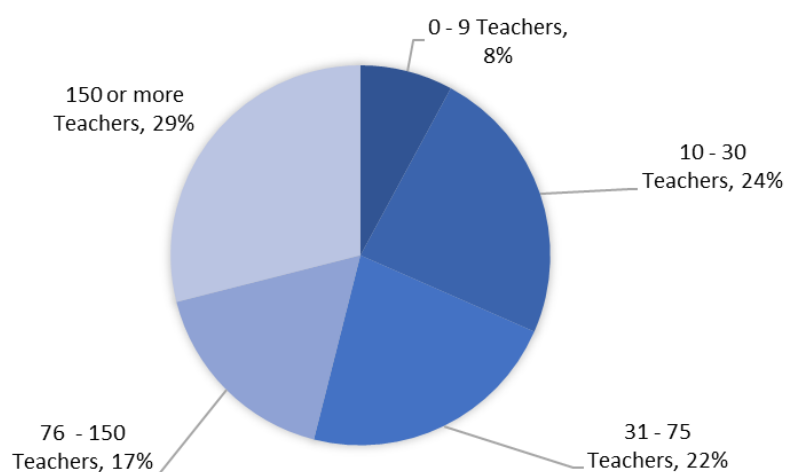
The graph shows the wide-ranging level of teacher involvement across district initiatives and highlights the sizeable number of projects that directly involve more than 30 teachers in the research activities.

Projects: Percentage of Involved Teachers by Division (percentages across all English-language and French-language projects)

Teachers of JK-3, 25%

Teachers of Gr. 9-12, 33%

Teachers of Gr. 7-8, 17%

Teachers of Gr. 4-6, 25%
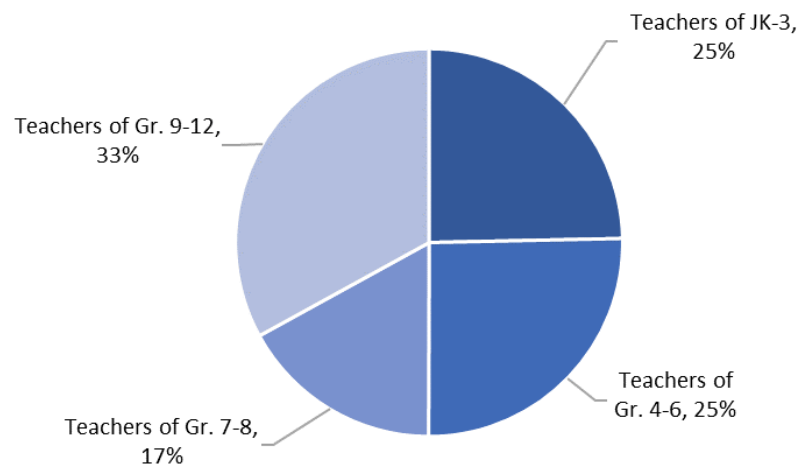
The graph indicates that there is an equitable distribution of teacher involvement in projects across the divisions.

As well as classroom teachers, projects reported that in total 2589 school administrators (principals, vice-principals) are involved. This compares to 1790 and 2285 school administrators in Rounds 4 and 5 respectively. In addition to school administrators, 300 system administrators, and 706 support staff (e.g., information technology staff, program staff) have direct involvement in the project undertakings in Round 6.

The substantial increase in the direct involvement of school leaders in Round 6 supports observations of the field team of the growing commitment to developing school-level leadership as a critical means of systematizing pedagogy-driven use of technology.

4. Projects by Level of School Involvement

Based on the numbers reported by projects, approximately 2300 schools across the province are directly engaged in aspects of the Round 6 initiative, with 17 schools per project being the median level of involvement.

	English	French
	(64 districts)	(12 districts)
Projects with 0 – 3 schools involved	6	3
Projects with 4 - 7 schools involved	7	5
Projects with 8 – 20 schools involved	22	4
Projects with 21 – 50 schools involved	15	0
Projects with 51 or more schools involved	14	0

Projects: School Involvement (percentages across all English-language and French-language projects)
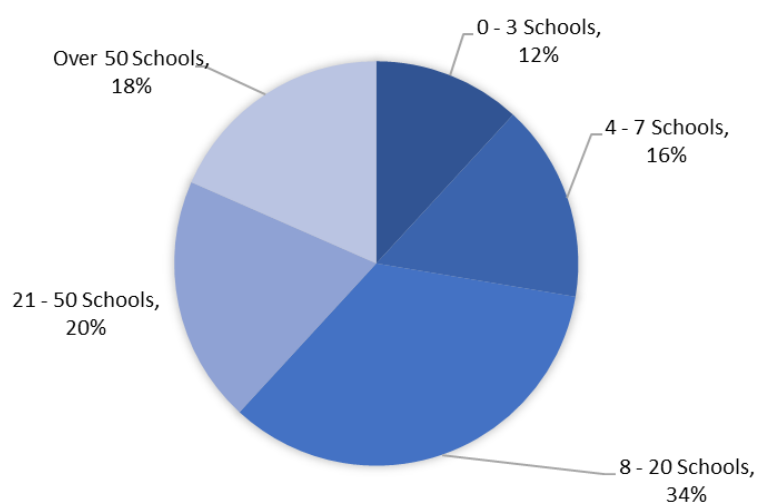
In Round 6, approximately the same number of schools are involved overall when compared to Rounds 5 and 4, but, on average, significantly more teachers and students from each school are direct participants in the innovation research activities.

5. Contextual Data: Project Elements

On the reporting template for the Project Profile, project leaders were asked to identify the components of their initiative that are significant and planned elements of their innovation research. The profile

template provided a list of elements that related to *student* development of global competencies, *teachers'* instructional practices and opportunities for professional growth, program, and policies that had broad *system*-wide implications, and the various technologies and tools that support the investigations. The reporting of these identified contextual elements is intended to highlight provincial patterns across project actions. When compared project by project, there are widely varying degrees of emphasis and actions associated with each of these elements.

Students: Global Competencies

	English	French
	(65 districts)	(12 districts)
Critical Thinking / Problem Solving..	59	12
Innovation and Creativity	55	11
Learning to Learn..	40	12
Collaboration	60	12
Communication	55	12
Global Citizenship...	49	11

The chart highlights a varying but balanced approach at examining and addressing each of the six competencies as identified in the Ministry of Education's foundation document (Draft 2016).

Students: Global Competencies and Supporting Actions

	English	French
	(65 districts)	(12 districts)
Critical Thinking / Problem Solving		
Makes informed decisions	38	7
Connects and transfers learning	47	10
Engages in authentic learning	50	8
Innovation and Creativity		
Pursues new ideas	38	6
Takes risks	40	8
Applies learning in different contexts	46	7
Learning to Learn		
Self regulates	32	10
Understands process of learning	33	7
Fosters personal well-being	23	3
Collaboration		
Co-constructs meaning	43	11
Networks through participation	52	5
Respects diverse opinions	34	8
Communication		
Communicates effectively in different contexts	40	10
Listens and asks relevant questions	38	8
Select appropriate digital tools	50	10
Global Citizenship		
Use technology responsibly, ethically	43	10
Interacts and learns from diverse communities	30	3
Engages in local and global initiatives	29	3

The frequency of which supporting actions were selected can inform where educators are currently observing demonstrations of these skills. The comfort that educators have articulating and visualizing supporting actions has important implications for the assessment of global competencies.

Teachers: Instructional Practice/Professional Growth

	English	French
	(65 districts)	(12 districts)
Instructional Strategies	60	11
Development of Learning Partnerships	62	11
Teacher-to-teacher	60	10
Teacher-to-student	58	7
Student-to-student	42	9
Assessment Practices	47	8
Professional Growth Opportunities	61	10
School based	55	10
System-wide	57	11
Multi-board / regional	16	2

System: Broad District-wide Implications

|	English	French
	(65 districts)	(12 districts)
Numeracy/mathematics	49	6
Literacy	40	7
Special Needs	39	9
Leadership Development	38	8
Assessment Policies	34	6
Policies related to educational technology	28	7
System planning related to educational technology	47	7

Tools of Technology-enabled Teaching and Learning

	English	French
	(65 districts)	(12 districts)
Cloud Technologies	54	10
Wireless Technologies..	49	9
Assistive Technologies...	38	5
Home Access to Technology (students)	28	7
In-class use of Personal Devices (students).......................	32	7
Student Use of Tablets	48	8
Teacher Use of Tablets	44	7
Student Use of Netbooks	28	8
Teacher Use of Netbooks	28	5
Student Use of Laptops	39	9
Teacher Use of Laptops	39	9
Productivity Applications (e.g., GAFE, O365)	55	11
Social Media	34	6

The following graphs display each of the previous tables by sorting the main identified elements based on the percentage of districts that identified each element as a significant aspect of their innovative research initiative.

Percentage of Projects Selecting Identified Elements (combined English-language and French-language projects, with elements sorted by frequency)

Students: Global Competencies
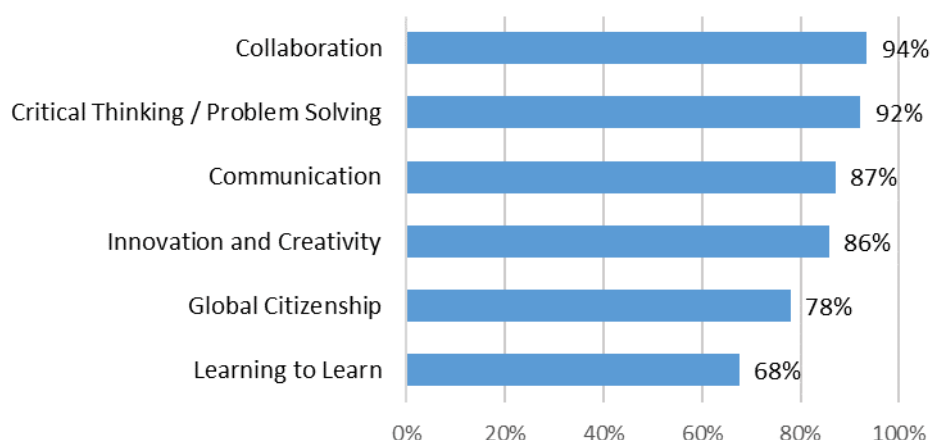
The chart identifies the emphasis districts across the province placed on the development of global competencies. Fifty-five percent (55%) of the districts approached the competencies broadly by addressing all six of the global competencies. Forty-five percent (45%) of districts targeted a subset of competencies, with collaboration and critical thinking being the most frequently cited in the project profile. Even though the competency *learning to learn* is the least identified by districts, an analysis of the district reports reveals that it is very central to teachers' observations of student learning, as identified through many stated references to phrases such as "displayed perseverance," "reflects on work," and "developing responsibility for learning." The language of global competencies is very evident in district action and reporting. Projects did report challenges in developing coherent directions for how competencies link with program, assessment, and reporting.

Teachers: Instructional Practice / Professional Growth
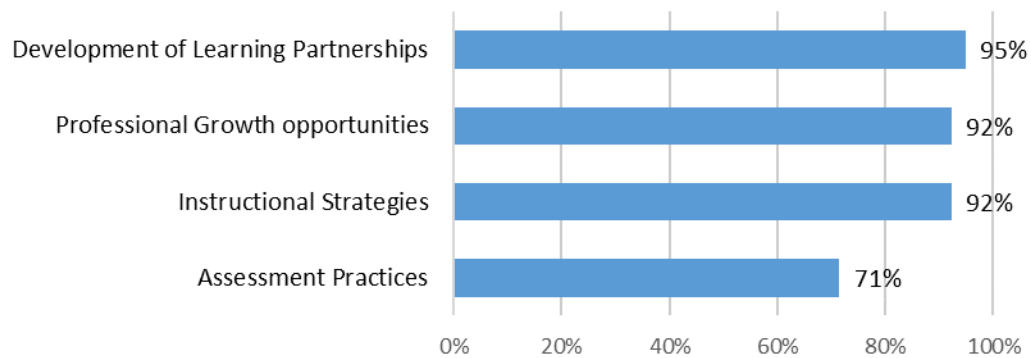
The graph highlights the emphasis that districts are placing on teacher professional learning. There is a continued emphasis on in-class instructional supports, most often in the form of school-based technology coaches. A central theme seen in many professional training sessions are strategies related to the changing role of teachers in the technology-enhanced classrooms, with a noticeable emphasis on student-to-teacher and teacher-to-teacher learning partnerships.

System: Broad District-wide Implications
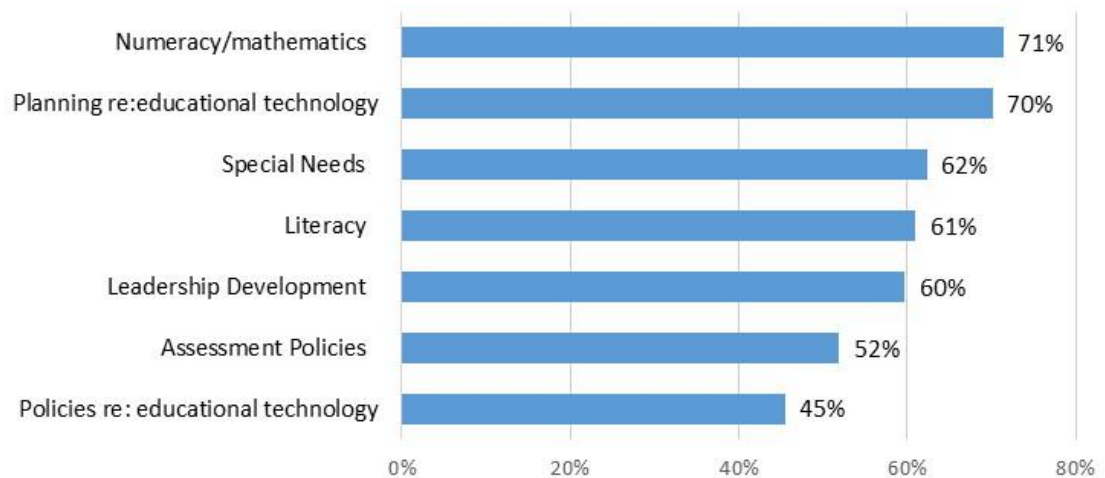
The graph shows a balanced approach to addressing the key areas of 21st Century Innovation, and the pattern is consistent with findings in Rounds 4 and 5.

Coding and Robotics

One aspect that is particularly striking in Round 6 is the dramatically heighted focus on coding and robotics. Over twenty-five (25) districts have coding and robotics as the single focus, or a significant focus, of their research.

There are several common themes evident in these coding and robotics projects. The first is the clear focus that coding is directly aligned with and supportive of meeting curriculum expectations. Coding is not done in isolation or as an enrichment add-on. Planned and articulated direct links are made to numeracy and literacy, and specifically to the mathematics curricula. As stated by several districts, the focus is on coding to learn, and not on learning how to code as an adjunct activity. A second theme is that coding and robotics provide a rich opportunity for both teachers and students to visualize and to verbalize global competencies. The skills of collaboration, communication, perseverance, creative thinking, planning, reflecting and making adjustments based on feedback, are all obvious, essential, and inherent in the student team investigations. Projects use coding and robotics as a means for students to develop awareness and understanding of these competencies. Lastly, it is universally stated that projects hope to expand this initiative in future years. There is clear excitement and appreciation for the educational value of coding and for the perspective it provides as creators, and not just consumers, of digital technologies.

Technologies

_____
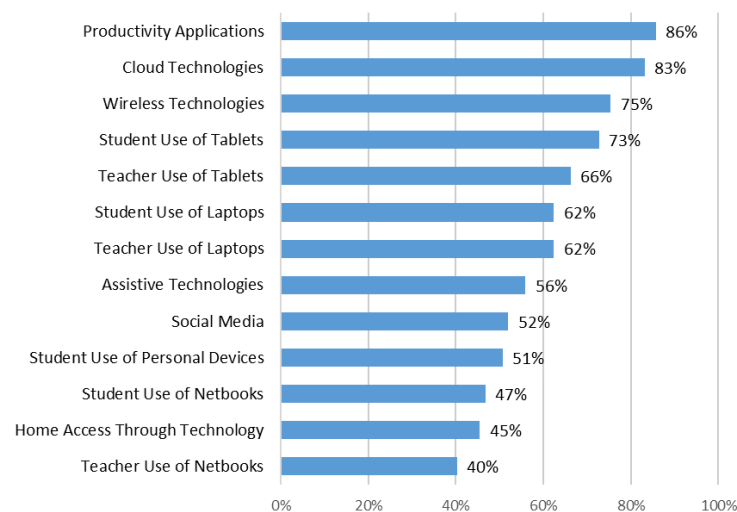
The graph emphasizes the continuing focus on utilizing technologies that impact teaching and learning at the point of instruction. The one area where there is noticeable change between Round 6 and Round 5 is the substantial increase in the number of districts that identified social media as a planned element.

The total number of districts that identified each of the technologies and tools is almost identical between Round 6 and Round 5. This highlights that systems are establishing direction and coherence, within and across districts, by following through on findings and priorities built on 5 or 6 years of investigations connected to the 21st Century Innovation Research Initiative.

6. Additional Project Elements and Perspectives

This chapter summarizes the numerical and contextual data provided by districts in their Project Profiles. However, there is additional data that the districts provided in the form of findings from their innovation research initiatives. These statistics and resulting analysis are highlighted in the project summaries and detailed in the artefacts submitted with the final report.

Overall, the quality of the submitted statistical data in Round 6 continues to grow. What is also evident is that more districts are establishing system tools and processes that allow for reliable comparative analysis of change and growth over time. Protocols and procedures are being set to allow for more meaningful long-term measures of student learning and achievement, and as well, for policies and procedures.

Chapter 4:

Impact of Continuing the Climb on Students, Teachers, and System

In this chapter, the research team presents qualitative data relating to the areas of investigation that form the purpose and focus of the study as described in Chapter 1. The innovation research projects for Round 6 documented impact evidence and identified progress toward systematizing and scaling-up effective teaching and learning innovation practices. They continued to promote knowledge mobilization and capacity building among and between classrooms, schools, and system, and established the needed supports to promote and monitor student acquisition of global competencies.

In the following sections, the research team delineates the findings based on the submitted data for the Round 6 projects using three major headings: 1) Impact on Students, 2) Impact on Teachers, and 3) Impact on System.

Impact on Students

The data that impacts students is reported as growth in the development of global competencies.

> *They aren't just talking at you… they set you in the right direction and you pick what you want to learn and how you want to learn it. And it gives you independence, because what the teacher does is guide you in the right direction. They keep you on the path rather than tell you the path.*
>
> *Comment from a student*

In the reporting for this Round, it is evident that while there are a wide range in the nature and scope of project initiatives, they all exhibit a common focus - the development of global competencies.

A significant emphasis on critical thinking and problem solving is evident throughout the projects. A project reported that their main focus is on having students think critically about the quality of their work and the depth of their knowledge, their understanding, and their thinking. Students have the opportunity to solve authentic real-life problems in a variety of subject areas. In another project, students are reported to be in a constant cycle of exploration and critical thinking as they seek solutions to problems.

Projects reported that critical thinking is encouraged in a number of ways. For example, as students create their own questions and investigate areas of a larger topic of interest, they begin to think critically about how they would find information, whether their research makes sense within the larger

schema, and the implications for their overall learning. A teacher reported that: "… for critical thinking one of the things we found we had to do was have a discussion with students first, give them a little more insight into what we mean when we say critical thinking, and the students were able to come up with some ideas as to 'what would be a success criteria for critical thinking?' [and] they were able to tell us what they think they're showing us through the project that shows critical thinking … they came up with different ways to solve their own problems and they have a discussion about it … [sometimes the discussion] leads to additional learning that they wouldn't otherwise have."

Projects such as those that involve coding and robotics found that when students are provided with rich tasks and opportunities to learn from and use technology to express their learning in the classroom they are empowered to ask questions and seek answers. A student said: "coding … has helped me have more patience when I try to solve a problem." A student said: "I look back over my code to see what I did wrong. Then I fix it and try again. If it doesn't work again then I ask for help or try to fix it once again. I never give up because if you do, you can't see your finished project."

Several projects shared that while the focus is on computational thinking supported by coding that students demonstrate creativity, problem solving, and critical thinking as they engage in mathematical tasks. One teacher noted: "Every one of my students has tried coding and has been successful. The content is scaffolded and there is immediate feedback. It's like every student has a teacher sitting right beside them." Another teacher reported: "I saw students were more willing to take risks with coding. They saw that they could keep trying until they were able to create, solve or work through something. As well, they were never hesitant to ask each other for help. None of them seemed shy or frustrated with coding."

A number of projects described collaboration as a significant aspect of students' learning as they work with others studying similar topics and sharing information and resources. Projects reported a significant increase in improved collaboration among students because of the introduction and growth in the use of collaborative technology platforms. As one teacher said: "The collaboration gives students the chance to practise expressing their opinions clearly and respectfully, and to listen to each other. They are also becoming more skilled at identifying what underpins their own and others' points of view."

Similarly, there is an increase in the opportunities and requirements for students to demonstrate collaboration, communication, and creativity as students share documents and work together to find ways to present their learning, using cloud-based productivity tools. It was also reported that students

could work seamlessly at school and continue their work at home, using these tools. Projects reported that student collaboration with peers and teachers using shared documents results in increased critical thinking, effective communication, and digital citizenship.

One district invited students to participate in the professional learning opportunities alongside teachers. This inclusion provides students with a strong sense of purpose and student voice. Another reported that their "Digital Student Certification Program" offers multiple levels of certification that help to provide equitable access to all students with opportunities to grow technical competencies through connecting, collaborating and creating with others.

Communication is another global competency reported on by projects. Several projects noted that students are actively and interactively communicating as they engage in the learning process. By collaborating and using technology during learning inquiries, students become owners of their learning and, in turn, communication becomes dynamic and enabling in both deepening and broadening their understanding.

It was reported that, by exposing students to many different types of communication strategies using digital technologies, students are better able to achieve the expected learning outcomes. Another project found that students like getting instant feedback from their teacher and peers because it helps them improve their work.

Creativity and innovation are also highlighted by projects. Students learn about a variety of electronic tools with which they could pursue ideas, take risks, and apply new learning in creative ways. One reported that they promote creativity and innovation by hosting STEM events that expose students to emerging technologies and how these technologies are being used in real-world applications.

Projects reported that creativity is demonstrated through the autonomy that students are given to determine the product that could best demonstrate their learning. Teachers see evidence of students being creative as they use thinking and creative strategies to generate innovative solutions, using various technologies. A wide range of choices are visible – some are entirely digital and others combine tangible products with digital aspects.

Several projects found that students move quickly from substitution to augmentation [SAMR model] by creating a dynamic range of products and ensuring that technology is used in their everyday learning. A student describing an increase in creativity said: "I have developed in creativity by being able to show

my work in different ways. I have developed in self-directed learning by being able to research things and learn things on my own."

A number of projects reported on global citizenship. Students are seeing themselves as global citizens with a responsibility to enact change in the world. Students are engaged in real-world problems and, in collaboratively putting their solutions into possible actions from supporting community causes to exploring places beyond Ontario as they work on inquiry-based projects using technology.

A project noted that their initiative intentionally supports the development of digital citizenship skills by requiring students and teachers to co-construct success criteria for safe and responsible use of technology and to develop an 'acceptable use of technology policy' for the classroom. Another project uses the technology in a 'walled-garden environment' so that students can safely explore and learn in a controlled setting. Through teacher-monitored communications with students from other locations, students practise skills needed for an ever-widening digital world.

Another project commented that students are making great progress as digital experts and digital citizens. A teacher found that: "students have become more digitally responsible and have more 'go-to' sources – they know which sources are credible and they have favourites. Students are starting to ask more questions about the credibility of websites showing that they care more and understand relevance."

It was reported that students are developing the attributes associated with 'learning to learn' – meta-cognition, self-regulation, self-reflection, and self-advocacy. Throughout the learning process, students are engaged in the initial planning and goal setting, monitoring, reflecting on, and modifying their work. Students are increasingly developing greater understanding of the landscape of learning, by utilizing a range of digital tools. As a project reported: "More students are making use of learning goals and success criteria. Students are frequently giving each other feedback during the design process and making better use of feedback to help themselves improve." When using technology, students were reported to feel more competent in their abilities, participate more in classroom activities, and have a higher rate of task completion.

In terms of overall adoption of global competencies, projects reported that students are challenged, more actively involved in assessing their own academic progress, more engaged and resilient when completing activities, and are more independent thinkers. Students' attitude towards learning is more positive, they take more risks and are more persistent in taking control of their own learning.

Impact on Teachers

In this section, data that has impacted teachers is reported under two headings: instructional practices and assessment practices.

Instructional Practices

> *Technology cannot be separated from my practice. It allows me to ensure students have options to differentiate content, process, and product for students. Technology allows me to direct my own professional development through professional journals and online courses, twitter, and professional blogs.*
>
> *Comment from a teacher*

In terms of instructional practices, a number of projects reported on the changing role of teachers in technology-enabled classrooms. Projects shared that the use of technology represents a significant power shift in classrooms toward a more student-centred approach, and that with this change, student interest and engagement are heightened. Teachers are taking more risks and are allowing students to share their knowledge in a variety of ways that align with student interest and needs. Teachers reported that they improved in their ability to be flexible during the learning process and model a growth mindset in the classroom. A teacher said: "My role isn't about me spitting out the information. …. It might be support, or direction, but not me saying this is what you need to know. We need to be there to guide students. It will change day-to-day or lesson-to-lesson. … I've shifted to now allowing [students] to have that learning process. We need to [have] an open mind and know our roles can evolve."

The shift in teacher role is key for longer-term impact on classroom practices. Teachers described how they intend to continue to maintain and expand pedagogical shifts, including: leveraging digital learning; building in more student choice and voice in learning; connecting learning tasks to the real world; and integrating new partnerships.

Learning partnerships are forming between classrooms, between schools, and globally as digital learning is being leveraged. Teachers are increasingly seeing themselves as partners in learning rather than knowledge-keepers. A teacher reported: "I can learn with the kids. I tell them 'I don't know, I'm not the expert here, but I bet someone else in the classroom may be' – so petitioning the classroom [I] ask who can help. It empowers the kids, and empowers me to use digital. By realizing that I don't need to be an expert on [digital] … I can do that learning with the kids and we can figure that out together."

Overall it seems clear that teachers participating in these projects are embracing changes to their role and seeing students in a new light; one that empowers students to be progressively seen as partners in the learning process.

Teachers are also more willing to take responsibility for their own professional growth. One project noted: "… much of the conversation in innovation is focused on teachers as being the learner at the centre of professional development." Another found that with the increase in confidence, teachers continue to build their knowledge and skill in technology-enabled instruction. Projects also shared that teachers feel time to collaborate with peers is an enabler for integrating competencies into their instructional practice.

Teacher-to-teacher learning partnerships are integral to the success of many projects. These partnerships also help shift some teachers disposition and perspective regarding their abilities to use technology in the classroom. A project reported that teacher-to-teacher learning partnerships are resulting in a culture of risk taking and sharing. In another project, teacher participants articulated the value of incorporating small group sharing in collaborative learning sessions with their peers to enhance their comfort level in trying new technology-enabled practices in their classrooms. Yet another project shared that educators are co-planning and co-learning in the spirit of collaborative professionalism. Other projects are focused on developing and supporting co-learning networks at different levels such as within schools, between schools, and outside the district.

Projects noted that when teachers acquire new technologies for the classroom, results show that pedagogical practices begin to shift. Overall, it was reported that teachers have become confident and comfortable with technologies and integrating them into their teaching strategies. Teachers are teaching from a more global perspective, bringing the outside world into the classroom. Projects reported an increase in teacher confidence with the design of cross-curricular, open-ended inquiries. Other projects reported teachers delving deeper into technology use in order to provide students with richer, more meaningful and more purposeful learning tasks. As a result, students are given more tools and opportunities to create, design, and problem solve as part of their learning.

Teachers shared that technology is helping them differentiate instruction to meet the needs of a variety of students. A teacher speaking from a personal perspective said: "The first thing I see is that technology allows students to make learning or their thinking more visible … As a teacher I can get more insight when a student explains to me how they solve [a problem] or how they ran a lab because I can see

exactly what they talked about and what they didn't talk about. How confident they felt about it. How much did they have to read off of the white board or the paper? All these little things …".

Assessment Practices

> *Teachers are using technology to document student work. When they gather to discuss student achievement, they are doing moderation with paper and with digital devices.*

<div align="right">

Comment from Project Lead

</div>

There is significant evidence that technology has impacted assessment practices. A clear trend emerged showing that the use of technology opened up the concept of what counts as evidence of learning. There is more acceptance of products that utilize tools to allow for student voice and creation in demonstrating learning. Technology enables teachers to make specific observations regarding student work and to collect and share evidence of learning. A project reported that technology increases the amount of communication between teacher and student, and that assessments are more efficient. Another project noted that teachers highlighted the role of technology to collect evidence of learning that informs practice in a meaningful and effectual manner.

A number of projects described assessment practices as tied to educational goals and the instructional strategies being used. One project reported that inquiry-based learning requires a specific yet flexible assessment framework. They collect evidence of learning through student interviews and conversations, observations of student work, creation of a product over the long term, and reflections on the design process. Another project noted that assessment for learning is a key feature in their initiative with teachers obtaining information about student progress on a daily basis to inform instruction and to offer immediate feedback to meet the needs of individual learners. A teacher noted: "I think the biggest change in my teaching has been how I use the assessment for learning process. My feedback to students has become more specific than it was before. I think that having constant access to students' work has allowed me to check their work with more regularity. I can also be more clear with my feedback as I can highlight areas within their work and make comments." Another teacher found that: "Because [students] were self-evaluating more, I was able to sit beside them and conference with them [which became] assessment as learning and this turned into assessment of learning. The students and I came to a consensus together."

The alignment of assessment data with curriculum priorities and evaluation requirements continues to be a challenge. For example, it was noted that one of the most pressing questions that teachers identify around assessment practices is the issue of not only 'how do we assess the skills in inquiry-based learning,'

but also 'what do we do with the information,' and 'how does it all fit with what needs to be evaluated and reported.' It was further noted by project leads that the lack of clarity provincially on the intended connections among and between global competencies, assessment and evaluation, curriculum policy, and technology-enabled instruction is a challenge.

Impact on System

In this section, the data is delineated under two sub-headings: leadership and professional learning.

Leadership

> *We built capacity with the students; we built capacity with the teachers; and now the administrators want it because they need it to be effective leaders…They want the collaborative tools and they want to act as a role model. The [same] push and pull that we felt from the students and teachers we are feeling with the principals.*
>
> *Comment about system leadership in a project report*

In terms of leadership, projects reported on policies and procedures regarding technology-enabled learning. As one project identified: "… it should be a system goal that the primary purpose of educational technology is to empower each student and transfer and support agency in each student." Looking ahead, one project describing their Board Improvement Plan noted that school and system leaders and their staff will be tasked with exploring the intersections of pedagogical practice, innovative learning environments, and digital technologies as new environments for learning are created.

A project shared that efficiencies are established through the use of cloud-based productivity tools. As an example, their school board is using technology to support the building and sharing of agendas, working documents, sharing information, facilitating collaboration, collecting data, and hosting meetings. System administrators are using social networking sites to facilitate professional development.

Another project reported that they established an innovations committee to oversee the work completed in the research projects. The committee is headed by a supervisory officer and includes principals, teachers, and instructional coaches. Similarly, in another project, a digital learning steering committee developed a technology plan that reflects the board vision, policies, and future direction. This committee, consisting of supervisory officers, special education staff, and school administrators, bring their system perspectives and are able to make solid recommendations. One project said that the

school board made it a priority to establish a committee dedicated to providing direction and guidance on digital learning, on hardware and software acquisitions, on planning for professional development, and on setting areas of priority and focus related to digital learning and technology. Another project reported that to further scale up technology-enabled learning, all central office consultants are involved in the delivery of curriculum as are principals who review and provide feedback to teachers on specific curriculum units, focusing on critical thinking.

A technology coach shared with a field researcher that: "To support scaling up the initiative, we have shifted the leadership and learning to each individual school. The Technology Champions are supporting both staff and students … and the learning is responsive to each school. We are shifting our impact to all learners … as a result of the strong foundation built in the previous rounds [of the projects]."

Some projects highlighted leadership in the growth in community partnerships being developed. For example, increased communication with parents so that they are becoming partners in their child's learning was noted, as was promoting citizenship by leveraging technology to increase connections to the community and family through learning management systems.

Changes to learning environments are described as having an impact on the system. Computer labs are being phased out and replaced with more mobile and adaptable digital technologies. Reliance on specific types of hardware has become less relevant as students now use multiple wireless devices. One project shared that their Learning Commons now includes a number of low and high technologies which students can borrow for projects to encourage creativity and real-world learning. Another project reported that in their digitally equipped classrooms, students can demonstrate their thinking, work together in groups, and make their learning visible to others.

Some project reports reflected the importance of research as part of the ongoing digital learning they are undertaking. These projects reported that the results are a deeper understanding of data-informed decision making related to technology acquisition, planning, and use. Another shared their awareness that a framework needs to be solidly in place to allow for systematic monitoring and evaluation of how technology-enabled teaching practices are implemented and sustained across the board. Some projects reported employing external researchers to support data collection and analysis to assess the impact of technology on students, teachers, and system.

A number of projects reported on their efforts to scale and sustain technology-enabled learning. One project reported that the collaborative nature of their Technology Embedded Learning Team is the main

driver for sustainability. They remarked that in the past, the technology was out front but that this team now puts pedagogy at the forefront of teaching. Another project relayed that as a system, scaling up and sustaining technology-enabled pedagogical practices is moving forward by increasing the number of schools that participate in their collaborative inquiry.

Teacher leadership is also highlighted as an important aspect of building capacity in school systems. Teachers who were engaged in previous rounds of study are described as showing great leadership with their peers and in their schools, sharing their passion for digital learning with others. Teachers are also reported to be increasingly interested in training opportunities.

Professional Learning

Central to the continuation of digital use in pedagogical practice is ongoing professional learning. A number of projects shared their insights about both school and system professional learning. In terms of school-based professional learning, one project reported adapting a model where small teams receive training and release time to create innovative ways to learn and share their learning within their schools and across the system to other schools. Another project shifted professional learning to be more classroom-based in order to reach more teachers and students.

The research field team observed multiple examples of professional development for school principals and school leaders to develop their leadership capacity for technology-enabled learning. Some projects reported that principals are involved as active learners in their professional learning initiative. Their role includes: leveraging technology to amplify student learning and setting conditions necessary to create a culture of innovation in schools; sharing of new learning and best practice with senior administration and central support staff; and continued use of a professional development model that incorporates multiple face-to-face small group collaborative learning sessions over time.

School-based professional learning networks are enhanced by social media so that teachers have access to supportive professional learning colleagues across the system. Professional connections are made through provincial educational networks which support teacher learning beyond a school district.

In terms of professional learning at the system level, several projects commented on school board vision. One project described that they plan to sustain momentum by: continuing to refine their professional learning model to better suit the needs of educators; concentrate on leveraging leadership opportunities; and by embedding goals for progressive and relevant learning into their 5-year strategic plan.

More generally, comments focused on: funding needs; keeping expectations realistic about what teachers can accomplish with students so they stay focused on global competencies; supporting teachers as a main thrust for improvement; and finding ways to purchase more devices in schools.

In Summary

Returning to the metaphor of mountain climbing, it is clear to the research team that each of the strands reported here – students, teachers, and system – continue to build upon the knowledge and skills amassed across the six Rounds of study. From initial observations across a new digital landscape in Round 1 (2011-2012) where technology use was central to the focus of projects, to beginning the steep climb to understanding that pedagogy is the necessary force driving technology-enabled learning, projects added to their initial knowledge which is facilitating their continuing growth. Climbing ropes have intertwined, using strands from each of the three groups described in this chapter and evidence displays the solid understanding that teachers and system are joining students as partners to scale up and sustain technology-enabled teaching and learning.

Epilogue

Reflections and Perspectives on Future Directions

In concluding this Round 6 study, it is interesting to look back to the research team's conclusions from Round 5 (2015-2016) and see that much of what we described there continues to be applicable and important in terms of ongoing growth and development in technology-enabled teaching and learning in schools across Ontario.

It is clear that there is continuous progress as students, teachers, and system refine and add to their knowledge about technology-enabled teaching and learning. Our patterns of evidence following six Rounds of research imply that innovation in pedagogical practice is now more readily accepted as commonplace by students and is broadly and increasingly embraced by teachers. Impact evidence suggests that technology-embedded learning at all levels within the system is becoming integral to district plans for scaling up and sustaining growth.

Teachers are increasingly comfortable and skilled with embedding technology in teaching and learning and, in employing a range of digital collaborative tools and strategies to positively impact their interactions with students and colleagues. Evidence supports the fact that teachers, as learners, are engaging in technology-supported professional learning groups with more eagerness and purpose. Students report an increased interest in classroom learning experiences as they exploit technology to reach goals and gain meaningful feedback and guidance from teachers.

It is evident that pedagogy is driving the appropriate and planned use of technology in classrooms, as global competencies move to the foreground in learning and teaching. Students, teachers, and system are now using the language of global competencies as reported in the international literature in their dialogue, in their daily learning, and in future planning. With this adoption, much like climbing teams, collaboration, communication, critical thinking and problem solving, creativity, learning to learn, and global citizenship become the central focus for supporting students as they reach for the summit.

One challenge that continuously emerged across previous rounds and remains important in this study is in the area of assessment practices. While projects reported a number of shifts in assessment practices using technology, challenges remain in terms of measuring the transitions in pedagogy that place development of global competencies at the centre of teachers' practice. In a paper distributed by the Brookings Institute (2014), they note:

"An initial distinction has to be made between assessment for learning and assessment of learning. The former is concerned with the function of assessment as an educational process. For this, feedback to the learner is essential. Nevertheless, on a systemic level, assessment of learning is essential in order to monitor achievement of the education system as a whole. Assessment of learning on the systemic level can also result in policy lessons to improve systemic performance." (p. 69)

Going forward, aligning system-wide assessment practices with the goals of technology-enabled teaching and learning and the development of global competencies highlighted as central for current pedagogical practice seems to be an important matter to address.

In the Round 5 study (2015-2016) the research team offered two broad recommendations, which remain appropriate for Round 6. They are to continue:

1. To establish a level of funding that would enable districts to continue to advance technology-enabled teaching and learning specifically in the areas of professional growth, infrastructure and hardware, and innovation.

2. To communicate the enabling role of technology in teaching and learning by making clearly defined connections among and between provincial policies such as competencies, curriculum and assessment as guidance for embracing effective instructional practices that promote student success.

In addition to these broad recommendations, it is important to consider ways that promote and honour openness to new ideas and perspectives for students, teachers, and system as technology-embedded teaching and learning continue to evolve over time.

While the global competencies are being implemented in Ontario schools, it is important that these attributes not stand alone as goals for reaching new heights in technology-embedded pedagogical practice. As Beetham & Sharpe (2013) write:

"In facing the uncertainties of the near and distant future, we can be sure that learners are better off – more resilient – if they have a broad repertoire of capabilities at their fingertips, those closely aligned with academic expertise and professional practice and those they have evolved from their digital experiences, along with hybrids of the two. Learners will be well served by tasks, programs and environments that generate uncertainty, and foster a repertoire of

resourceful responses. Educators too will have to become more resilient, more adaptive and multi-competent in the various niches that the new education system will open up." (p. 279)

Remaining open to change may be the most important skill that students can learn in order for them to succeed in the global society. With this perspective in mind, teachers and system leaders will have to continue to be innovative in developing strategies that motivate and guide students in their learning journey.

Writing about leadership, Hargreaves, Boyle & Harris (2014) note that: *"… uplifting leadership identifies and articulates a real but improbable destination or dream to aim for at the outset. It creates a bracing sense of trepidation that prompts the desire to move to a better place. It connects future aspirations to classic origins in a way that affirms people's sense of who they are and what they feel called to do"* (p. 160).

As the Ontario school system continues the climb beyond the important Rounds of study provided through the Technology and Learning Fund Initiative, the research team anticipates that these perspectives will be woven into the professional fabric of schools and system to enhance innovation going forward into the future.

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Appendix

Project Report Summaries

Artefacts submitted by the projects provide additional context and content for the Round 6 innovation research.

NOTE: Information in the project report summaries is taken directly from the data contained in the final project report.

Algoma District School Board

Project Title	Educational Technology Leads
Description	Our Educational Technology Lead action plan focuses on system-level professional learning opportunities as well as opportunities for collaboration, co-learning, co-planning and job-embedded learning with colleagues at the school by assisting teachers with the integration of technology into learning and teaching. Over time, this will lead to the deep learning task development and assessment practices enabled by technology. Our multi-year plan fosters teacher-to-teacher, teacher-to-student and student-to-student learning partnerships and real-world, authentic learning tasks enabled by technology supporting the development of 21st century skills and competencies: critical thinking, communication, collaboration and creativity and innovation along with global citizenship.

In 2016-2017 we are continuing to build on the successes of the Educational Technology Lead role and deepen our professional learning by focusing on pedagogy and the development of deep learning tasks that leverage technology-enabled learning. We are also focusing on our Algoma DSB Standards for Digital Learning framework and strengthen our learning partnerships through the job-embedded support model. Our focus is aligned with Fullan and Langworthy's research report, A Rich Seam.

Our investigation of the Educational Technology Lead role is to determine if there is increased teacher confidence, greater integration of technologies into learning and teaching, and higher student engagement in real-world, authentic learning tasks.

As part of our Round 6 project, we are introducing several new technologies to our system and the Educational Technology Leads are vital to support the implementation and use to support learning and teaching. We are continuing to build on our relationship with Microsoft to provide professional learning opportunities for our Educational Technology Leads. The Leads are also introducing coding at the schools to support students' investigation, problem solving, exploration, and, critical thinking skills. |
| Context | *Number of students:* 3,500

Number of teachers: 290

Number of schools: 46

Grades/Program: K-12 |
| Impact on Students | Our investigation of the Educational Technology Lead role is to determine if there is increased teacher confidence, greater integration of technologies into learning and teaching, and higher student engagement in real-world, authentic learning tasks.

As part of our Round 6 project, we introduced several new technologies to our students and the Educational Technology Leads were vital in supporting the implementation and |

use of the technologies to support student learning.

<u>Winbooks and Wireless Projection</u>

In order to provide students with greater access to technology and enhance technology-enabled learning, the Algoma DSB deployed 1600 Winbooks this year. Students can now easily display their work and thoughts from the Winbooks to the entire class promoting collaboration, learning to learn and communication. With the support of the Educational Technology Lead, students are more frequently integrating the use of technology in their completion of tasks, using Office 365 and a variety of web applications to enhance their learning and collaborating with their peers. The data indicates that a majority of students in the Board are utilizing Office 365 as part of their daily learning and completion of projects. This shows a significant increase from the 2015-16 school year. Students are becoming more actively involved in assessing their progress and achievement. Access to technology allows them to document, store, and reflect on their artifacts and share with other students, teachers and parents.

<u>Coding and Student-Teacher Learning Partners</u>

The Algoma DSB is also in the initial implementation phase of a Coding project. The project aligns with the Board's focus on Mathematics. Our approach to the coding professional learning opportunity was unique and very successful. We invited students to participate in the professional learning opportunities alongside teachers in the coding learning and exploration. This model of professional learning developed strong student-to-teacher and student-to-student learning partnerships. Students became leaders in the project and this provided them with a strong sense of purpose and student voice.

<u>English Language Learners (ELL)</u>

We have had many newcomers to our system and supports are being put in place. One support is the use of technology, specifically iPads, to assist with communication and learning. These students have greatly benefitted from the use of translation apps and a variety of text to speech and speech to text apps.

In analyzing our data, the Educational Technology Leads, teachers and administrators indicated that technology is providing students with opportunities to foster collaboration, engage in learning tasks, build independence, and promote innovation in ways that were not possible without it. A significant number stated that the technology has had the greatest impact on students with Learning Disabilities and students with communication needs, allowing them to be more successful by using accessibility features like voice to text and text to voice options. Overall, the data indicates opportunities for inquiry and problem solving have increased, the efficiency of communication, collaboration, and feedback have improved, and overall, student interest and engagement has been heightened as they work with individual interests, talents, and learning styles.

Impact on Instruction	The target group for the Round 6 project continued to be the Educational Technology Leads. The data indicates a majority of teachers accessed the Educational Technology Lead for support and growth and learning opportunities. In many cases, teachers worked with the Educational Technology Lead a number of times throughout the year. We continue to build on our relationship with Microsoft to provide professional learning opportunities for our Educational Technology Leads.
	The Educational Technology Leads were instrumental in the implementation and support of the new technologies this year. The Educational Technology Leads provided support to teachers on how to use the new technologies to enhance their instructional practices to improve technology-enabled learning. The ADSB Standards for Digital Learning K-12 was again utilized to support teachers by providing a guide to help integrate technology and digital learning into The Ontario Curriculum, into teaching practice, and into students' repertoire of skills to support and enhance continuous learning. The data indicated that a majority of the focus was on technology operations and concepts and communication and collaboration.
	The data indicates there has been a positive impact on teacher practice. The Educational Technology Leads are continuing to develop teacher-to-teacher learning partnerships with colleagues at their schools. The data shows that teachers are feeling a greater comfort level with the following areas:
	1. Engaging students in exploring real-world issues and solving authentic problems using digital tools and resources
	2. Advocating, modelling, and teaching safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources
	3. Promoting and modelling digital etiquette and responsible social interactions related to the use of technology and information
	4. Designing or adapting relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
Impact on System	The vision of the Algoma District School Board is to engage learners in innovative experiences that maximize achievement, build confidence and develop responsible citizens while utilizing technology in purposeful, responsible and innovative ways to support their learning. We are focused on preparing our students for success in a collaborative, engaging, dynamic, technology-intensive and increasingly connected world. Changes are affecting what we teach, how we teach, and how we assess student learning.
	The Educational Technology Leads are an instrumental team member in the development of the school's professional learning by ensuring that technology is effectively utilized as a learning and teaching tool, supporting the use of technology integration into the curriculum, and providing training and one-to-one support to

	colleagues through job-embedded professional learning opportunities. Technology-enabled learning and teaching along with the Educational Technology Lead role is embedded in our Board Improvement Plan for Student Achievement and our Educational Technology Plan. Principals are including technology-enabled learning and teaching as a focus in the SIPSA and including how the Educational Technology Lead role supports the plan.

Algonquin and Lakeshore Catholic District School Board

Project Title	Transforming Secondary Classrooms through Teacher Innovation
Description	Our project is designed around teacher leadership at the grass roots level. We have invited secondary teachers from our five high schools and 3 adult learning centers to engage in a year long journey around innovation and the global competencies. We launched our first session and invited teachers to form collaborative groups back at their schools to dig into an area of common interest and learning. Purpose: • to strengthen educator confidence and ability to integrate technology at the point of instruction, • increase use and application of blended learning opportunities • to create student independence and ownership over learning Expected Outcomes: • increase in our use of the D2L platform • increased collegiality and a willingness for secondary teachers to work together and learn at their own pace • increased use and understanding of our Office 365 form and tools
Context	*Number of students:* 2,000 *Number of teachers:* 67 *Number of schools:* 5 *Grades/Program:* Gr.9-12 and adult education
Impact on Students	Students were positively impacted in many ways. The first area is the number of students who benefited from a focus on BYOD. Many teachers began imbedding cell phone use into their regular classroom practice. Many more students were exposed to blended learning opportunities and found the Virtual Commons a place to access all digital tools. Many students began to see our Learning Commons areas as places of innovation and exploration. Students are expecting and demanding that school look and feel more like the world they live in. This will continue to be a focus as we move deeper into this project in 2017/18.
Impact on Instruction	This TLF project impacted many areas of teacher practice. The first area is risk-taking. Healthy risk-taking is a theme in our board and the teachers who participated in this project demonstrated how healthy it can be to open your mind and try new things. Small inquiry groups discovered that asking "why do we do what we do" can open conversations that many have been afraid to have. The second area of impact is related to how and why technology is used in secondary classrooms. The technology usage also began to impact the floor

	design and pushed many teachers to think about how flexible learning spaces impact learning. In each of the five secondary schools. Classroom teachers began to implement technology that supported the learning task at hand. Many of them began to think about how to better use the small but efficient computer each student is carrying around in their hands. Since this project began at the grass roots level and remained there throughout the year, we had tremendous buy in and true and useful collaboration. Most of the collaboration occurred among teachers at the same school but we did have one project that brought three schools together. Many teachers commented on how spending time with like-minded individuals exploring a common passion, challenged and improved practice.
Impact on System	Our 2016/17 BIPSAW goal "Learning environments (e.g., classroom and Learning Commons) will be enhanced through collaborative and innovative uses of technology" leads our system scaling. The collaborative nature of our Technology Embedded Learning Team is the main driver of our sustainability. This is the team that plans and puts the pedagogy in the forefront of teaching. Too often in the past the technology was out front and we were trying to find a way to connect it to the curriculum. This is no longer the case and we aren't going back.

Avon Maitland District School Board

Project Title	Technology Coaching through Inquiry-Based Partnerships
Description	Our focus this year is to use inquiry as the basis for spread, sustainability, and improved practice. We are encouraging our tech coaches to focus on coaching partnerships in schools that are based on authentic teacher and student learning needs. As the year has evolved this has led to some interesting inquiries that is positioning our work well with other departments like Learning Services and Program. The goal is to make the use of technology transparent and embedded in all practice. We are also undertaking a research initiative to explore the effectiveness of an iPad versus a Chromebook as a one to one device that is used by students. We are responding to requests made by teachers and students to consider the possibility of using Chromebooks more frequently. Because our board uses GAFE this fits in very well with our embedded tech support structures.
Context	*Number of students:* 5,700 *Number of teachers:* 230 *Number of schools:* 23 *Grades/Program:* Gr.7-10 (primary focus), spread to all students
Impact on Students	The Next Generation Learning Initiative in AMDSB continues to grow. We began four years ago with a few hundred students and now it has grown to almost five thousand students. The development of Global Competencies was heavily focused in our work with students and staff. Communication, Collaboration and Creativity were the areas that required the most support of our tech coaches with teachers. This is a strong connection to our BIPSAW goals for promoting Adolescent Literacy in our schools. In addition, our board is participating in the program New Pedagogies for Deeper Learning which focuses heavily on promoting global competencies among our students and staff. Integrating community and family partnerships within the learning experiences of our students is leveraging technology to enhance experiential learning and to promote citizenship. An example of this is an outreach program with senior citizens that one of our schools has engaged in. Parents are more connected to the progress of their children as we have them signed up for learning management systems like Brightspace, and we are using class management solutions like Google classroom. We have been working with an external research group to help us determine the types of digital portable tools and technology use strategies that are creating positive learning conditions for our students. Based on these research findings

	from the feedback of our students, they feel empowered by their roles in shaping technology-related decision making at AMDSB. This will affect their education and the learning of all stakeholders. Students are acknowledging the rapid rate of change in technology and reflect that they learn best with devices that are progressive and efficient.
	Additional findings from this research are informing decisions we will make in the future about devices that will be used by students to support learning. Although most of our work features iPad use by our students, we were given an opportunity to explore the use of multiple devices including Chromebooks. Our research findings indicate that students are using the iPads and Chromebooks to bridge learning at school and home through collaboration, communication, and exchange of knowledge with their peers. They are demonstrating that they are adaptable; they supplement their learning with a variety of devices (e.g. iPads, Chromebooks, and phones). Yet, data analysis demonstrates that it is not the device that makes the greatest difference in their learning, but the opportunities presented in classrooms.
Impact on Instruction	An interesting challenge we faced in earlier years of our NGL implementation was that although we had many students who had personal devices, a majority of our students in high school still did not have them. With this in mind we chose a personalized model of tech support that involved collaborative partnerships, coaching, and inquiry-based approaches to professional learning. This work provided us with more flexibility in our approach and increased the capacity of our coaches to feel more competent and confident in their work.
	Based on feedback received from our tech coaches, a majority of the types of supports provided to teachers fell under the categories of 1. Workflow and organization 2. Lesson planning support and 3. Assessment strategies utilizing digital tools. Our Google Suite of apps has been instrumental in enabling teachers to create learning activities for students to readily use tools that are system wide and work across all platforms of devices. Therefore, it was easier to demonstrate impact for teacher use considering that there is equitable access for all of these technology tools. With this increased confidence in teachers, we believe we are well positioned in future years to create deeper learning opportunities for students that fully utilize global competency skills across all curricular areas and subject disciplines. Creativity, for example, is now readily visible outside of our Arts-based classes. The power of creativity is demonstrated in many situations and in many classes and disciplines throughout our schools.
	With a focus on the SAMR model, most of our coaching supports were provided to teachers who required assistance with Augmentation and Modification. Our classes now feature digitized resources which are enabling teachers to de-

	emphasize the need for print resources. Schools order fewer textbooks and photocopying is occurring less often. Teachers are accessing a full range of resources and accessing worldwide audiences for students.

Our technology use is reaching a broad spectrum of students. This is evidenced by 91% of our coaches reporting direct partnerships with teachers to support students with learning disabilities. This is aligned with our BIPSAW goals to support students with learning disabilities in Literacy and Numeracy Achievement. |
| Impact on System | We made an adjustment to our coaching model to focus on inquiry as a basis of our work. In the early years of implementation, the focus was on trying to create a comfort level and basic competency of the learning tools used.

During the past year we transitioned into our inquiry-based coaching model to provide deeper learning opportunities for our teachers to accelerate effective connections between evidence-based learning strategies and leveraging technology to support them. This has led to growth in building relationships with our tech coaches and teachers. Based on our tech coach survey, 64% of our coaches have engaged in more learning partnerships with teachers in their schools as compared to previous years. These partnerships are leading to deeper learning opportunities in leveraging technology with effective pedagogy.

Our strategic direction challenges our schools to innovate through the creative potential of emerging technologies. As a support for this we have re-energised our work in coding and robotics. This has resulted in 24 schools participating in local robotics competitions and 2 of our high schools participating in provincial robotics competitions.

We continue to explore opportunities to embed coding within our learning environments. This year we created a PLC to explore the following inquiry question: How do I integrate computational thinking through coding into the Ontario curriculum and my classroom program? [This lead to] the development of a continuum (scope and sequence) for integrating coding into elementary and secondary programs. Students have benefitted greatly from this work as many have demonstrated an increased level of engagement and additional opportunities to demonstrate creativity, critical thinking, communication, collaboration and problem solving.

As we continue with our integration of technology into the future, we will use technology in meaningful, relevant and effective ways to increase global competencies, student achievement, equity, and wellness for all students. |

Bluewater District School Board

Project Title	Increasing Student Access
Description	The main purpose of our project is to dramatically increase the use of information technologies in our classrooms. We believe that this is best accomplished through pedagogies that: 1) address the needs of the school, 2) allow for the development of skills and attitudes necessary for the world beyond the walls of the school, , and 3) are relevant to the lives of both teachers and students, especially in regards to authentic tasks that provide a global audience for our students.
	One key, on-going area of our project has been ensuring that all students can send and receive work electronically. Students and teachers use the Office 365 platform to communicate and collaborate electronically. The use of OneNote Class Notebook provides a mechanism for teachers and students to monitor all stages of the learning process (assessment as/for/of) through their individual digital student notebooks.
	The use of a variety of devices, housed inside a properly managed and secure Open Access (i.e. BYOD environment) has provided students and teachers opportunities for "just-in-time" learning. We are becoming device agnostic. It is more about developing Global Competencies, and less about learning a specific piece of software. This also honours student choice to pick the right device and tool for the specific task. Our Open Access network policy allows for greater access to the internet for all learners, which improves learning experience available to teachers.
	Ongoing school-based inquiries, including the "Digital Learner Inquiry Project", have been supported by Board central staff, and have allowed for collaboration between staff within and across other schools. This allows for building capacity in school based staff around students with special needs (LD), specifically how technology can support higher level learning. Another innovation result is the strengthened connection between home and school. We now have a plan to support the development of Global Competencies in our classrooms.
Context	*Number of students:* 2,515
	Number of teachers: 191
	Number of schools: 50
	Grades/Program: K-12, specifically students with special needs
Impact on Students	Students with Learning Disabilities
	As all students continue to use the Office 365 suite (O365) and its variety of integrated accessibility features, we have seen increased output from students with learning disabilities and improved demonstration of higher-level thinking skills. Students and teachers use O365 to communicate and collaborate

	electronically. The use of OneNote Class Notebook provides a mechanism for teachers and students to monitor all stages of the learning process. The appropriate and timely training and support for both the students and their teachers has resulted in a growth mindset, recognizing that all students can be successful given the appropriate accommodations.
	Equipment Refresh
	In the on-going effort to refresh technology at schools in Bluewater, we have used results from our previous year's study to guide and inform the selection of which technologies will be purchased. We have seen a movement away from traditional labs and toward more robust mobile platforms. Cloud based applications have also enabled the purchase of less expensive devices for student use. Recognizing that teachers and students require consistent learning environments, we have a model Standardized Technology Wall for classrooms. This wall consists of an interactive projector, whiteboard and a device capable of displaying student work from any device (i.e. computer, tablet). Personal devices are widely used in many classrooms. Teachers are encouraging students to use them, especially at the intermediate and secondary levels.
	Digital Citizenship and Global Competencies
	Real-world experts are entering the classroom in growing numbers thanks to initiatives such as Skype in the Classroom, and the Digital Human Library. This type of learning helps to grow cultural awareness, student engagement and learning that is not possible by any other means.
	This year began our Digital Learner pilot project in which teachers from four schools in the district piloted the use of technology and the ISTE standards to improve student learning. Teachers involved in the project reported that their students were more engaged and demonstrated increased creativity in lessons when technology was used. They also saw improved student ownership and self-direction of the learning.
Impact on Instruction	Schools are beginning to implement other applications within O365, to include rich collaborative tools such as OneNote Class Notebook. Teachers have responded positively to this collaborative electronic space. Administrators have requested additional professional development for their staffs both during the instructional day and as well at staff meetings to enhance their use of O365 for both between colleagues and with their students. Their confidence is growing and they are excited about the possibilities for teaching and learning in new, collaborative, global ways.
	A pilot group of educators from four schools worked collaboratively this year to explore the possibilities of using technology to support global learning. Most felt more confident in using technology in new and innovative ways to allow students choice and more creativity when demonstrating their learning.

	A significant benefit to our use of the O365 platform is the ability to collaborate outside of normal school hours, which has allowed us to strengthen the connection between home and school. Parents have expressed that they are pleased that they can access student work files in order to assist their child at home, and also be aware of what is happening in the classroom.
Impact on System	The Digital Learner Inquiry Project was designed to address the needs identified in school improvement plans, and involved both literacy and numeracy initiatives. Through this project, we have identified specific policies and procedures relating to the use of digital technology for assessment purposes. In addition, the creation of a SAMR model chart for each grade level from JK to 12 gives teachers an example of where to start when deciding how to integrate technology.
	The use of O365 has been implemented as a communication tool for all staff and Grades 4-12 students throughout the board. System level and school level staff continue to develop the skills to use the full functionality of the platform as they explore the wide variety of programs that are available.
	A revised Specialized Technology Procedure was developed and implemented this year to methodize and streamline our process, with a focus on technology to promote self-advocacy and metacognition. The use of a OneNote notebook and a private group for each technology trial allows for communication and tracking to see the use of technology and how it is making a difference for students.
	The use of a variety of devices, housed inside a properly managed and secure Open Access (i.e. BYOD environment) has provided students and teachers opportunities for "just-in-time" learning; this has shifted the focus towards deeper cognitive learning and discussion, and not on recall of facts. Open access has allowed more students to be connected, especially in schools where technology access is limited.
	Needing to have a specific device has become less relevant as students are now able to use Office 365 tools on all devices. We are becoming device agnostic. It is more about developing Global Competencies, and less about learning a specific piece of software. This also honours student choice to pick the right device and tool for the specific task. Our Open Access network policy allows for greater access to the internet for all learners.
	The move toward an Open Access policy is in response to the current reality and this will emulate the world beyond the classroom. The abundance of personal devices in schools, and the move to embrace an open access policy, is leading to the development of a scope and sequence document for digital citizenship and global competencies. The digital learner pilot projects have helped to implement this document into schools and embed the learning into classrooms.

Brant Haldimand Norfolk Catholic District School Board

Project Title	Transforming Learning Project Phase 3
Description	We believe that by improving teacher content knowledge and pedagogical approaches, students will experience improvements in their math learning.
	The goals of the work this round are:
	• To develop educator content knowledge and pedagogical content knowledge for specific math concepts in number sense
	• To further develop educator knowledge and confidence with assessment
	• To ensure administrators are involved and informed to be better-equipped to lead and monitor the learning in their school
	• To build systems and processes that staff at all levels of the organization use to monitor the impact of strategic work
	Staff are organized into Professional Learning Communities (PLCs) and the learning is facilitated using a blended learning approach, leveraging the same technology that teachers can use with their students, to facilitate professional learning. Our approach is purposeful because it will further develop teacher capacity to leverage technology to enhance learning and the development of global competencies. From a technology standpoint, we have created the conditions across the district that enable all teachers and students to use technology to support their learning (e.g. wireless infrastructure, learning stations in classrooms, desktop computers for student use, mobile devices for student use, and mobile devices for teacher use).
Context	*Number of students:* 6,652
	Number of teachers: 304
	Number of schools: 32
	Grades/Program: K-10 Numeracy
Impact on Students	• Students engaged in numeracy learning that was improved by their teacher's participation in a series of centrally coordinated, but locally facilitated, professional learning activities. Students:
	– Demonstrated greater engagement during math activities
	– Share their thinking more efficiently using a wide variety of tools and models
	– Have become more proficient and confident when engaging in number talks
	• The numeracy learning students engaged in required and helped build capacity in 5 of the 6 global competencies
	• While technology is not necessary to develop or demonstrate global competencies, where and when appropriate, technology was used to enable

	the learning.
	• Improvements in student thinking became evident during moderated marking.
Impact on Instruction	Teacher Practice and Professional Growth
	• Teachers participated in a series of centrally coordinated, but locally facilitated, professional learning modules to improve math content knowledge and pedagogical content knowledge.
	• They reported increased content knowledge, improved pedagogical content knowledge, improvements to their assessment practices, and improvements in ability to identify student learning needs.
	• During the PLC work, teachers demonstrated improvement in their ability to have students represent their thinking using a wide variety of tools.
	Technology-Enabled Instruction
	There has been an increase in:
	• The use of the digital tools to support student learning
	• Opportunities that promote development of global competencies
	• The sophistication of methods used to collect and manage assessment data
	• The awareness of the need to protect the privacy of student information
	Learning Partnerships
	• The PLC learning bands created partnerships among principals, similar-grade educators, special education resource teachers, and central-office colleagues.
	• Principals, classroom, special education, and central-office educators developed competence with a variety of electronic tools to facilitate learning, communicating, and collaborating.
	Assessment Practices
	• Techniques evolved over time and capacity spread across groups
	• Promoting the privacy and security of student data was a constant part of the conversation. Educators report that they feel more confident that data is secure when using Board-provided devices and systems.
	• Moderated marking, discussions evolving from the sharing of artefacts, and shared research on best practices were strategies used during PLC meetings to promote improvements to assessment practices.
Impact on System	Scaling
	• This was a system-wide project, directly connected to our system strategic plan, and included all educators and students from K to 10.
	• Highlights of what was achieved:
	– Developed math content knowledge and pedagogical content knowledge across all K to 8 and grades 9 and 10 math educators

	– Created monthly opportunities and resources for all elementary school principals to build their math content knowledge
	– Established principal learning networks to build leadership capacity
	– Introduced and supported greater range of instructional practices to support math learning, including: number talks, models, and tools
	– Further-developed educator knowledge and confidence with assessment for learning practices

Sustaining

- A number of structures and process were developed and refined to sustain the work.
  - Developed a system-wide model using Board-provided devices, infrastructure, and software to facilitate the educator learning.
  - Provided common tools and processes that staff at all levels of the organization can access to measure and monitor impact
  - Improved infrastructure to enable access to common electronic resources for all stakeholders in all classrooms
- Improving content knowledge and pedagogical practices will continue to be a focus moving forward.
- Standard devices and software promote security, consistency in practice, and access for all users.
- The CODE/TLF resources have enabled us to provide devices to students and staff, improve our infrastructure, and provide professional learning.

Technology-enabled Practices

- Technology was one of the tools used to facilitate the work. Educators used the same tools and processes our students use. This was purposefully done to facilitate "collateral learning" in how technology can support and enhance learning for all. While technology was never the point of a PLC session, it was often used to facilitate the learning. As a result, educators are more aware of what tools are available, how to use them, and are making greater use of them to support student learning.

Additional Benefits to the Board

- The implementation team worked with the MISA Lead to improve data collection practices. Improvements include:
  - Established a standard tool and protocols for surveys
  - Developed standard pre and post surveys for educators and principals to measure professional learning across math modules
  - The common standards and electronic tool increased the timeliness, validity, reliability, and comparability of the perceptual data on educator learning.

	These will be used to monitor and measure the impact of all professional learning as we move forward.
	– Revised approaches enable views of the data at various levels (i.e. district, family of schools, school, educator, principal, etc.).
	– Monitoring and measure impact is now part of the conversation when planning professional learning and other system projects.

Bruce-Grey Catholic District School Board

Project Title	School Learning Teams- Building Teacher Capacity in Math
Description	If we punctuate fraction instruction throughout the year for teachers then teachers will become more confident and knowledgeable in their approach to teaching fractions. This punctuation of teaching fractions throughout a school year rather than a single unit will address applying the fractions knowledge to all strands in the math curriculum.
	Our purpose for this initiative is to align with our board strategic plan/BIPSA where we are growing in all areas of our plan; "Let's Pray, Let's Inspire, Let's Learn, Let's Shine". In order to determine our area of focus we started with the four areas already identified by the Ministry of Education in the "Paying Attention to" guides. Our board EQAO data also indicated fractions as a content area of need. We collected teacher observations as well and discovered that teachers often state that fractions are difficult to teach and difficult for students to learn – especially in the junior and intermediate grades. We also know that fractions are often taught as a discrete topic, and maybe we could address the idea of punctuating fractions teaching and learning throughout the year. Unit fractions are not emphasized enough while teaching fractions and in teaching fractional content currently there is a low use of linear representations in classrooms, e.g., number lines, etc. (with too many circles and pies used as representation).
	We aligned our research project with our School Learning Teams on Fractions. The renewed math strategy has provided the funds to have math leads in our schools, as well as providing a common focus for the province. We have developed school learning teams that consist of the school principal, the instructional coach, the resource teacher and the math leads. These (non-negotiable) professional development days occur seven times throughout the school year, where the morning is focused on fractions content learning, monitoring our impact and carousel learning.
Context	*Number of students:* 1,905
	Number of teachers: 126
	Number of schools: 11
	Grades/Program: Gr.2-8 Mathematics
Impact on Students	Critical Thinking: While engaging in authentic fractions problems, students were able to select tools needed using 'mathies' (an online tool) to support them in demonstrating their understanding of fractions and giving a common ground for teachers to suggest next steps in learning. In response to a widespread uptake of students using the mathies tools, a system approach was applied by enabling the tools to populate to every student's Chromebook upon log in. Our ability to track

	students' use of this tool has grown over time.
	Innovation/Collaboration: The student element that demonstrates innovation and creativity within our plan is the introduction of a 360 degrees classroom. A 360 classroom includes an interactive SMART Board, and white boards that surround the classroom on all walls (or as many as available). This allows a place for students to demonstrate their thinking, work together in groups and make their learning visible for the teacher and for one another. Although the initial plan was to use the 360 classroom for math as a starting point, students are able to apply learning in different contexts such as science and innovation projects where making learning visible allows for the teacher to interact with student learning. When we paired the 360 classrooms with technology available to students in the Chromebook (forward facing camera), students were able to capture their learning, document their thinking, and share the learning quickly with their teacher for feedback and next steps.
	Communication: When students were working in groups, pairs, and on their own using the whiteboards, students were building positive relationships and learning from one another. Phrases such as "how did you get that?" "show me how you did that?" while checking/verifying steps are becoming the norm. Students are contributing to the learning of each other through conversations and action.
	Global Citizenship: Throughout our year students modeled using technology appropriately by recognizing that blended learning is an essential tool for learning. In providing digital tools that are available and accessible twenty-four hours a day to our students, they can access technology and fractions content outside of the school day.
Impact on Instruction	We cannot highlight enough the success that this year's TLF plan has had on teacher practice (teaching fractions) and on professional growth related to technology-enabled instruction. Through 7 monthly sessions at the Board office, with teams from each school (including the principal, resource teacher, instructional coach and math lead), led by the math consultant and central support team, teachers grew in their ability to shift views on the approach to teaching fractions. They accepted new technologies (360 classrooms, online support tools, Google classroom), and put them into practice in their instruction.
	The SLT's provided a professional learning space for teachers to risk take and learn together in teacher to teacher partnerships and these partnerships became more widespread as the teams returned to their own schools. As far as teacher to student partnerships, the 360 classroom and google classroom teachers are acting more like "coaches" or "facilitators of learning" who interact with the students and their learning (which is visible on the whiteboard surfaces).
	The School Learning Team plan has been an opportunity for both school based

	and system wide PD for teachers Gr.2-8. Teachers tweeted samples of work trialed from the school learning team days, opening their classrooms and their own learning for any and all to see. Teachers have used iPads, Chromebooks, computers and laptops to collect impact evidence on student learning. Every school completed a triangulation of evidence template that we call COPS (conversations, observations, product), which is shared with all involved, both at school and system level using cloud based technology to allow for collaboration and communication.
Impact on System	Based on feedback from TLF support from CSC this year, we are specifically targeting technology-enabled practices for scaling forward. As the provincial focus will continue to be mathematics (shifting content focus to proportional reasoning, but the structure remaining the same), we will look more into providing best practices and tools for technology enabled learning in the mathematics classrooms.
	We will continue to explore the area of Special Needs (with the support of the province through the RMS) using both looking at Students with Learning Disabilities and in the carousel "Knowing your Learner." Technology that will support this initiative moving forward will be the use of the blended learning carousels found in the Virtual Learning Environment and the interactive mathematics carousels from the Ontario Education Resource Bank, which all students will have access to.
	In the new year, all teachers and students will be a part of an online learning space using Google Classroom. From a system level, this will be automatically activated, to allow access to all and avoid the need for teachers to ask for permission/access to be added.
	We have invited an outside agency (IBM consulting) to be a part of the conversation to act as a "critical friend" to help us in our decision making around the collection of evidence. We will also continue to monitor impact through the use of twitter at all levels and the exploration of Assessment in mathematics will continue through the assessment carousel.

Catholic District School Board of Eastern Ontario

Project Title	Infrastructure to Scale Technology-Enabled Learning & Teaching Board-Wide
Description	This year, our capacity building model is helping teachers explore and implement "Blended Learning" in their classrooms. As a Board, we are providing teachers with the opportunity to leverage technology and increase student engagement by promoting authentic learning opportunities for all students when using technology. During our sessions, Teachers are learning how to use Office 365 and Brightspace. Our sessions focus around the theme "Technology that starts with pedagogy" where teachers design rich collaborative tasks based on Curriculum expectations using Office 365 and Brightspace.
	We continue to build capacity with our innovative teachers and early adopters around the effective, productive, measurable and safe/secure use of technology in the classroom. In response to our redistribution of technology in 2015-2016, we provide capacity building days to help teachers learn how to leverage the technology to move toward a Blended Learning Model.
	CDSBEO is committed to a renewed vision for education that calls for transformations to teaching and learning to ensure that graduates are prepared for a more competitive, globally connected and technologically engaged society and economy. To support board-wide progress toward this vision, the Curriculum Department is providing capacity building sessions for 5 elementary teachers from each school. This support will offer meaningful opportunities for our teachers to nurture 21st century learning skills and innovation with our students.
	We have added 21st Century Learning and Training as a standing item for our Regional School Leaders' Meetings and will be providing a full day capacity building session for all Principals and Vice-Principals. All administrators have been encouraged and supported to upgrade to the latest "Two in One" device to promote, facilitate and encourage their own 21st century learning.
	The nature of professional learning is evolving to new models. Office Groups allows participants to access the resources and knowledge acquired during a PD day session. All teachers who participate in our capacity building sessions will join our PLN group to help them grow, share and connect with other educators.
Context	*Number of students:* 5,000
	Number of teachers: 217
	Number of schools: 41
	Grades/Program: K-8 Teachers and Administration
Impact on Students	The integration of Office 365 in our classrooms has allowed our students to be better prepared for the workforce of tomorrow. This year, they leveraged new capabilities that cloud-based technology offers. We are seeing an increase in

	students' ability to work in collaboration with others, and to demonstrate creativity and critical thinking. Students were easily able to share documents and work together on rich tasks. Students were able to work seamlessly at school and continue their work at home. This is having a positive impact on their learning, where students can easily start at school and then access what they need to be successful when working from home.
	We are starting to see an increase in a variety of strategies that students are using to demonstrate their learning. Cloud-based technology has helped immensely in student engagement, developing 21st century competencies, and making learning accessible for all our students.
	Two of our elementary schools worked at developing a school-based approach around coding and computational thinking. Students were presented with the rich collaborative coding tasks that required them to use computational thinking, collaboration, critical thinking and problem-solving.
	The take off with robotics ensured great gains in all areas of school community, engaging curriculum applications and increased student achievement. Their robotics initiative provided students with the opportunity to apply mathematical knowledge to real-world situations, to collaborate, and to problem solve with hands-on activities. Also, students were challenged to apply their conceptual understanding of math, solve problems in teams and share their learning as they diagnose and test solutions to a variety of cross-curricular problems. This lead to increased math confidence, growth mindset, meaningful applications of technology and renewed interest in applied math applications.
	OneNote is being used by more and more by our students. It has truly transformed the way in which students receive both formative and summative feedback to help guide their learning. Teachers have the option to give students formative feedback directly on the students' copy while in progress. Students could use that real-time rich feedback as they worked on their assignment to help guide them in submitting a final product that demonstrated their true abilities.
	We are also starting to see kindergarten students contributing to their learning and various classroom inquiries since they have access to the OneNote Class Notebook. Getting students started with cloud-based technology from the early kindergarten years allows students to develop creativity, collaboration, critical thinking, problem solving and effective communication skills.
	Students often struggle with abstract thinking skills, problem solving, self-directed learning, and the ability to work in groups. LEGO Serious Play promoted creativity within a framework that allowed students to have a fertile topic to explore these essential skills and the freedom to do so in collaboration with teachers, parents, and community partners. This resulted in students producing meaningful

	solutions to real world problems. LEGO Serious Play taught students to learn about their identity, relationships, curriculum content and the world in a whole new way. Our classrooms were transformed into a culture of communication and, as a result, students will be better prepared to explain their thinking; metacognition will become a natural process in student learning at every phase of their education.
Impact on Instruction	Our capacity building model was to help teachers explore and implement "Blended Learning" in their classrooms. The use of differentiated instruction strategies and the gradual release model of responsibility allowed educators to model and promote the use of the 21st century learning skills (and) to share and create 21st century monitoring and assessment practices.
	The Early Years Department and the Curriculum Department joined forces to provide capacity building with technology to all Kindergarten educators across the board. Educators came ready to learn more about pedagogical documentation, assessment and evaluation and the digital tools that will support them and their students through this transition to the new Kindergarten Curriculum and report card. A big take-way for educators from our sessions was the network and relationships created through learning together. CTs and ECEs used digital tools to build and structure how they will capture and document student learning within the frames of the curriculum. To consolidate the learning, they shared with each other how they decided to organize their OneNote Class Notebook and provided support on how this tool will be leveraged for documentation of assessment and collaboration, as well as for school-home communication.
	All Grade 7 Language teachers received a full-day curriculum lead session on Transitional Literacy. We addressed how to identify and support our struggling adolescent readers, provided Board resources proven to have impact on all student learning, and shared best practices. Through this network, we will continue to collaborate and challenge each other with our efforts in working towards the goal for all students to become literate in their reading, comprehension, and writing skills. This session allowed teachers time to learn about and share re-engagement strategies for instruction and assessment. We made connections to the natural links to literacy skills and achievement in numeracy.
	CLC was represented this year by 5 teams supported by the TeLT & K-12 Literacy & Technology Consultants. All teams shared a common vision in wanting to use this time to learn and explore our digital platform O365 and how this could facilitate their practice and enhance student learning. Each participant received 4 full days of release to work in collaboration with their teams to learn, build and

	share along their learning journey with O365 and best practices around student engagement for our 21st century learners. Teachers expressed that this was a very rewarding experience, recognizing how technology plays a role in teachers' mental health. This opportunity allowed teachers to realize they do not have to be experts with technology and that they only need to be open to the learning and present themselves with a growth mind-set.
Impact on System	Our focus area this year, is to develop teacher experts in each of our elementary schools. We were looking to build capacity with our innovative teachers and early adopters around the effective, productive, measurable, and safe/secure use of technology in the classroom. As a result of our redistribution of technology in 2015-2016, we provided capacity building days to help teachers learn how to leverage the technology to move toward a Blended Learning Model. The five teachers that attended our capacity building session were then encouraged to go back to their school and support other teachers in either, getting started or continuing, their learning journey around technology enabled learning and teaching.
	Principals requested a day of learning for themselves around 21st Century leadership using cloud-based technology. In alignment with our BIPSA goals to support board-wide progress toward this vision, the Curriculum Department provided capacity building sessions for principals that focused on the theme "Principals as Accelerators".
	The capacity building with technology session offered meaningful opportunities for school leaders to build and model 21st century learning skills and innovation for organizational capacity, strategic planning, and quality assurance
	The nature of professional learning is evolving to new models. Post-session accessibility to the resources and knowledge acquired during a PD session was a crucial piece in helping teachers continue their learning journey around technology-enabled learning and teaching. All teachers who participated in our capacity building sessions joined our PLN group to help them grow, share and connect with other educators board-wide.

Conseil des écoles catholiques du Centre-Est

Project Title	Gamification with Minecraft: A Fun Way to Learn and Teach Mathematics
Description	This project will allow us to measure to what extent the Minecraft platform can be used in a gamification context at several grade levels of the school system. The four classes participating in this project will use the mathematics platform. Each teacher will be able to create an authentic gaming environment to motivate and engage the students, and to foster deep learning by suggesting complex tasks and challenges. Students are already familiar with the Minecraft virtual environment and like it. It allows them to develop their creativity and critical thinking. The game benefits exceptional pupils in particular because it provides them with a concrete means to explore and experiment with the mathematical concepts being studied. Besides the lessons and educational activities, the game helps students learn mathematics. The technology will allow students to fully experience each learning situation in a gamification context.
Context	*Number of students:* 80 *Number of teachers:* 4 *Number of schools:* 4 *Grades/Program:* Gr.3, 6, 7, 10
Impact on Students	The use of the Minecraft platform has had an impact on the learning of mathematics and the development of global competencies in both students and teachers. Since this technological tool uses a STEM approach, its use also promotes the development of such competencies. Collaboration is encouraged at every stage of the project. Students were invited to contribute to creating a world to be used for teaching and learning a mathematics unit. Summative assessments made it possible to assess whether students built an understanding of the concepts collaboratively. We used report cards as a tool to measure collaboration among students in some classrooms. We wanted to verify whether using a virtual platform allowing students to collaborate would have an impact on them and whether this impact would be transferred to other areas and/or subjects. Throughout the project, evidence of learning in the form of videos and photos was used to demonstrate student learning in a virtual context. Students used their knowledge to solve actual complex problems in a collaborative environment. A comparison of the results was carried out through assessments, observations, videos/photos and student testimonials. As part of the game, students had to communicate what they were learning (individually and collectively) throughout the project. Individually, students underwent formative and summative assessments in classes that had the least

	technical problems. Summative assessments and report cards were used in these classes to measure students' ability to effectively communicate their understanding of the concepts being studied.
Impact on Instruction	Integration of Technologies in Teaching
	The Minecraft platform provided teachers with a conducive environment for the effective use of technology in the classroom during learning activities. The Minecraft Universe therefore served to enhance the lessons and activities experienced in the classroom.
	During the project, a group of students was formed to support teachers in the exploration of the Minecraft game. Basic training was provided by students and enabled teachers to acquire a better understanding of the Minecraft platform. With the support of teachers on special assignment and resources available in the Minecraft community, participants could prepare a clear and detailed lesson plan. In this lesson plan, teachers had to make sure they included collaborative challenges that would allow students to develop their problem-solving skills. During the lessons, teachers could also create a partnership with students, as the students are already very familiar with the game and use it. "Before and after" surveys were conducted in order to track the development of competencies in teachers.
Impact on System	The innovation project was assessed in terms of numeracy. Using the Minecraft game in a mathematics context enabled special-needs students to better understand the concepts being studied by providing them with an engaging and interesting virtual space. Both teachers and students demonstrated leadership in designing and carrying out projects in this initiative.
	Having completed the research and exploration period, the Board is now better equipped to go ahead with gradually integrating the Minecraft platform in its classrooms. As of September 2017, we are planning to expand our current team of teachers and to enable other classroom teachers to take part in this initiative.

Conseil scolaire de district catholique Mon Avenir

Project Title	Transforming Learning Spaces
Description	<u>Main Goal</u> • Common spaces within schools are being transformed to optimize learning in the digital era. • Develop and validate learning criteria in the digital era by targeting and defining competencies in the digital era (Participatory approach to teaching and learning); • Develop and validate criteria for an environment that maximizes learning in the digital era (Contributing environment); • Develop and validate criteria related to the system-level commitment of the school staff to the shift towards digital learning (system-level commitment); • Based on the criteria, create a tool for the transformation framework for common spaces; • Work with internal school teams to create a learning design to develop student competencies, using digital and non-digital tools; • Support schools to ensure the effective instructional use of common spaces, in the transformed space and in the classrooms, according to the three gateways to the project (Development of student competencies - 6C's).
Context	*Number of students:* 800-1,400 *Number of teachers:* 150 *Number of schools:* 7 *Grades/Program:* K-8
Impact on Students	Our elementary student survey was completed by 741 students in Grades 2 to 8. This number represents a response from most of the students in schools that took part in the space transformation project during this school year. Here are a few of the major findings of the survey: • COLLABORATION: 54% of students said that, at least 8 times out of 10, the school is a place where collaboration is cultivated. • COMMUNICATION: 46% of students said that, 5 to 7 times out of 10, their ideas are valued at school. • CREATIVITY AND INNOVATION: 59.2% of students said that, at least 8 times out of 10, their school allows them to be creative and innovative. • CRITICAL THINKING: 47% of students said that, at least 8 times out of 10, their school is very often a place that enables them to understand the world around them. • SELF-REGULATION: 50% of students said that they very often felt they could receive support. • PHYSICAL SPACE: 41.1% of students said that, in general, the furniture and space are

	comfortable, but that there is room for improvement.
	• In the general comments from students on how they imagine their renewed learning space, they mentioned access to digital tools, to the availability of sports equipment or to ways of exercising, and different surfaces for writing and areas for learning, comfortable furniture and, in general, several examples of tools allowing them to learn through movement.
Impact on Instruction	Numerous meetings allowed us to develop ideas about classrooms where several groups from the same school could come to learn in a space that would help to develop competencies. A partnership between the internal school team, the advisory team and various services played a crucial role in engaging the school and administrative staff in optimizing education to meet the needs of today's learners.
	More specifically, the process undertaken enabled people with different positions in the Board (teachers, principals or vice-principals, educators, librarians, janitors, computer technicians, department heads, educational consultants, school leaders) to collaborate in creating a transformed space to foster the development of global competencies in students.
	In addition, in a context of collaboration, a partnership was developed with the Toronto campus of the University of Ottawa's Faculty of Education. This was accomplished through a series of joint planning and training meetings, as well as focus groups with students, teaching and administrative staff, and Board members with the purpose of reflecting together on how to redesign the university learning space to better equip teachers currently in training to teach modern-day students, given the present transformations of the learning space in our schools.
Impact on System	In our organizational processes, we aim at connecting services, after and during the projects to transform learning spaces. Specifically, from the time the training sessions are planned, our goal is to have multiple disciplines and services to provide better planning for school team training activities.
	The transformation of spaces acts as a trigger for the transformation of education. The teams of the various educational services, including special education, will continue their training efforts with the school teams to determine how to adapt instructional practices in a space that contributes to the development of global competencies.
	In general, the project develops leadership qualities and emphasizes better consultation between the various school stakeholders when it comes to managing and making decisions about the next steps to be taken. It also contributes to a better understanding of the essential conditions for the development of competencies not only of students, but of all participants at all levels.

Conseil des écoles publiques de l'Est de l'Ontario

Project Title	Developing an Entrepreneurial Spirit
Description	The aim of the project is to provide students with a caring learning environment that allows them to develop competencies for life (e.g., collaboration, communication, creativity, critical thinking, citizenship). In order to reach this goal, the project focuses on the creation of seven entrepreneurial cells that give a voice to learners and engage them in their learning. In each of the entrepreneurial cells, changes are made to the learning environment (e.g., availability of technology – Chromebooks, Wi-Fi and social networks, mobility and flexibility of furniture used by learners and teachers, vertical erasable writing surfaces). In addition, the teachers implement instructional practices to engage students (e.g., immersing students in Design Thinking, encouraging students to use task-appropriate technological tools, giving students the opportunity to cooperate and use erasable surfaces to promote creativity and reflection, developing community partnerships).
Context	*Number of students:* 435 *Number of teachers:* 19 *Number of schools:* 1 *Grades/Program:* Gr.7-12
Impact on Students	As part of this initiative, students developed an individual or group project based on their interests or passions. The impact of entrepreneurial projects on students is shown through various data collected during the school year, specifically in sessions where students could express their opinions, and from photos taken at different stages of the school entrepreneurial projects and the students' digital learning portfolios, as well as notes taken at the Symposium de l'innovation, la créativité et l'entrepreneuriat [Innovation, Creativity and Entrepreneurship Symposium] in May 2017. Students stated that they had developed a wide range of global competencies through their entrepreneurial project, in particular communication, collaboration, creativity, entrepreneurship, leadership, independence, dependability and respect for the environment. An important component of the project consists in transforming the learning environment, including improved access to technological tools and networking. In some cases, the students use the technological tools to create a website, program video games, explore robotics or develop products using a variety of software. All of these activities promote the development of global competencies. The learning that takes place in the context of the project results in productions that demonstrate innovation, creativity and entrepreneurship.

Impact on Instruction	Several technological tools were integrated in the new classroom layout in the eight schools. This non-traditional layout that is connected to the world has enabled teachers to change the nature of their role from a conventional teaching approach to a learning-oriented approach.
	Indeed, a culture of learning reigns among the teams, and teachers act more like guides or coaches with the students. This dynamic enables the teachers and students to be co-leaders, i.e., to learn together, and provide and attend training together, for example, in the context of training sessions given by the TicTac team of the Centre franco-ontarien des ressources pédagogiques (CFORP), the University of Ottawa's Maker Mobile and WIGUP, or in robotics competitions. This training makes it possible both to support the integration of technologies in instructional practices and to acknowledge that teachers are also learners.
	According to the self-evaluation data provided by school teams, teaching practices have become increasingly innovative in the four areas of the Board's entrepreneurial spirit conceptual framework (authenticity, education, the learning environment and relationships).
Impact on System	The Board has invested resources in order to physically and virtually transform classrooms in the eight schools participating in the project, which has allowed teachers to be innovative in their teaching practices, so as to engage students and encourage them to develop global competencies.
	In addition, the coaching team supported school teams in establishing partnerships with community organizations to enrich their entrepreneurial projects. Among other things, partnerships with the University of Ottawa's Maker Mobile, CFORP's TacTic team and Robotique Zone01 have made it possible to support the integration of the technology-enabled teaching practices of the school teams participating in this project. The Board plans to maintain its involvement with these partnerships in the coming years and to establish new ones.
	Lastly, the coaching team interviewed school principals involved in the project to identify best practices, challenges and ways of improving monitoring. The findings will allows us to better implement the projects in participating schools and in the second cohort.

Conseil scolaire catholique Providence

Project Title	Learning and Innovation Hubs: Transforming Learning Spaces to Support Redefined Teaching Practices
Description	CSC Providence wishes to implement the EA-B2 initiative of its Technology Roadmap (TRM), the "Creation of Model Classrooms –at the Secondary and Elementary Levels", in order to begin the shift towards digital learning on a "physical" level in classrooms and on the level of "instructional practices" within schools, in keeping with the Ministry's intentions for the shift to the digital era.
	In the "model classrooms" project in particular, the Board explores the dynamics of a renewed learning space in the spirit of learning in the digital era. This project includes two components:
	A. Refitting of the physical space with furniture and equipment to support teaching and learning that combine global competencies with the new way of doing things;
	B. Evolution (transformation / adaptation) of the instructional practices of the teachers involved in this project, in order to integrate the development of global competencies.
Context	*Number of students:* 248
	Number of teachers: 10
	Number of schools: 2
	Grades/Program: K-12
Impact on Students	It is still too soon to draw any conclusions regarding the impact of this initiative on student performance. Work was carried out this year at a system-wide level, at which the framework for this project was established. This framework is currently being reviewed. We have installed hubs and are currently working on criteria and indicators that will guide data collection and analysis.
Impact on Instruction	It is still too soon to tell whether this initiative has had a direct impact on the instructional practice of teachers. Work was carried out this year at a system-wide level, at which the framework for this project was established. This framework is currently being reviewed.
	The teachers appreciate the hub approach as it gives them some flexibility and allows them to become involved according to their capacities, skills and interests. In addition, they appreciated the coaching, especially in the context of joint planning and modelling.
	The year 2017-2018 will provide more information as we will monitor the project throughout the year with the help of Dr. Cotnam-Kappel from the University of Ottawa. There will be a follow-up with schools that participated in the 2016-2017 project and with the new schools that will be added in 2017-2018.

| Impact on System | The Board was able to put together a team of specialized technology and learning coaches to provide ongoing support for teachers in transforming their instructional practices. Since the last stage of the project, the Board has maintained this direction by exploring approaches that incorporate computational thinking through programming and robotics. For this stage, further consideration was given to the transformation of "learning spaces." The intent of this initiative is to review the traditional classroom and to design its transformation into a "contemporary" classroom that is well suited to teaching and learning in the digital era. Among other things, we have launched our "learning and exploration hub" initiative in which our computer labs are transformed into technological spaces, in keeping with the "Makerspace" movement.

In contrast, our learning and exploration hub initiative has been well received by the school community, in which it has elicited the desired response. The innovation hubs are accessible by the entire school community, can accommodate multiple groups or classes at a time, and encourage all school staff members to collaborate and use these hubs.

In 2017-2018, we will:

- develop a monitoring and performance plan, through a research partnership with the University of Ottawa, to identify winning practices of our adapted "model classroom" initiative;
- target a centralized design in schools for the learning and innovative hub rather than a class-by-class approach;
- offer expanded specialized technology and learning coaching in participating schools, and
- ensure alignment and consistency between the model classroom/hub initiative and the principles of New Pedagogies for Deep Learning (NPDL) (in connection with the Board's strategic plan). |
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Conseil scolaire catholique de district des Grandes Rivières

Project Title	Transforming Teaching Practices and Student Learning Using a Variety of Technological Tools to Develop Global Competencies
Description	The main purpose of this project is to use a variety of technological tools to bring about changes to instructional practices of teachers, with the goal of transforming student learning, while at the same time developing skills needed by 21st-century learners (communication, collaboration and critical thinking). The use of advanced reality, robotics, iPads and laptops will be prioritized. For instance, policies and procedures will be established so that staff, students and parents can use technology and other tools available to them in a responsible, safe and ethical manner.
Context	*Number of students:* 143 *Number of teachers:* 6 *Number of schools:* 3 *Grades/Program:* K-8
Impact on Students	Our students were interviewed about the use of technology as a preferred tool for supporting oral communication (81%) and writing (82%). The majority of these students appreciated the fact that technology allowed them to improve their work thanks to their teachers' encouragement and feedback in OneDrive. Students knew right away what they had to change to do better on their assignments. With an iPad, teachers made videos of the students' oral presentations and allowed students to watch themselves and to provide constructive criticism of their presentations in order to improve them in the future. Other tools, such as digital publishing (EPUB) and videos, have helped to improve oral communication by allowing students to do self-evaluations and giving them opportunities to improve their final products. Technology such as robotics has provided them with opportunities to solve problems, and to discover math and science concepts through play. In addition, this technology has enabled them to develop their spatial reasoning through coding. Furthermore, technology has fostered the development of global competencies in learners. Communication, collaboration and problem solving were impacted throughout the project. Following our observations and several testimonials, the use of technology has met the needs of exceptional students, helping them to become more independent and to improve their performance.
Impact on Instruction	Teachers discovered winning strategies for teaching numeracy and literacy using technology, such as writing a short text in Office 365 Forms or brainstorming in Padlet.

	OneDrive is a tool that has made it possible to document students' continuous and authentic learning. This technology has allowed them to prepare educational documentation and learning reports in a collaborative way, since all the stakeholders were able to add their observations efficiently, on an ongoing basis. Technology has made it possible to provide feedback and have discussions throughout learning. Junior and senior Kindergarten teachers created files and shared a web link with parents giving them access to evidence of learning (e.g., photos, videos, explanatory notes) and their child's progress. Parents were then informed about accomplishments and challenges, and the next steps to better ensure their child's success. Teachers acknowledged that technology has allowed them to provide much more differentiated instruction. They have collaborated in sharing knowledge and work tools between schools in our Board.
Impact on System	We have addressed in part the challenges posed by infrastructure in order to meet and support the growing demand for new technology. We have improved the quality of the wireless network, solved several problems with the Office 365 portal, and increased the technology available to the students. In addition, we are continuing to develop a plan to make technology more directly accessible to students. These are interesting indicators that show how technology is advancing tremendously, and how teachers in our Board feel ready to learn and embrace the new products made available to them.

Conseil scolaire catholique Franco-Nord

Project Title	Implementing the Renewed Vision for Education for Learning in the 21st Century
Description	This year, we are working on finalizing the Board's renewed vision for education in the digital era. This latest version of our vision is now in line with Ontario's Well-Being Strategy for Education, the Ministry of Education's renewed vision for education and the exit profile of CSCFN students. Furthermore, we will broaden the implementation of our renewed vision for education by encouraging the launch of the following innovative educational programs: 1. The creation of a "Makerspace" related to the implementation of a STEM Teaching program in one of our high schools. We are also preparing for a "Makerspace" in two other high schools in the 2017–2018 school year. 2. The implementation of a project focusing on challenge-based learning in one of our high schools following the "What Grinds Your Gears?" model. 3. The start-up of Robotics enrichment programs in several schools. 4. The start-up of a coaching program for 15 high school teachers with consultant Garfield Gini-Newman on the development of critical thinking and enquiry-based learning. 5. The start-up of a coaching project offered by the TacTIC team for a dozen high school teachers, in line with our renewed vision for education. This more intensive system-wide implementation of our new vision for education and technology requires considerable and sustained efforts in terms of professional development.
Context	*Number of students:* 2,479 *Number of teachers:* 111 *Number of schools:* 12 *Grades/Program:* K-12
Impact on Students	The implementation of new teaching practices and the integration of technologies have had a significant impact on student engagement and motivation in classes where teachers had effectively integrated technology. The development of learning partnerships seems to have had an impact on student engagement because students now have a voice and can contribute to making the decisions required throughout their learning. Deep learning often has an impact on student engagement because their curiosity is more nurtured. The fact that students could present their works and productions to peers was also a motivating factor for them. Problem-based learning is a strategy used by many teachers. When this strategy is properly structured, it allows teachers to engage students in carrying out

	authentic learning tasks.
	Many teachers have transformed their approach in their relationship with students by adopting a learning partnership approach.
	The implementation of the Board's renewed vision for education has encouraged teachers to base their teaching on student and class profiles. Evidence helps with choosing better strategies and educational interventions. The staff's ability to implement differentiated instruction is improving. According to teachers, technology is facilitating this differentiated instruction.
Impact on Instruction	Besides basic learning skills, the Board's renewed vision for education includes the development in our students of six key competencies for succeeding in life in the 21st century and for meeting the Board's student exit profile. The six global competencies targeted are based on four competencies identified by the American P21 agency: creativity, critical thinking, collaboration and communication.
	The project has allowed some members to make observations comparing the various approaches, i.e., regarding student engagement and motivation, and the impact demonstrated outside the school.
	In spite of the challenges that arise, numerous testimonials emphasize the use of various technologies for reaching educational goals. Beyond the five components of deep learning (foundational learning and global competencies, high-yield instructional practices and assessment, learning environments, learning partnerships and technology in support of learning), surveys have identified the impact of practices based on the following elements: differentiated instruction, student voice, and the role of teachers as catalysts for learning.
	While training is the most common form of professional development for deep learning, ongoing support remains important based on the learner-to-learner approach. It is a learning partnership contributing to each person's professional development to better meet student needs and master new technologies.
Impact on System	In 2013-2014, the Board began its technological shift by adopting an implementation plan to teach competencies for 21st-century learning.
	During this same year, the Conseil scolaire de district catholique Franco-Nord (CSCFN) consolidated this work of the last four years to complete the alignment of its vision for education with its mission and vision, the student exit profile and the latest research in education.
	Indeed, the Board team continued to develop important tools for updating its renewed vision for education. Last year, the Board created a grid called Éveil à l'écrit, developed with the help of professional speech therapists and literacy experts. It is continuing this work, while also leveraging the development of the Continuum de développement de l'enfant (Child Development Continuum). This

	year, the Board also began developing the Continuum des apprentissages essentiels en mathématiques (OR Foundational Mathematics Learning Continuum) (M-9). Last year, it also adopted a Continuum du développement des compétences mondiales (Global Competency Development Continuum), a slightly different version from the original document produced by the international project entitled New Pedagogies for Deep Learning led by Michael Fullan. This year, the CSCFN adopted the version adapted for students.
	This year, schools specifically explored the use of robotics, STIM learning, hybrid learning, virtual and augmented reality, and the development of creation spaces (Makerspaces) for learning purposes.
	The Board continues to include parents as essential partners for a successful transformation of the student learning experience. Consequently, it published a guide for parents explaining why education is being revamped, what global competencies are, what 21st-century learning means (deep learning, technology integration and digital citizenship) and providing information about the iPad program, including advice for managing tablets at home.

Conseil scolaire catholique du Nouvel-Ontario

Project Title	Innovative Science Rooms at Champlain and System-Wide Initiatives to Support the Project
Description	The CSCNO is making the shift to the digital era by working on different fronts, this research project being one of them. In tandem with two other innovation projects (Littera-TIC and Carrefours à l'ère numérique [Crossroads in the Digital Era], this sub-project of the Reinforcement of Digital Learning Capacities component targets the development of global competencies in Grade 11 and 12 Science students. More specifically, the competencies that will be tracked in this project are self-regulation (learning how to learn), the ability of students to construct meaning through collaboration, and their communication skills (communicating effectively in different settings, listening and asking relevant questions, and how to choose and use appropriate digital tools). The approach will involve working in a learning community to implement innovative teaching and assessment strategies, using an action research approach that fosters the development of global competencies, while transforming learning spaces and integrating technology in them.
Context	*Number of students:* 30 *Number of teachers:* 3 *Number of schools:* 1 *Grades/Program:* Gr.11-12
Impact on Students	The staff involved took time to reflect in order to provide proper guidance for the project and to establish observable criteria for success that could be used as goals for the project. Before these competencies could be developed and measured, students and teachers first needed to be introduced to the available technology. The student and teacher surveys revealed that the major technological requirements included the following: the need to be introduced to the Cloud (more specifically to Office 365), document management, the use of an electronic calendar in student devices (mainly smart phones), the Board's student portal, and different presentation tools. In the survey, students clearly indicated that they wanted to work more collaboratively and to explore different technological tools, whereas teachers wanted to be equipped to integrate technology in their teaching practice.
Impact on Instruction	During PLC meetings, teachers, principals, vice-principals and educational consultants discussed progress, set goals for themselves, and reflected on measures to be implemented by the entire class or by specific students. At the last PLC meeting, which will take place at the end of June, we will take the

	necessary time to assess the progress that has been made throughout the semester and determine the next steps to be taken in the coming year in these three science courses in order to continue with the shift that has been initiated. Next year, we will also be able to use iPads and innovative furniture.
Impact on System	This initiative has supported us for a number of years in establishing the infrastructure and practices that help us as a system to build our technology-enabled capacities and to support our students, along with their teachers, to make the technological shift. We continue to provide training, coaching and activities for the following components: hybrid learning, the Virtual Learning Environment (VLE), the Calepin de l'enseignant du Coffre du CSCNO (computer-based "teacher's notebook" in the CSCNO's depository), the CSCNO's parent-student portal, the MS Office 365 Cloud Suite, various iPAD applications (assistive technology and classroom applications) and robotics.
	The transformation of libraries into a learning hub also helps to support the technological shift. This new hub enables teachers and students to have a place that provides a technological infrastructure and environment promoting the development of global competencies, whereas their classroom may not yet have the desired infrastructure and environment.
	Lastly, we have also integrated areas pertaining to the technological shift in our Board and Services Improvement Plan and School Improvement Plans, which are automated in our Web tool, the "Coffre" (the CSCNO's depository).

Conseil scolaire de district catholique des Aurores boréales

Project Title	Enquiry-Based Learning and Differentiated Instruction in Mathematics
Description	Given the size of the territory covered by our Board and the fact that most of our teachers are the only teachers assigned to a particular grade, we are going to create a professional learning network through the use of technology. This network will allow teachers, whatever the location or size of their school, to collaborate in developing differentiated instruction and assessment strategies in order to develop the students' reflection and critical thinking in solving mathematical problems. In addition, with the use of technology, students will be able to develop their critical thinking in problem-solving situations, in collaboration with their peers and with more specific one-time feedback. This year, we would like to deepen the scope of our innovation model by continuing with the same teachers for a second year in the differentiated instruction project. By first emphasizing education that aims to meet the students' needs, we can foster their learning through technology.
Context	*Number of students:* 144 *Number of teachers:* 9 *Number of schools:* 5 *Grades/Program:* K-12
Impact on Students	With the integration of technology and planning in the context of a technology-enabled learning centre, students were immersed in authentic learning situations. We noted that this motivates students to collaborate with "new friends in other schools." Students could choose digital tools to support their learning and thus cultivate an environment focused on the well-being of learners. Assessments carried out before and after the learning process, with supporting evidence of learning through technological tools, helped students to better understand the learning process and to see their progress. Lastly, we saw a gradual delegation of the responsibility for learning to students with the launch of student portfolios.
Impact on Instruction	Using technology, teachers used guided teaching more often to enable students to have the competencies required in authentic learning situations. Technology has allowed teachers not only to observe the process, but also to review it, and break it down into pieces and steps. Questioning was used more to see the students' critical thinking, and technology allowed teachers to capture these discussions in order to evaluate them later. The presentation of their results to colleagues highlighted teachers' efforts and leadership. This new capacity to support colleagues in their new area of expertise is reinforcing what they are learning.

Impact on System	Technology has encouraged joint planning among colleagues at the Board level. Learning and sharing environments have enabled teachers to put their resources into a resource databank of authentic activities to develop critical thinking in students. The infrastructure and support for teachers must continue to evolve and meet emerging needs in order to ensure that teachers are able to work in a technological environment that fosters the development of learning for the 21st century.

Conseil scolaire de district catholique de l'Est ontarien

Project Title	Educating Responsible Digital Citizens Together
Description	We are continuing to support greater integration of technologies in the classroom so that teachers can transform their practice by offering a variety of learning environments and choices for students. This year, in implementing our digital citizenship plan, we are targeting two specific components: • Digital literacy • Digital security We want to validate the fact that teaching and learning in these two areas will allow students to develop global competencies and to become responsible digital citizens. Our coaching will focus on the integration of technologies in a context where we will target basic digital and technological skills and competencies. We will look at ways to continuously improve planning, teaching and assessment practices. At the secondary level, again this year, we will prioritize teacher coaching. This type of coaching aims to continuously improve planning, teaching and assessment practices.
Context	*Number of students:* 1,163 *Number of teachers:* 42 *Number of schools:* 10 *Grades/Program:* Gr.3-12
Impact on Students	This year, we have continued to support a greater integration of technologies in the classroom so that teachers can transform their practice by varying the learning environments and giving more choices to their students. In implementing our digital citizenship plan, we targeted two specific components, i.e., digital literacy and digital safety and security. To ensure the development of global competencies, we relied on effective planning focused on the integration of technologies, including Chromebooks, tablets, robotics and Google Education (the Cloud). In connection with the measures used in previous stages and according to our data collection and analysis, students report that they are more engaged in their learning task and in their courses. They appreciate the variety of strategies and tools, as well as the opportunity to collaborate with schoolmates and teachers. Teachers also report that students are more engaged when technologies are integrated in the classroom. Since we are interested in developing digital citizenship in our students, it goes without saying that our coaching is focused on planning and teaching content associated with digital safety and security and digital literacy, through authentic

	tasks integrated in the various subjects being studied.
	In summary, students report being more engaged in class because of technology. They participate more and more in their learning experience because teachers give them choices. They appreciate working in collaboration with other students and with teachers. They make good decisions and use technology to learn and to find material for their research.
Impact on Instruction	Throughout the year, we provided coaching in various forms to develop digital citizenship competencies. Among other things, we provided coaching for the integration of technologies and the development of digital citizenship through a process of moral discernment.
	In our project, we are interested in various changes in practices following instructional coaching. Teachers feel that they are better equipped to support their students and, as a result, technologies are being integrated more frequently. Eighty-seven percent of teachers said they use technologies daily in the classroom.
	Teachers report that they see the impact of technologies on their instructional practices, particularly in the assessment process (assessment in support of learning and assessment as a form of learning) and in the development of 21st-century competencies.
	Since our project also targeted the development of competencies related to digital citizenship, we became interested in the teachers' professional practices following our coaching. Almost half of them, i.e., 44%, said they often discussed digital citizenship and identity with their students.
	In summary, it is important to continue our efforts to expand the integration of the 6Cs, using technology, in teaching in all subject areas. In our coaching, we favour differentiated instruction through assessment in support of learning.
Impact on System	In a system-wide approach related to the Board's digital citizenship plan, we offered two training sessions on this topic. We created a plan integrating the principles of digital literacy and digital safety and security at the middle, intermediate and senior levels. Through shared leadership enabling us to have sustainable practices, the school team leaders ensured that practices, knowledge and resources were shared with other school members by integrating the goals of the Board's digital citizenship plan into their School Improvement Plan.
	In addition, we created a partnership with Habilomédias, a pan-Canadian organization that promotes media education and digital literacy. The goal of this partnership is to ensure that both children and teenagers develop critical thinking that will enable them to use media as active and informed digital citizens.
	Lastly, we ensure that system-wide practices are shared with parents. For instance, we provided resources to parents so they could help their children

	learn.
	In short, to ensure the sustainability of our system-wide initiatives and support their implementation, it is important for all members of the school community to participate. Teacher engagement contributes to a positive climate and beneficial collaborations. Engagement can then be observed in students, who feel supported at school and at home.

Conseil scolaire public du Grand Nord de l'Ontario

Project Title	The Development of Global Competencies Through Robotics
Description	For a year now, all our Grade 4 to Grade 6 classes have been equipped with Chromebook carts. With coaching, teachers feel better equipped to transform their teaching practices to take a more participatory and differentiated approach using a process of inquiry-based learning. This year, we targeted three groups at the middle level and equipped the students with LEGO MINDSTORMS (EV3) kits. We are trying to determine whether students as well as teachers can be led to better develop particular 21st-century competencies, including communication skills, collaboration, critical thinking, creativity and innovation. Links will be created, and robotics will be integrated into mathematics and literacy. We will seek the support of a provincial team for our teachers (TacTIC). In collaboration with other school boards, a provincial C@O will be set up to gather all resources related to this initiative.
Context	*Number of students:* 70 *Number of teachers:* 3 *Number of schools:* 3 *Grades/Program:* Gr.4-6
Impact on Students	We note that the students are more motivated and eager to learn when robotics is integrated in the classroom. Some students have indicated that they are more creative when they work with robots. Students said that they like to do robotics because it gives them a chance to talk and collaborate more with their friends. Students are learning to work differently with other people. Some indicate that collaborating with their team members is sometimes difficult, but that they are learning how important it is to listen to and respect other people's opinions and ideas. By doing robotics, students develop problem-solving strategies and learn critical thinking. They must create, test, adjust and try again to face various challenges. When they are not sure about how to proceed, several students shared that they feel comfortable asking members of their own team or other teams for support. They learn that mistakes are a part of learning and that it is necessary to take risks.
Impact on Instruction	From the outset of the project, teachers were given training in co-planning and co-teaching. In addition, they received coaching from the Board's teaching team. Teachers report that they felt more confident about integrating robotics in the classroom. They have integrated robotics in mathematics and literacy contexts. Teachers indicate that integrating robotics in the classroom promotes equity and

	that a balance is created. Moreover, the integration of robotics contributes to the development of certain global competencies. Teachers indicate that students are clearly collaborating. The integration of robotics supports the development of critical thinking. Students have to put in place the best strategies to face various challenges. Throughout the project, teachers measured and assessed student learning through observations, photos and videos.
Impact on System	This initiative supports the Board's vision, which is to build the teachers' capacity and confidence regarding the integration of technological tools in their teaching practices. The teachers will be coached throughout the shift towards a more participatory and differentiated instruction.
	Due to the success of the project this year, we will expand the scope of the initiative next year to include all of our elementary schools. In addition, teachers at the intermediate level will begin to integrate robotics in the classroom. The close collaboration between members of the teaching team (including literacy, numeracy and specialized technology and learning) is key to the success of this initiative and should be continued.

Conseil scolaire public du Nord-Est de l'Ontario

Project Title	Technology Learning Continuum
Description	The CSPNE's technology learning continuum includes coaching based on the teachers' needs. In order to refine the data analysis, the Board gathers evidence on inquiry-based learning. The latter thus becomes a means by which students can acquire global competencies. Following are the rationale, primary goal and expected results for students, teachers and the system: Results for students • Develop global competencies • Become engaged in their own learning • Use technology efficiently and effectively • Have authentic learning situations • Be able to ask questions • Become self-regulating • Become good digital citizens Teachers • Document the students' learning • Provide differentiated instruction • Ensure a change in teaching practices • Ensure the effective and efficient use of technological tools in teaching • Act as coaches instead of knowledge keepers System • Ensure a shift towards the digital era • Ensure the harmonious implementation of the Board's vision for education using technology • Ensure access to technological tools for all students • Ensure a smooth transition from one level of education to another
Context	*Number of students:* 200 *Number of teachers:* 10 *Number of schools:* 4 *Grades/Program:* Gr.4-8
Impact on Students	The technology learning continuum allows students to effectively use technological tools that meet their needs. These tools facilitate the acquisition of global competencies. Among other things, they enable inquiry-based learning. Schools involved in the continuum implement inquiry-based learning. Students use the tools throughout their inquiry. Among other things, they develop critical

	thinking and problem-solving skills, innovation and creativity, the concept of learning to learn, collaboration, communication and global citizenship. Students persevere and overcome challenges to reach their goals. In addition, they self-regulate in order to become lifelong learners. They work more as part of a team and establish positive relationships. In summary, they learn from others and help others learn.
Impact on Instruction	Teachers who participate in the technology learning continuum receive ongoing coaching from two specialized technology and learning teachers. After the initial training, teachers do a self-evaluation using the Technology Integration Matrix, and coaching is planned jointly according to the teachers' needs to ensure a change in the instructional approach and strategy. The strategy of collaboration continues throughout professional learning. Among the changes made in the instructional approach, the following were observed: • increased collaboration between teachers working at the same grade levels; • integration of technology in assessments in support of learning. It is clear that teachers are acting as facilitators rather than as keepers of knowledge. It is also evident that they are more open-minded about the various approaches.
Impact on System	An alignment has taken place between the responsibilities of the specialized technology and learning teachers and the vision of the [technology learning] continuum. The activities of the technological transition committee will continue. An assessment of the process was conducted, and practical proposals were put forward for the next steps in order to include more schools in the continuum, to buy new tools for next year, to continue developing specialized technology and learning leaders among team members (CP, LEADS, ER), and to create support tools.

Conseil scolaire Viamonde

Project Title	Viamonde 21, Building Capacity towards Innovation
Description	Viamonde 21 is a program that provides multi-service support (educational and computer services) to help schools develop 21st-century competencies and technological skills. The classes in the participating schools are committed to establishing an online presence accessible to the students, working to develop 21st-century competencies, and encouraging students to be proactive in demonstrating and documenting their learning.
	The purpose of this program is to bring about long-lasting changes in teaching practices and ways of learning, as well as to demonstrate and document learnings.
	This year (2016–2017), the program is being implemented in 17 schools (13 elementary schools and 4 secondary schools) located in all four regions of the Board.
Context	*Number of students:* 1,194
	Number of teachers: 65
	Number of schools: 17
	Grades/Program: K-12
Impact on Students	According to the survey data, since the beginning of the year, the majority of students (77%) noticed a difference in how technology was used in the classroom, and more than two thirds (68%) said that they have made better use of technology in their assignments and projects this year. Regarding the frequency of use, 57% use technology almost every day and another 33% use it once or twice a week. Most students believe that technology gives them more learning options (65% said Yes and 26% said Sometimes).
	In general, students are more motivated to complete an assignment when using a technological tool, and 58% said that they tend to improve their project or assignment if they are using a technological tool. Most of the students (75%) believe that technology helps them to better express their ideas and creativity in certain projects.
	Almost half of the students (49%) said that they are given a choice of whether or not to use technology for projects, which would seem to indicate that teachers are providing differentiated instruction, which is one of the practices Conseil scolaire Viamonde strongly encourages.
Impact on Instruction	According to our survey data, teachers have described some of the changes they made in their practices this year.
	The first change is that they provided students with more choices and gave them more responsibility regarding the inquiry and project topics, ways of

	demonstrating, and time management. Teachers used reversed (flipped) teaching and differentiated instruction strategies to better reach students at their level and at a suitable time. According to the survey responses, these practices have led students to be more creative in their work, more conscious of its quality, and more persevering, learning from their mistakes as well as feedback from their teacher and peers. The second change was in the assessment practices: the fact that students could demonstrate what they had learned in multiple ways resulted in more balance in the triangulation, and generated more types of evidence and more comprehensive documentation. Staff found that by incorporating learning results and criteria in their planning, the quality of the products improved, especially when feedback was facilitated by technology. For teachers, differentiated instruction becomes meaningful when they see concrete ways to implement it. By seeing good examples and modifying their practices in class, teachers are open to change, want to take risks and give themselves permission to make mistakes. In 2016-2017, a training network was set up on Programming and STEAM (Science, Technology, Engineering, Arts and Math) (annex 06) to explore the possibilities offered by different tools for students in Grades 4 to 12 to learn programming. This network was the first one planned in partnership with the Boards' Computer Department. The members of this team facilitated some of the workshops on various technological tools.
Impact on System	At a systemic level, the program was developed in a dynamic and exponential manner. We are working with the needs identified by the schools to provide personalized coaching, while ensuring that guidelines are followed in assessment and differentiated instruction and conveying important messages about the foundations of global competencies. The Board is also working to minimize obstacles that could slow down this technological shift, while promoting collaboration and risk taking. Since May 2015, four gatherings have taken place. The Rassemblement Viamonde21 (Viamonde21 Gathering) provides an opportunity for teachers, school administrators and computer technicians to see successful practices integrating technology and global competencies in schools. This type of event provides examples for participants, who can then use them to transform their own practice. This year, school administrators benefitted from a series of meetings entitled "Direction 21", which were open not only to those participating in the program, but to other school administrators who were interested. The last meeting of the year (annex 09) focused on the use of technologies in schools and more specifically on the role of school administrators as educational leaders as well as managers.

District School Board of Niagara

Project Title	Google Read & Write
Description	During the 2016-2017 school year the DSBN has worked to further integrate Google Read & Write into daily practice for teachers and students. Google Read & Write provides assistive tools that support all students to increase their reading and writing proficiency. Read & Write is of benefit to students requiring accommodations. The DSBN's goal is to improve the success rate of students in their language assessments and to provide a tool that is a sustainable long term support for each student's learning journey.
Context	*Number of students:* 37,000 *Number of teachers:* 2,900 *Number of schools:* 99 *Grades/Program:* JK-12
Impact on Students	DSBN students have been using Read & Write increasingly for the past four years, primarily for reading support and for assistive technology for EQAO and OSSLT. We have noted improvement in achievement for elementary students with IEPs and for all students in the system. Specific improvements have been tracked at one elementary school where the entire staff have been instrumental in the consistent implementation across all grades. Similarly, a secondary school has been highlighted for providing comprehensive whole staff training and class specific targeted training. They have had gains in OSSLT results for students taking applied courses and for students with special education needs. Google Read & Write addresses global competencies for students: • The support for reading, word prediction and research features allow students to make informed decisions regarding classroom work; • Students can make connections and transfer learning; • The software has the benefit of providing supports that a scribe would provide and mitigates the need for teacher continual one-on one support, increasing the student's self-efficacy; • Students report that their confidence as a learner increases, which impacts their well-being; • Student written communication is enhanced through word prediction, research and speech to text.
Impact on Instruction	Google Read & Write is now part of the established technology tool kit that teachers use to support students in regular classroom activities and as assistive technology for the mid-year (practice) assessment and for EQAO. The IT4 Learning Team has worked extensively to build capacity in teachers.

	Teachers see the immediate impact it can have on their students and on their own personal efficacy.
Impact on System	We are continuing to roll-out Read & Write to the system using continued messaging to administrators, teachers and special education staff. Since Read & Write has been supported more intensively by EQAO in favour of other assistive technology products, its increased use and popularity for everyday use will naturally follow. The only challenge faced by system adoption is regular access to technology and reliable internet service. Supports for both remain a priority in our IT department. Recent upgrades to the network have addressed traffic challenges.
	This year, over 1100 students accessed assistive technology for EQAO, primarily choosing and using Read & Write over other products that do not have the potential to be used by all students. Special education SEA claim students are largely opting to use Read & Write for its portability and tools rather than the more expensive and more powerful Kurzweil. The DSBN's five year trend results, published in this year's Board Improvement Plan, shows improvements in reading and writing for students requiring special education supports. Increases were achieved for Grade 9 and 10 English students in applied and academic programming. Students with special education supports, writing the Literacy Test, also experienced improvements over five years. This upward trajectory of report card achievement and performance on provincial standardized tests have been impacted by the system's adoption of Read & Write as "a tool for all and necessary for some".

District School Board Ontario North East

Project Title	Empowering Learners through Challenge-based Learning
Description	For the 2016-17 school year, our innovation research project will build off our 1:1 project from last year but the focus will be on new pedagogies and instructional frameworks that help us to transform learning for our students. The focus this year will be on leveraging the challenge-based learning framework to redefine teaching and learning through the use of tablet technologies. While some of our teachers have moved towards Modification and Redefinition last year, many have not moved beyond substitution and augmentation. Our inquiry question is: "What is the impact of challenge-based learning on student achievement, and engagement?" To determine the answer to the inquiry question we will employ the following theory of action: • "IF we provide professional development for teachers on the challenge-based learning framework, THEN teachers will use the iPad to transform/redefine their instructional practices." • "IF teachers transform/redefine their instructional practices with a focus on challenge-based learning with the iPad as the tool, THEN students will be more engaged." • "IF students are more engaged, THEN they will create innovative solutions to challenges." • "IF students create innovative solutions to challenges, THEN their achievement will improve."
Context	*Number of students:* 354 *Number of teachers:* 16 *Number of schools:* 14 *Grades/Program:* K-12
Impact on Students	Students are driving their learning by being given the opportunity to choose what they want to learn, how they want to learn and how they want to show their learning. Multiple sources of data show us that implementing challenge-based learning (CBL) helped shift our classrooms from a traditional, more teacher-centred classroom to a 21st century classroom that is more student-centred. More student-directed learning opportunities are allowing students to design and manage their own projects and develop resilience in overcoming challenges while meaningfully participating on teams. Our observation protocol, used to record observations of student engagement in classrooms trying CBL, asked observers to categorize the classroom as either teacher-directed or student-directed. The data showed that 100% of the primary and junior classrooms were student-directed when implementing CBL and 80% of

	the intermediate and senior classrooms were student-directed when implementing CBL. While the intermediate and senior classrooms demonstrated less of a student-directed classroom, the students were working in small groups/teams to complete various tasks, and were no longer in discrete rows. As students take ownership of their learning, and it becomes more authentic as they tackle complex problems, students demonstrate an increase in cognitive and emotional engagement which corresponds to deeper learning and reflection. We conducted an observation protocol to look for observable elements of social, emotional, and cognitive engagement. When observing in a classroom that was implementing challenge-based learning, observers could always, frequently, and occasionally observe body language that indicated students were paying attention. The same was true for students being focused on task, expressing ideas, demonstrating confidence in task completion, and exhibiting interest and enthusiasm. We did observe students in the rarely or not observed categories.
Impact on Instruction	Multiple sources of data show us that implementing challenge-based learning helped shift our classrooms from a traditional, more teacher centred classroom to a 21st century classroom that is more student centred. This shift saw teachers changing their stance from expert to co-learner. Our observation protocol, used to record observations of student engagement in classrooms trying CBL, asked observers to categorize the classroom as either teacher-directed or student-directed. The data showed that 100% of the primary and junior classrooms were student-directed when implementing CBL and 80% of the intermediate and senior classrooms were student-directed when implementing CBL. Not only did the CBL work shift the role of the teacher, it changed the physical set-up of the classroom to support student-to-student collaboration as students tackled real world problems that mattered to them. Assessment Practices: Teachers started to shift assessment and evaluation to incorporate a triangulation of data through a balance of conversations, observations, and products. As students worked a variety of different challenges, and completed a variety of diverse tasks in teams, teacher assessment practices had to incorporate technology to document the learning process, not just the final product. In our pre-survey of our challenge-based learning teachers, they were asked to rate their familiarity with pedagogical documentation. During the pre-survey, 39% of the teachers said they were familiar with and had applied pedagogical documentation into their practice. In the post survey, this increased to 75%. Through the challenge-based learning collaborative inquiry, teachers meaningfully integrated technology more purposefully into their classroom as it

	supported personalization and differentiation. This integration of technology saw more choice for students in how they would access content, and how they would show what they know.
	Using Rogers diffusion of innovation model, teachers were asked to describe their adoption of technology enabled learning as an innovator, early adopter, early majority, or late majority. In the pre-survey, 87% of the teachers placed themselves in the early majority/early adopter categories. During the post survey, 73.4% of the teachers placed themselves in the innovator/early adopter category. We also included insight into the teacher's technology integration along the SAMR model. During the pre-survey, 100% of the CBL teacher group fit into the substitution category. By the end of implementing challenge-based learning, 35% of the teachers were at the substitution level, 55% were at the substitution/augmentation level and 10% were at the modification level.
Impact on System	PD opportunity for teachers and administrators wanting to deepen their understanding of CBL and implement CBL into their practice for the upcoming school year. We have 40 educators volunteering to come to a two-day session this summer.
	By including the 21st Century competencies in the BIPSA and SIPSA we are demonstrating the importance of these competencies and emphasizing the importance of including them within everything we need to do in our schools.

Dufferin-Peel Catholic District School Board

Project Title	Building Educator Capacity in Data Literacy for Student Assessment
Description	In 2012, the Ministry of Education released a resource continuum entitled 'STEP' (Steps to English Proficiency) for teachers to assess and track the language and literacy development of English Language Learners (ELLs). The continuum includes specific descriptors in connection with the Ontario curriculum that can be observed through day-to-day learning activities.
	Qualtrics is an electronic survey and reporting tool. Qualtrics can meet current survey needs, as well as improve upon the efficiency of electronic data collection and reporting. The 2016-2019 Dufferin-Peel Catholic Board Improvement Learning Cycle similarly reflects the principle tenets of STEP and the application of Qualtrics. They maximize the use of student information in alignment with the board's plan of creating personalized learning profiles that foster student success, supports wellbeing, and nurtures professional growth and leadership. They also highlight the system's focus in supporting educator awareness of the board's digital tools and their use in meeting the needs of all learners. Lastly, implementing the use of STEP through Qualtrics software fosters the development of culturally-responsive teachers, who value the diverse knowledge and experiences that students bring to class.
	The STEP framework and Qualtrics software is also reflected in the board's shared belief and understanding of the importance of building community through partnerships and collaboration, where information gained from STEP through Qualtrics can help navigate discussions with students, parents, and professionals about the language acquisition and literacy development of ELLs and the personalization of learning goals in order to promote academic success and equitable opportunities for student voice and creativity.
	The goals of this collaborative project include:
	• Building capacity in school and system leadership;
	• Advancing toward the system-wide use of the resource;
	• Addressing the learning needs of identified ELLs through the implementation of STEP and provide learning and support for students' transition and classroom instruction;
	• Examine the capability of Qualtrics as an online, support tool.
Context	*Number of students:* 600
	Number of teachers: 25
	Number of schools: 10
	Grades/Program: Gr.4-8

Impact on Students	Dufferin-Peel will be fully implementing the STEP continuum in 2017-2018 system-wide. To facilitate system-wide implementation, an electronic data collection and scoring tool, Qualtrics, will be provided to schools in support of STEP and enhance the professional collaboration necessary to support ELL students.
	It is anticipated that an electronic data collection tool such as Qualtrics will assist educators in supporting students' acquisition of not only language, but also enrich their global competencies.
Impact on Instruction	During the professional development in-service, educators were introduced to the online data collection and scoring tool. The tool was configured to include all the observable language behaviours associated with each STEP continuum. Within the tool, educators select the appropriate level for a given student in the areas of oral, reading and writing proficiencies.
	Preliminary educator feedback from our pilot schools suggests that an electronic data collection tool would be beneficial to schools as we implement STEP system-wide. Educators found the tool convenient to store student assessments and many support the idea of storing the data digitally. In general, educators have been appreciative of the ongoing support regarding the implementation of the STEP process and that the system is piloting the storage of student assessments digitally.
Impact on System	Given the infancy of the project, broader system impact has yet to be measured. However, the principle tenets of STEP and the application of Qualtrics aligns with the Dufferin-Peel Catholic Board Improvement Learning Cycle. We anticipate maximizing the use of student information in alignment with the board's plan of creating personalized learning profiles that foster student success, supports wellbeing, and nurtures professional growth and leadership. Lastly, implementing the use of STEP through Qualtrics software fosters the development of culturally-responsive teachers, who value the diverse knowledge and experiences that students bring to class within a safe and caring environment.

Durham Catholic District School Board

Project Title	i³: Imagination, Innovation and Inquiry
Description	Our Innovation Project is comprised of three separate, but aligned projects: Learning Commons Inquiry, 3D Printing Inquiry and a board Technology Innovation Fund. Learning Commons Inquiry We are continuing to scale up the Learning Commons Model throughout our system. We are focusing on both the physical and pedagogical transformation of the learning environment. This year, there are 10 schools involved in our inquiry. These include both schools that have had their physical spaces transformed over the past few years, and schools that are currently renovating their spaces. Each team will attend four central training sessions for professional development in areas such as: the learning commons philosophy, the role of technology in the learning commons, the global competencies and New Pedagogies. Each Learning Commons PLC will conduct its own inquiry at the school level. Teachers are collaborating using cloud based technology. Schools are developing rich tasks that integrate coding, robotics, green-screens, 3D printing, cloud computing and web 2.0 technologies. Technology Innovation Fund All schools in our system have been encouraged to apply to our board Technology Innovation Fund (TIF) for teacher release time to run school-based collaborative inquires on technology enabled teaching and learning. Each project must involve the use of digital technology using a model for technological integration (eg. SAMR, TPACK, 21st Century Design …) and the development of Global Competencies. 3D Printing Inquiry Five secondary schools are involved in this inquiry. Teachers have been designated at each school as 3D printer leads. Each school team has an administrator and at least three teachers participating. The focus of the inquiry is on how this technology (3D printer) can support curriculum delivery and student engagement. Cross curriculum collaboration and the 21st century competencies are stressed and collaboration is encouraged (teacher to teacher, student to teacher, student to student). The devices, for the most part, are located in the learning commons within a "hack lab" or "makerspace" with the design software accessible from any computer throughout the school.
Context	*Number of students:* 6,750 *Number of teachers:* 126 *Number of schools:* 20 *Grades/Program:* JK- 12

Impact on Students	Data was collect at the school level by teachers involved in our various inquiries. The data indicates that there has been growth area of developing the global competencies. For example: • 93% of students involved in the 3D printing inquiry felt that using a 3D moderately or significantly improved their critical thinking skills. • One said being involved in the 3D printing program, "Increased my self-esteem which gave me the confidence to learn new things." • Another indicated, "[the 3D printing project] connected me with new resources and expert students which allowed me to learn more effectively.
Impact on Instruction	We collected data from our teachers at the beginning and at the conclusion of innovation project. The results indicate a great deal of movement in several areas including collaboration, global competencies and technology-enabled teaching and learning.
Impact on System	Instruction for the 21st century is a priority in our Board Improvement Plan. The plan includes several strategic actions including: • Establishing a Learning Commons PLC comprised of teachers, administrators and board personal for developing best practices for the transforming of a library into a Learning Commons. The feedback will inform our board's strategy regarding scaling up the Learning Commons model. • Consultants are now working closely school Teacher Librarians to provide support for technology enabled teaching and learning and 21st Century pedagogy. • Online forums (e.g. Yammer groups and Outlook Groups) have now been established and are active. Teachers, board personnel, and administrators are asking questions, exchanging ideas and supporting each other in the area pedagogically-driven, technology-enabled practices. Based on the encouraging results of the 3D printing inquiry we will be deploying 3D printers in two more secondary schools. The experiences of the five secondary schools involved in our 2016-2017 initiative will inform both teacher training and best practices for harnessing the benefits of 3D printing across curriculum areas.

Durham District School Board

Project Title	Cloud Learning through Mobile Technology
Description	The focus of this multi-year project has been to provide small charging carts of small form factor wireless laptops into grades 5 and 8 classrooms in year 1 (2014-2015); and into grades 6 and 7 classrooms in year 2 (2015-2016). This year, we will scale the project to incorporate grade 4 classrooms. At the same time the project has been working with a third party application design and creation group to co-create a mobile collaborative sharing site for all students in these classrooms to allow them to interact with one another and their teachers. This site (DDSB Campus) was created using the Microsoft O365/SharePoint technology. The project focused on embedding technology into classroom learning, with a focus of mathematics and technology integration. By providing the virtual space through our DDSB Mobile Campus environment and Virtual Learning Commons resources and putting mobile technology in the form of small form factor laptops directly into our classrooms along with targeted professional development, we will empower teachers to leverage digital technologies to deepen learning for their students. Our focus is promoting digital technologies through hardware and the DDSB Mobile Campus tools for teachers, specifically within the mathematics program to improve student engagement and ultimately enhance student achievement. Given that this project represents a widening of the previous years' project scope, we anticipate that teacher practice will be broadened and technology integration will allow for a more robust repertoire of teaching strategies in the classroom. (i.e.: Guided practice, student inquiry and problem based learning.)
Context	*Number of students:* 28,000 *Number of teachers:* 1,526 *Number of schools:* 127 *Grades/Program:* Gr.3-12
Impact on Students	Looking at feedback from both our grades 6 & 7 teacher cohort and our grade 4 teacher cohort, we can see that the implementation of cloud resources and mobile technology continues to have significant student impact as we scale this project. Teacher perceptual survey data show that: • Teachers believe that having the cart of laptops in the classroom increases student achievement • Teachers believe that having the laptops available in the classroom increases student achievement in numeracy When we look at the global competencies, we know that our work, focused on

	the use of cloud tools and resources along with mobile technology, most directly looked at the competencies of collaboration, creativity and innovation, and communication. Our survey data shows that students are using the technology to support:
	• Creativity and Innovation (Inquiry and Library Learning Commons)
	• Communication and Creativity: (Multi-media-presentations & Blended Learning)
	What we are seeing is an increased focus on the global competencies as student now have access to the tools and resources to support that type of learning.
	Qualitative feedback from teachers shows that they believe their students are more engaged, that they can explore more on their own as part of an inquiry or extensions. Some teachers mentioned an increase in reading comprehension with the access to more material at differentiated levels. Teachers also noted that students with SEA funded laptops were more likely to use their equipment, as having other students using the equipment reduced the stigma of being different.
Impact on Instruction	In terms of specific teacher practice, teacher perceptual survey data shows:
	• Having the laptops available in the classroom increases their use of technology at the point of learning
	• Teachers utilized the available technology to support assessment
	Qualitative analysis shows that many teachers feel they can more effectively run centres or small groups with the technology being readily available, as well as allowing them to personalize learning more for their students.
	One theme noted in the open text comments was that of using technology as an "assessment for" tool in the classroom. Besides being an engaging way for students to assess their learning with their teacher, it is a personalized approach to assessment in the junior and intermediate grades and may speak to a growing emphasis on assisting students to hone their ability to self-regulate their learning.
Impact on System	Our cascading model of professional development, with opportunities specific to this group of teachers as well as opportunities for all teachers throughout the district to take part in or lead professional development around cloud and mobile technology has allowed us to reach more staff and build further capacity throughout the system.
	We will be continuing to explore other models of professional development, including open-online courses for just-in-time learning, and developing a way in which teachers can share their own innovative practices and search for examples from other teachers.
	The impact of having greater access to technology in the classroom and on-demand has been felt so deeply, that as a system we are developing a

| | comprehensive, sustainable technology model to ensure that students in all classrooms have equitable access to technology. |
| | We have learned that leveraging digital means so much more than putting devices in the hands of students. We need to shift pedagogical practices and develop innovative learning environments, both physical and virtual, to support student in developing their global competencies. To that end, we are launching a "Leveraging Digital" focus as part of our district priorities and our board improvement plan that will ask school and system leaders, along with their staff, to explore the intersections of pedagogical practice, innovative learning environments and digital technologies. This initiative is supported by our board trustees and all senior administration, and will be embedded through nearly all system level portfolios, including special education, poverty strategy, leadership development, student success, and K-6. The TLF Innovation grant has allowed us to see the possibilities for our students, and now the district is ready to move. |

Grand Erie District School Board

Project Title	**Educational Technology Evaluation**
Description	The Educational Technology Initiative in Grand Erie encompasses several new forms of professional development opportunities for teachers and students. These include Digital Lead Learner Development, Demonstration Classes, Ed Tech Projects, Ed Tech Student Crew, and Ed Tech After School Workshops. Our research this year is focused on evaluative inquiry of our various Ed Tech support processes to determine our overall impact on student learning and teacher practice. Our specific focus is around the 21st Century Competencies of Critical Thinking, Problem Solving and Collaboration.
	We will have evidence to form a better understanding about the role of educational technology as a support for learning and teaching. We are specifically looking at the growth in the 21st Century Competencies. One of the outcomes of informal and formal reporting during and at the end of the evaluative inquiry is documentation which allows for mobilization of knowledge, a focus on ongoing improvement with relation to educational technology practices, and dissemination of effective practice.
Context	*Number of students:* 100
	Number of teachers: 600
	Number of schools: 73
	Grades/Program: JK-12
Impact on Students	By far the biggest direct impact the Ed Tech Team has witnessed (in the area of student learning) is with our EdTech Student Crew (ESC Teams). We support these students directly at central events where they learn about various technologies and digital resources and then they return to their schools to support both staff and students in their communities. Students involved in ESC go to the Student Learning Corner to learn about digital resources and as they gain and prove proficiency (online quizzing), they earn badges. Many of the badges are focused on technical skills (connecting cables and adapters to devices) and digital resources (Office 365, OneNote, Kurzweil, etc.). Several are also specifically geared towards the 21st century competencies (Communicator – posting and replying to a forum; Problem Solver – posting to the "Problem of the Week" forum, etc.).
	Our assessment of student learning around the 21st century competencies was captured via badging and in future we intend to focus on student reflection as assessment of learning and growth around the 21st century competencies.
	Through our EdTech Student Crews, students support both staff AND students in their school communities. This has provided obvious development of partnerships

	between students & students, students & teachers, as well as teachers & teachers. The opportunity this element provides for student leadership is very significant and staff advisors report increased student confidence in both their technical skillsets and in their leadership abilities.
	Through our inquiry, educators commented that students developed critical thinking and problem-solving skills when dealing with the technology itself. Students also developed Problem Solving skills while completing classroom activities – often learning by trial and error, testing a solution, and adjusting their process based on the task and outcome (this included finding solutions in coding, solving technical issues, or applying to real life problems). School projects also encouraged collaboration between students using technology. Educators commented that some students are more willing to share ideas and converse when working in a digital or virtual space than they would be face to face or in a large group. Technology is also cited by teachers as being the "hook" that pulls students in and gets them excited about learning.
	Based on a survey completed by our 3rd party Research Team, educators were asked to comment on how education technology is impacting student confidence in the classroom. The following 3 themes emerged from the responses:
	1. Educational technology makes learning more accessible for students who have learning differences or challenges
	2. Educational technology has a direct impact on students' increased confidence
	3. There is variability in how students respond to the use of technology for learning
Impact on Instruction	We have 4 main pillars that comprise the Ed Tech Initiative and each of these provide growth opportunities for teachers:
	1. EdTech Student Crew – student and teacher partnerships formed by the support from ESC teams in classrooms and schools provide teachers with direct support from students around technology options some teachers are otherwise unaware of.
	2. Demonstration Classes – these provide small groups of teachers with an opportunity to observe another teacher's class and highlight common effective teaching practices leveraging digital tools. Participating educators reported that they made regular attempts to implement ideas and cited that collaboration was evident throughout the Demo Classes.
	3. Ed Tech Projects – these provide groups of 4-8 teachers in a school an opportunity to innovate and try something new with the support of the Ed Tech Team and Digital Lead Learner team. The structure also provides the time and supply release needed for teachers to collaborate and co-learn in order to integrate new learning into current practice.
	4. After School Workshops (ASW) – we hosted 20 After School Workshops over

	the year all focused on the 21st century competencies and various support resources including Outlook, OneDrive, Office Mix, OneNote, Coding, Social Media, Skype, etc. Our attendance numbers were lower than anticipated so we've begun discussing modifications for next year.
	We were very pleased to see the shift in understanding of resources shared from BEFORE attending sessions to AFTER, where 23% of attendees reported "Good" or "Great Deal" of understanding prior to attending and then 75% reported "Good" or "Great Deal" of understanding after attending. We have also seen solid gains in motivation to implement, knowledge of content, and confidence in applying new learning.
	Overall many educators and students (based on educator comments) use tablets, laptops, projectors and personal smartphones every day. Many educators indicated they had changed their teaching and/or assessment practice as a result of participating in Ed Tech PD. Many discussed using OneNote for feedback and documentation, focus on 21st century competencies, improving collaboration and providing better feedback to students.
Impact on System	The scaling and systematizing has already begun and we continue to expand as we map out plans for next year.
	1. Digital Lead Learners – 45 teachers were involved in 2016-17 – so far 37 have already re-applied for next year and 10 others have submitted new applications to join the DLL team.
	2. EdTech Student Crew – last year we had 9 schools in the original pilot. In 2016-17, 12 more schools joined bringing us to 29% of all schools in the Board. The role of students on ESC teams continues to evolve.
	3. Demonstration Classes – until last year, the Ed Tech Team members acted as "Curriculum Support Teachers" for new "Demonstration Class Teachers". This year, 2 of our experienced Demonstration Class Teachers shadowed Ed Tech Team members to become Curriculum Support Teachers for new Demo Classes.
	4. Ed Tech Projects – Ed Tech Team members are actively starting to plan with current Project Leads to evolve their Project into Demonstration Classes next year. This will be a key in scaling up individual school projects and sharing out to other schools.
	5. After School Projects – ASWs have had lower attendance that anticipated so this pillar will be modified next year to accommodate more staff in different ways.
	6. Ed Tech Symposium – recently we held the first Ed Tech Symposium and invited all principals to attend along with 1 teacher from their school to learn about all of the above and plan how their school can get involved next year.

Greater Essex County District School Board

Project Title	System-Wide Implementation of Technology-Enabled Pedagogy to Support Developing 21st Century Competencies
Description	We are beginning to shift away from learning about technology in the classroom and more towards learning how to leverage technology to make a difference. In previous years our focus has been on building the conditions for innovation to occur and this year we are already seeing results across the Elementary and Secondary panel that are exciting, especially in the support of spread and scaling-up that is occurring. As the focus of our CODE project changed last year with the introduction of Edsby, our projects have evolved to the point of supporting a grass roots effort from the classroom level where educators (including support staff) are leading the learning and sharing of ways to leverage this technology. Edsby: To provide ongoing support for innovative practices, we have developed four smaller Edsby projects: • Kindergarten and Special Education Innovation Project: Small groups of educators explore documentation and assessment capabilities. • Grade 1-8 Innovation Project: Small groups of teachers will meet to plan and use Edsby for lessons, assessments and evaluation. • Edsby Reporting Tool Evaluation Project: Teachers and central staff are investigating moving from our current Report Card software to Edsby. • Edsby Secondary Innovation Project Partnerships: For the current year, there related to technology enhanced learning and 21st century competencies include: • Supporting our 6th "EdCamp" event. This is a partnership effort between the GECDSB, WECDSB and LKDSB. This year will focus on using mobile technology to validate observation and conversation data. • Our ongoing partnership with the Faculty of Education at the University of Windsor. Teams of teachers, including faculty if Ed candidates and OTs, collaborate with researchers to conduct in school research. • New partnership this year with the University of Windsor and our ESL department, involves an investigation of a specific software that is being researched to support for English Language Learners. • A new partnership this year involves our First Nations, Metis and Inuit Collaborative Inquiry project. We are examining the connection of aboriginal education to the competencies. Computers in Education Site Contacts (CIESC): Each year the project has helped support spreading knowledge from the system level to schools (and vice-versa) through our Computer Contact program.

Context	*Number of students:* 35,695
	Number of teachers: 1,922
	Number of schools: 72
	Grades/Program: K-12, Mathematics and Assessment Practices
Impact on Students	We have continued to follow the philosophy that building the content knowledge, pedagogy and leadership of lead learners will lead to the scaling up of instructional practices that we need to see in classrooms. This leads to experiences for students that lead to improved student achievement. We wanted to see changes for every student, in every classroom, through new pedagogies and understandings for every teacher. We have determined that the classroom is the unit of learning and have shifted the nature of professional learning opportunities to be more school-based and classroom based.
	The grades 1-8 project teams looked at engaging students with the interactive features of Edsby.
	Use of online tools like OneDrive and OneNote promote the global competencies of collaboration and communication for students by allowing them to work collaboratively in an online space. They work together with students creating shared word documents, Excel spreadsheets and PowerPoint presentations. Teachers can monitor the work in progress and provide feedback to students from wherever they are.
	Lexia is an interactive, electronic reading program through which students build reading skills and confidence by interacting with the software. The program provides live assessment and instruction supports for teachers that allow targeted interventions to happen during the literacy block. We have clear evidence that student confidence, self-esteem and advocacy have improved substantially. Lexia assesses each student and places them in their individualized appropriate instructional level. It also remediates and provides teachers with instructional tools when students continue to struggle in any given area.
	Lexia is being used by our students with ESL and special education needs as well as students in French Immersion programs. Every student in the selected classes is using this as a learning tool during the literacy block leading to greater equity in the classroom. It is helping students improve their reading, spelling, world knowledge, vocabulary... all in an engaging and meaningful way using technology.
	Students are using the features of the program to develop the global competencies of learning to learn/self-aware and self-directed learning, as they work toward goals and monitor their progress.
	Several schools in our board have taken a step into coding as an instructional practice to improve student critical thinking and problem solving, and innovation, creativity and entrepreneurship."

	Four schools who created Maker Spaces in their schools held a joint "Maker Faire" for the public. Teachers encouraged students to lead the Maker Faire by presenting their maker projects and inviting visitors to make things as well.
	Another school who has been deeply invested in developing coding and robotics lessons, chose knowledge mobilization as part of their TLLP project. In the junior grades, students in one class were tutored to become 'Coding Coaches' and were then supported with coaching their peers in the school. Students felt empowered to teach something they had just learned and to find success working together. Students experienced several of the global competencies in this learning experience, including learning to learn, communication and collaboration.
Impact on Instruction	A The results of our board's Math Task Force indicated that our teachers were not as comfortable using technology in Math class as they were in other subject areas. As we implemented the recommendations of our Math Task Force this year, one of the steps was to improve capacity of lead learners in our system (administrators, Math Leads and Learning Support Teachers).
	Through various professional learning structures this year, using apps effectively for teaching math was included as part of the professional learning. Administrators and teachers were introduced to using math apps to increase student critical thinking and problem solving, productive disposition and conceptual understanding.
	As a result of the spread of professional learning opportunities for using math apps effectively across the system, our board's iPads now have over 200 math app titles requested by various schools. The PD this year mainly focused on introducing apps that work as virtual math manipulatives.
	We are currently supporting teams of teachers from 38 of the 70 schools in our board who are collaborating to learn about using Edsby for assessment and evaluation as well as for creating online learning environments for students, teachers and parents to learn together online.
	We rolled out the use of Edsby Student Engagement System last year, beginning with attendance for all classes, and access for students and teachers in Secondary schools, and 2 elementary pilot schools to use the other features available in the software (class communication, lesson and unit planning, documenting observations, assessment and evaluation, professional learning groups, etc.). We provided the minimum training and provided online supports, program and IT supports, and allowed teachers to explore how the tools would best strengthen their practice. To provide ongoing support for innovative practices, we have developed four smaller Edsby projects:
	Kindergarten and Special Education: Developing a knowledge mobilization plan to share learning (for example developing resources for other teachers) was an

expectation of the project. Teachers shared how they used Portfolios and assessment features as well. Some teams were able to bring parents in to the school and help get them started with the program. A few teams were able to travel to other schools in the system to share and learn together with colleagues.

Grades 1-8: Small groups of teachers met to plan and use Edsby for lessons, assessments and evaluation. Some teachers also chose to explore classroom communication capabilities to engage students in online learning. Teams received an additional four release days to use for job-embedded professional learning and to spread the learning to others in our system. Teachers within the group were also able to meet with teachers from other schools to observe in classrooms and to debrief and answer questions. In this sharing group, leadership moves were noticed as teachers were posting questions and helping each other by answering rather than waiting for the project lead to respond.

AER: Teachers are working together to go deeper with their own learning around using the virtual classroom features for communicating with students and parents, and they are creating in-school learning opportunities to share their learning with other teachers in the school. Teachers in this project group were actively involved in a shared help group where they were often able to post responses to teachers who needed help

Some teachers are new to Edsby this year and have received two ½ day release days to learn how to use Edsby for assessment and evaluation as well as student and parent communication and to work on deepening their own learning and to create and provide shared learning with others on staff. A few teachers were also experimenting with using Edsby to create a 'flipped classroom' where the work is posted for students to view before class and the teacher can spend more time helping students while they work in class.

Teachers took advantage of the online sharing space (PLC Groups in Edsby) to share their learning and connect with teachers at other schools who had similar learning interests. Teams were able to be much more creative and innovative in this model.

The technology tool has allowed us as a board to have conversations with teachers across our system about assessment, evaluation and reporting in a way that has not been possible in the past. At all learning and sharing sessions, discussions around what makes up a balanced assessment program have naturally occurred. The tool has helped us revisit concepts from Growing Success and ensure system-wide understanding of the differences between assessment of, for and as learning and when they are appropriate to use.

We continue to develop partnerships through our work to create conditions for innovation and peer-to-peer learning. There are several partnerships related to

	technology-enhanced learning and 21st century competencies.
	Ongoing partnership with the Faculty of Education at the University of Windsor. Teams of teachers, including faculty of Ed candidates and OTs, collaborate with researchers to conduct in school research into current topics in teaching and learning with respect to innovation and new learning. Teachers explore new pedagogies, changes in practice, and ideas such as the global competencies, social justice, and project-based approaches to learning.
	An interesting new partnership has developed between the Program Department and the Special Education department. The departments have created opportunities to share learning together at meetings, and have co-created and co-presented professional development in the areas of mathematics and technology. Other opportunities for co-learning developed this year, with a goal of building a culture of co-learning and collaboration between the departments.
	Another new partnership involves our First Nations, Metis and Inuit Collaborative Inquiry project. Teachers were very interested in learning about how the 21st century competencies could be incorporated in the indigenous ways of learning and knowing to help increase student achievement for our self-identified students. We have created an online professional learning community group in Edsby where all teams post their learning and share resources with each other. Teachers this year incorporated technology such as coding and iPads to help students from indigenous backgrounds build on their strengths and to improve outcomes in mathematics.
Impact on System	We continue to work collaboratively in our board to align professional learning to support system goals. We support School Based Learning (SBL) days where principals and lead math teachers co-lead professional learning in school. Administrators were provided training with Edsby at their principal conference and at System Principal meetings so they could comfortably lead their schools in bringing students and parents on board with Edsby. We are currently piloting special education software in several schools (Lexia) and are part of a study by the University of Windsor involving software for English Language Learners. The tools in Edsby have provided us with an excellent forum to work with teachers from K-12 on how technology supports effective assessment and evaluation practices. Math professional development sessions created by the program department have had 21st century competencies and teaching math with technology as a part of every session planned and presented.
	Throughout the years of the project, we have been focused on developing formal and informal leadership to bring positive changes to our system. We continue to build on this foundation work by spreading the leadership even further this year with recognizable impact on budding teacher leadership throughout the system.

	Each year the TLF project has helped support spreading knowledge from the system level to schools (and vice-versa) through our Computer Contact program. These teachers are also the school-based liaison with the IT department to improve communication across the system. Every elementary and secondary school has a teacher who has been identified by the principal as a leader in effective teaching and learning with technology to attend meetings and share learning with staffs. We have intentionally aligned our system needs for math and technology learning at these sessions by sharing effective technologies to be used in math learning and in developing 21st century competencies across all subjects.
	The impact of the various Edsby Innovation projects at a system level is quite powerful. One of the benefits of the Edsby software is the ability to connect parents with their students' schools – especially their classes. Through the project, teachers were able to learn how to engage parents, and build a more positive outlook toward parent participation through their sharing time.
	Based on the learning we experienced especially how well the model lead to scaling-up of technology-enabled student, teacher and parent communication and effective assessment and evaluation, we have decided to re-envision the role of the CIESC contact teacher role. Principals identify a lead teacher who will use technology innovations to improve teaching and learning, and who wishes to demonstrate collaboration and innovation, creativity and entrepreneurship, to become an Innovation Learning Teacher.
	Innovation projects have helped our system develop leadership across our board where change is happening at the school and classroom level. A shift in belief around teacher leadership is evident by the large number of teachers willing to host workshops, lunch-and-learn sessions, presenting at staff meetings and on PD days, as well as using electronic tools to share their learning and invite collaboration with others. The scaling-up that we have seen in the up-take of using Edsby to improve assessment, evaluation and communication practices has been staggering.

Halton Catholic District School Board

Project Title	Shifting Our Practice
Description	HCDSB's model is resonant of our strategic plan, where we believe that all "educational experiences and opportunities are differentiated to support all learners." We seek to enable and empower educators to facilitate the optimal conditions for student success using technology. This philosophy lives in how we deliver the CODE projects within our learning communities. We allow the educator teams to choose their inquiry question concerning technology, to implement it through the 21st Century lens of teaching, learning and assessment. We learned how to collect system data without relying on surveys to capture depth. Our second year with using a LMS to structure our work proved successful again. We are tweaking our project model now that we have landed on a clear framework for what is working for us and our teams. We have also learned that leveraging research support to help CI teams with alignment between their inquiry questions and their proposed evidence gathering is vital in keeping the work realistic and targeted.
Context	*Number of students:* 2,700 *Number of teachers:* 120 *Number of schools:* 27 *Grades/Program:* K-12
Impact on Students	HCDSB students got another opportunity to engage in technology-enabled learning in round 6 of the TLF initiative. The most common 21st century competencies that were targeted among our collaborative inquiry teams were collaboration, learning –to learn/self-aware and self-directed learning, critical thinking and problem solving, and innovation, creativity and entrepreneurship. All teams were asked to document their students' learning. To illustrate our development with the learning to learn competency, one team said, *"it took the students a few tries before adapting to capturing their learning on technology, especially in Math",* similar sentiments were echoed by another team, who said *"overall, there was more ownership of the success of their written work and a shift in their mindset"*. These two examples represent perseverance and overcoming challenges to reach a learning goal and believing in their ability to learn. Almost all of the projects that focused on the learning to learn competency had success with their students, with several teachers reporting that their students chose activities and/or areas/tools that suited them best. Our development of critical thinking and problem solving was widespread, with almost all of the projects tackling the skills in this competency area. One team said that *"the majority of students stated that the coding helped them in solving*

	problems and then transferred these skills to other areas" and similarly, another team said *"students have become more digitally responsible and have more go-to sources – they know which sources are creditable and have favourites. They are starting to ask more questions about the credibility of websites showing that they care more and understand relevance"*. These two examples demonstrate how engaging in technology-enabled learning allowed students to make connections and transfer learning from one situation to another, and to acquire and interpret information to make informed decisions.
Impact on Instruction	HCDSB teaching staff were once again asked to submit a project proposal to our TLF committee for approval. Teams were asked to pull together a problem of practice that they were interested in and to find teammates who would be willing to learn collaboratively. In round 6, HCDSB supported 33 collaborative inquiry teams.

At the start of our project, all teaching teams were invited to an introductory workshop, which was facilitated by our Project lead, a board researcher and one other teaching staff member. At the end of our project, all teaching teams were once again brought together for an opportunity to celebrate and share their learning with the larger group at a consolidation day. Teams were asked to produce an IGNITE-style presentation (5 minutes, 20 slides) and to present their findings. Examples ranged from learning about new technology to learning more about knowledge in a content area.

Teams were asked to comment on how they will incorporate their learning into their teaching practice moving forward. … our teachers that are participating in this initiative are reflecting on their learning and realizing the value in collaborative inquiry for technology-enabled practices. Those who did not have a collaborative experience commented on how it would be hard to move forward if they didn't have the support of a team. Additional capacity building and awareness on the power of the collaborative inquiry process may be an area to continue developing in our secondary panel. |
| Impact on System | As a system, HCDSB has taken some key steps forward in round 6 in terms of scaling up and sustaining pedagogical technology-enabled practices. …we increased the number of schools who participated in this collaborative inquiry project, and most notably we had many more of our secondary schools participating in this round.

As in the previous round, we used our Scale rubric to assess the scalability of our project. For round 6, we analyzed three pieces of evidence (What did we learn? How have you incorporated your learning into your practice, and impact on student learning) for 19 of our project teams. Overall, we continue to be successful in the domain of deepening our collaborative inquiry model. |

	As a Board, we believe the TLF initiative allowed us to identity areas that we are doing well and areas that still need improvement. As new staff are welcomed to our system, we are aware that we need to have a framework in place that allows for systematic monitoring and evaluation of what we are doing, how well we are doing it, and how well we are sustaining pedagogical technology-enabled teaching practices in our Board.

Halton District School Board

Project Title	ESL/ELL Innovation Project
Description	Halton has continued to experience many students who have limited or no English entering into the school system. While several communities have become quite diverse and many schools have a number of languages spoken openly by the students, this does not preclude there being transition issues for new students entering into Halton. Currently, the Welcome Centre provides initial support to families arriving into the Halton area, but there is limited connection between the schools and the Welcome Centre that can heighten underlying anxieties, insecurities or attachment issues felt by the new student. Once settled into a school environment, many English Language Learners may struggle academically because of the barriers that their limited communication abilities with peers and teachers create.
	We believe if we leverage the virtual communication and collaboration aspects of personalized technology to purposefully create a community amongst students with compatible languages as well as support the transition between the Welcome Centre and the Schools, then new students arriving to Halton will be more successful academically and more engaged.
Context	*Number of students:* 490
	Number of teachers: 130
	Number of schools: 90
	Grades/Program: K-12
Impact on Students	While leveraging the virtual communication and collaboration aspects of personalized technology to purposefully create a community amongst students with compatible languages, demonstrable indicators of learning were evident in the areas of global citizenship, collaboration, and communication.
	Teachers reported that although some students were shy and reluctant to participate, most students were excited to collaborate in the project. Key opportunities for student engagement and true learning from each other were noted as was the value of creating inter-school support and friendships. Ambassador students collaborated with their newcomers students in order to learn more about their interests, concerns, cultures. There were many commonalities between ambassador students and newcomer students with respect to birth country and family traditions.
	Several newcomers who arrived at the Welcome Centre were successful in connecting with their receiving schools and this increased communication eased their concerns about school and supported friendships.

Impact on Instruction	Research has shown students are more likely to succeed in academics if given a chance to think and talk in their first language and teachers who participated in the ESL Innovation Project have been able observe the impact first hand. Additionally, teachers have expanded their portfolio of virtual communication and are now leveraging this in a variety of circumstances.
Impact on System	The HDSB is beginning to consider opportunities to expand this initiative. We are looking at expanding it into our secondary schools, with our International students, with the wider Halton community and connecting ELL students whenever there is a transition in their education, i.e., grades 8-9 or moving from one school to another. Teachers are now connecting ELL Grade 8 students to those in high school to ease the transition to high school and establish connections for the following school year.

Hamilton-Wentworth Catholic District School Board

Project Title	Meeting the Minds of the Mobile Learner - Transforming Learning in Grade 4 Classrooms
Description	The HWCDSB 2016-2017 Innovative Research Initiative was designed to further support student achievement and the acquisition of the Ontario Catholic Graduate Expectations, which encapsulate the Global Competencies. The Initiative was grounded in key learnings gained through past years' Innovative Research Projects and was in alignment with the goals identified within the HWCDSB Board Improvement Plan for Student Achievement and the overall goals of the Technology Learning Fund (TLF).
	This year's initiative will examine the impact that regular access to digital technology, supported by ongoing professional learning, has on teachers' approach to instruction and assessment, the development of learning partnerships, and the degree of comfort with using technology to support professional practice.
	Project teachers were divided into three groups. Each group will participate in six collaborative learning sessions organized to allow teachers time between sessions to return to their classrooms to 'try out' new learnings. Session themes will include Digital Citizenship, Making Student Thinking Visible, Documenting Student Learning, and Immersive Learning Experiences.
	All project teachers are asked to participate in the 2016-2017 Innovation Research Project Yammer Group. Teachers were encouraged to use this enterprise social media tool to connect with other project teachers and share examples of their technology-enabled practices, new learnings, success stories, challenges and/or questions with all project participants.
	Technology will play an integral role in the research project as it serves as the vehicle through which instructional/assessment practices and student learning experiences are transformed.
Context	*Number of students:* 1,432
	Number of teachers: 56
	Number of schools: 48
	Grades/Program: Gr.4
Impact on Students	The Innovation Initiative supported the development of student-student learning partnerships. Focus group data and observational data revealed the collaborative nature of learning partnerships between students to include spontaneous opportunities for mentoring, the sharing of expertise among students, and technology-enabled peer assessment.
	Student drawings revealed a shift in the physical classroom set-up that would

	support collaborative learning structures. Comparison of desk organization in pre and post student drawing analysis showed less classrooms having desks in rows. The grouping together of desks in classrooms further supported the development of learning partnerships. Some classrooms were redesigned completely to support student collaboration.
	The Innovation Initiative supported the development of technology-enabled communication skills among students. Yammer group posts, samples of student work and classroom observations showed that students were able to leverage iPads to effectively communicate their thinking in multiple ways (e.g. images, videos, audio recordings, animations, etc.). In reflecting on their experiences, teachers commented on the value of the accessibility features of the iPad in supporting all students with their learning.
	Digital citizenship instruction was embedded into the project and was evidenced within the project Yammer. Teachers and student co-constructed success criteria for the safe, responsible, and appropriate use of their mobile devices. Students demonstrated a shift towards identifying the iPad as a learning tool and the understanding of how to use it appropriately and responsibly for learning, being critical consumers of digital information.
	One of the key themes to emerge from the Innovation Initiative was the direct impact that the use of iPads had on student engagement. Data collected from student and teacher interviews, as well as from observations, clearly shows the iPads to have had a positive impact on student motivation to learn, student enjoyment of learning, as well as, in student confidence and productivity during learning tasks. A by-product of the increase in motivation and engagement was a demonstrated impact on students' confidence in their learning. For many students the iPad not only supported their learning, but enhanced it.
	Overall, class sets of mobile devices and iPads impacted students' development of global competencies, engagement and learning.
Impact on Instruction	The 2016-2017 HWCDSB Innovation Research Initiative positively impacted teacher practice by increasing teacher comfort level in using technology to support teaching and learning, fostering the establishment of technology-enabled learning partnerships, supporting the development of technology-enabled practices, and developing assessment practices that reflect deep learning pedagogy.
	The greatest gains in teacher comfort included:
	• fluency with digital photographer/videography equipment
	• fluency with virtual field trips
	• fluency with cloud based products
	• fluency with online collaborative tools

	• fluency with robotics
	• using technology to provide feedback
	• using technology to support the creation of authentic learning tasks
	Post analysis validated the teacher self-efficacy findings as results indicated that most project participants are now confident and comfortable with using mobile technologies and integrating them into their teaching strategies and are ready to develop deeper curricular integration skills to engage students.
	Project participation led to shifts in teachers' instructional behaviours. Comparison analysis of pre and post ETP participant survey data revealed transformations in teachers' use of technology in learning and teaching in light of the SAMR Framework. Over the course of the project, there was a large movement away from the integration of technology at the Substitution level. With more teachers integrating technology at the Augmentation level (+20%) and Modification level (+16%), and the emergence of teachers at the Redefinition level (+2%), we can conclude that project participation supported the transformation of learning.
	Data indicated that shifts in teachers' assessment practices occurred throughout the project. Teachers highlighted the role that the iPads play in creating opportunities to use technology to collect evidence of learning that informs practice in a meaningful and efficient manner. This can be attributed to an increase in the understanding of the various ways the iPad allows students to communicate their thinking. The engagement and multi-modal capabilities of the iPad helped support the goals of universal design for learning.
	A key area of learning partnerships where technology impacted the nature of the relationships was in the area of teacher-student interactions. Teachers and students reported a transition to experiences that were more "student led" and where students were provided with the opportunity to become "teachers". As one project teacher shared. The development of teacher-student learning partnerships was also highlighted by teachers when sharing their digital story of change through which they used multi-media (video, audio, images, graphics) to communicate the impact of their involvement in the project.
	The project had a great impact on teachers' comfort level in using technology and technology-enabled instructional and assessment practices to support teaching and learning. It changed practice.
Impact on System	Learnings from the 2016-2017 Innovation Initiative will continue to contribute to plans for system scaling of pedagogically-driven, technology-enabled practices within the multi-year strategic plan, the board improvement plan for student achievement and school improvement plans. Actions that have resulted from this initiative include:

	• Leadership development on leveraging technology to amplify student learning and setting the conditions to create a culture of innovation • New policies and procedures for the deployment of classroom sets of iPads will inform future deployment and management procedures • Sharing of new learnings and best practices with senior administration and central support staff to inform the Board Improvement Plan for Student Achievement (BIPSA) and build capacity in schools • Continued use of a professional development model that incorporates multiple face-to-face small group collaborative learning sessions over time

Hamilton-Wentworth District School Board

Project Title	Transforming Learning Everywhere - Phase Three
Description	HWDSB's vision for 21st Century Learning, Transforming Learning Everywhere (TLE), challenges us to create a culture of engaged learners (staff and students) by focusing on instructional practices being used in our classrooms, accelerated by digital tools. Our goal is to improve the essential skills of problem solving, critical literacy, higher order thinking, in addition to foundational knowledge and skills that are required in the 21st century. Elementary Project: We continue to engage all grade 4-8 classes at seven Elementary. This is the fourth year working with these schools, as in 2013 they were the first set of schools in HWDSB to systematically explore the use of digital devices in the classroom. Focus continues to be on instructional practices supported through 1:1 tablet technology for all students in grades 4 to 8 and their educators. Secondary Project: This is the third year of implementation at one secondary school. All educators and students continue to be provided with tablet technology and are supported through enhanced infrastructure to allow for this innovative delivery model. Special Education: Similar to 2015-2016, all educators and students continue to be provided with tablet technology. Staff continues to engage in professional development on the use of digital tools to support and augment the learning environment for students with learning difficulties. New Pedagogies for Deep Learning: Twenty-four schools in one geographical participated in "New Pedagogies for Deep Learning" or NPDL. NPDL involves implementing change by providing professional development and job-embedded support to create new learning partnerships, define new roles for students, educators and families. During Phase Three, we are expanding this approach to all schools and all classrooms throughout the district by exploring how to make the NPDL Learning Progressions accessible to all educators.
Context	*Number of students:* 19,940 *Number of teachers:* 1,205 *Number of schools:* 103 *Grades/Program:* FDK-12
Impact on Students	Our Transforming Learning Everywhere (TLE) story is framed within "The Chase the Future Initiative". The Chase the Future initiative provides student experience in collaboration with the community and other stakeholders. Project-based

	learning provided authentic real-world assessment for student learning in ways outside of the classroom such as presenting to City Council or through media coverage. Furthermore, through community partnership for project-based learning, students were the stewards to their personalized learning. It is evident that within these projects, students, educators, administrators, system leaders (e.g., instructional coaches) and parents were all engaged collectively. A culminating celebration event was held where students from 50 schools ranging in grades from K-12 shared their innovations with a variety of city representatives, board personnel and their peers.
Impact on Instruction	TLE connects pedagogy to teach students to love learning and teach them how to learn, while providing them with rich classroom experiences. As we are in year three of the HWDSB TLE implementation, we are now entering the initial implementation phase where we are prepared for change, training and engaged in small-scale piloting of strategies, such as Chase the Future to develop capacity across the system. HWDSB has gathered quantitative survey evidence that technology enhances engagement, and now, following the lessons learned this year, we need to use these successes to continue to scale up our TLE efforts.
Impact on System	The learning this year has allowed HWDSB to think intentionally about the next steps in the implementation and monitoring of TLE across the board. In response to the success of the inquiry-based projects, and to scale up beyond isolated pockets of innovation, we are planning a more rigorous research program to elucidate the impact of collaboration and inquiry based learning on student learning.
	Reflections about scaling up sustainable innovation from our TLE efforts this year were emergent within the following dimensions:
	Depth: It is evident that students and educators both went deep into their inquiries that demonstrated change in the nature of the subject matter with effective instruction and co-learning between educators and students.
	Spread: Inquiry-based learning is expected to change the norms of interaction between educators and students, where the traditional teacher/student roles were challenged and altered.
	Sustainability: The projects highlighted our overall board TLE implementation. Many of the projects are iterative, and did not end once the presentation was finished. Community networks were created and sustained through the learning communities beyond the school walls. Administrator buy-in, participation, support, and resourcing was also clear within these projects.
	Ownership: A shift in ownership occurred from the educator as the authority and knowledge did not entirely live with the teacher, but was shared with the students in the project. We did not examine the specific impacts at this time

| | about how these projects and learning have shifted the norms of professional development at the schools. This is a distal outcome of TLE implementation that we hope will be demonstrated as we persevere over the next several years. |
| | In conclusion, according to Dede, Rockman and Knox (2007), achieving true scale is predicated on factors such as leadership style, effective communication, focusing the right resources on the right initiatives, and a cadence of accountable monitoring for impact. |

Hastings and Prince Edward District School Board

Project Title	New Pedagogies for Deep Learning
Description	NPDL is a global partnership and research based approach to leading edge practices that foster Deep Learning accelerated by digital. Deep Learning is measured through student development and growth around 6Cs: Character, Citizenship, Creativity, Critical Thinking, Collaboration and Communication.
	Teachers work to improve their instructional design using new pedagogies, enhanced learning partnerships and learning environments, and by leveraging digital to maximize learning opportunities.
	This is our second year participating in the NPDL Global Project. We have scaled up participation from 7 schools to 8 schools and from 35 to 54 educators. We launched in January of last year and educators spent a significant amount of time learning new language related to the initiative and how to implement new assessment tools.
	Last year's data indicates a significant growth in student acquisition of competency-based skills over the course of 1 learning cycle. Educators are using their data from last year, as well as artifacts from previous learning cycles, to make adjustments and improvements to their lesson design and instructional practice.
Context	*Number of students:* 324
	Number of teachers: 54
	Number of schools: 8
	Grades/Program: JK-12
Impact on Students	Teachers involved in the NPDL Global Partnership tracked 6 Marker students for 2 or more cycles of learning. While over 1100 students were impacted by change in teacher practice, all quantitative evidence is based on marker students. Teachers monitored and tracked student growth using NPDL specific tools, classroom observations, student reflections and student product.
	Trends documented through the Board Improvement Plan for Student Achievement and Well-being monitoring process indicate that there has been an increase in student ownership, empowerment and engagement in learning.
	Qualitative and quantitative evidence indicates a growth in targeted competencies – teachers chose focus competencies based on urgent student learning needs. Through teacher reflection there is evidence that while one competency may be the focus, it is inevitable that there are connections to other competency areas that are naturally addressed and supported through learning opportunities.
	Data on marker students indicates an increase in all competency areas that are a

	focus of the NPDL mandate: Character, Citizenship, Collaboration, Communication, Creativity and Critical Thinking. There are several dimensions for each competency within the NPDL Learning Progression Rating scale, supporting a targeted approach. Leveraging digital is embedded in all competencies. Teachers monitored students in specific areas and also provided overall competency data along the following scale:
	
	 Limited Evidence Emerging Evidence Developing Accelerating Proficient
	
	 Data shows that students moved along the overall competency scales as follows:
	
	   Character: Low developing to high developing
	
	   Citizenship: Mid emerging to mid developing
	
	   Collaboration: High emerging to mid developing
	
	   Communication: High emerging to mid developing
	
	   Creativity: Mid emerging to mid developing
	
	   Critical Thinking: low developing to high developing
	
	 Teachers also tracked the academic impact their change in practice and focus on competency development had on students using pre and post assessments. Of the 136 marker students reported on through teacher artefacts, 72% of students moved up at least one level and 77% of students completed learning cycles with an achievement at or above provincial standard.

Impact on Instruction	<u>Trends</u> documented through the Board Improvement Plan for Student Achievement and Well-being monitoring process indicate: • Increased use of student centered learning (e.g., inquiry) based on authentic learning tasks • Taking risks and trying new approaches in the classroom • Exploring how to leverage digital tools and technology to support learning connections outside the classroom and assessment for learning • Beginning use of triangulated assessment data to make student thinking and learning visible (e.g., pedagogical documentation, video, conversations with students) • Increased use of feedback to students during the learning cycle <u>Practices Worth Sustaining</u> • Providing student choice and ownership of learning through inquiry approach • Leveraging digital to support student learning and feedback • Focus on the process of learning <u>Next Steps</u> • Explore further community and family connections to support learning • Develop, and learn more about, all 6 competencies

	• Continue to provide support through time to collaborate with colleagues
	• Continue to explore purposeful ways to leverage digital technologies
	Data was collected on teacher confidence in the areas of technology-enabled instruction, learning partnerships and assessment practices. A significant shift is visible as teachers grew from not being confident at the beginning of the year to the bulk of year-end assessments landing in the areas of emerging confidence and very confident.
	Technology-enabled instruction
	• Foster student innovation to use digital to deepen learning, create knowledge, and apply digital in innovative ways.
	• Scaffold learning processes using digital.
	• Enable connecting and collaborating locally and globally
	• Use digital to increase engagement and motivation
	Learning Partnerships
	• Take the role of activator or learning
	• Use collaborative processes and measures to engage families with student learning and communicate progress
	• Create a learning environment that is interactive and student centered
	• Create transparent learning goals and expectations
	• Use student voice as a driver for learning design and improvement
	• Use strategies to build partnerships with students and families
	Assessment Practices
	• Utilize a variety of learning and assessment strategies to scaffold and personalize the learning process
	• Foster student access to digital that enables timely and accurate feedback for learning
Impact on System	Strategic Plan and Direction:
	The vision and mission of HPEDSB aligns with the competency development of students through our Globally Minded Learners and Leaders focus. Globally minded graduates see themselves as connected citizens of the world. They apply relevant knowledge and skill to make a difference in local, national and global contexts. This focus is supported in all schools throughout the district and we have worked this year to spread knowledge to parents and community partners about the focus on competency development.
	Sharing the learning in support of scaling up and sustainability:
	Deep Learning Lab - 25 educators participated in the Global Deep Learning Lab this spring and had an opportunity to network with learning partners from around

	the globe. Educators from HPEDSB involved at the secondary level also had an opportunity to share their learning during an Insight Session titled: Growing Deep Learning in Secondary Schools. Some districts involved in the global partnership are struggling with building capacity around competency development and the New Pedagogies conceptual framework in secondary schools. During this session our educators were able to provide clear evidence and artefacts related to their shift in practice and the outcome on student achievement, along with a discussion of successes and challenges.
	Teachers are regularly sharing their innovative practices with colleagues during professional development days to build capacity among teaching staff at schools involved with NPDL.
	School and system educators supported knowledge building with local trustees at a Board Meeting and at a Human Resources and Programming meeting.
	K-12 Leadership NPDL Learning Fair – 16 classroom teachers shared their learning journeys with administrators throughout the district as we introduced the global learning partnership on a wide-scale to leaders in our district.
	Next Steps:
	We have worked with the Global Partnership and will have full access to the entire NPDL suite of tools to support capacity building in the district. These tools support knowledge building, backward design, the assessment cycle, professional learning cycle and serve to identify strengths and areas for growth for students and educators. A focus on competency development through sound pedagogy that leverages digital will continue to be a central focus of Board and School improvement planning.

Huron-Perth Catholic District School Board

Project Title	The HPCDSB Summit Series: Professional Development for Staff and Students
Description	Our board's innovation research project is contributing to improve student achievement and well-being as we are ensuring all students receive access and training on our suite of 21st digital tools. In order to accomplish this, we have created "The Digital Certified Student Program," the "Classroom Summit Series", an "Expanded Blended Learning Training Program," "Blended Learning Networks, and a "Teacher Coaching Program."
	The Digital Student Certification Program will be a staged approach with multiple levels of certification that will help initially to provide equitable access to all students with opportunities to grow technical competencies through connecting, creating, collaborating, committing, and certifying. By leveraging the full power of technology all students can move from entry level technology skills to complex authentic peer-led models for learning. The implementation of this program must be based on the following premises:
	1. all students deserve access to board and ministry provided digital tools
	2. students and classrooms need to develop digital routines and responsible digital citizenship practices
	3. to identify and promote leadership opportunities for students and teachers in the 21st century classroom environment
	4. to create an inclusive learning environment by embedding and supporting special education goals as a part of the blended learning strategy.
	To aid the implementation, modules will be created in the provincial Virtual Learning Environment (VLE). All students will receive implementation information to get them started via an icon on the D2L landing page. However, the real target of implementation will focus on offering all classrooms a Learning Summit and other blended learning supports.
Context	*Number of students:* 3,863
	Number of teachers: 270
	Number of schools: 17
	Grades/Program: K-12
Impact on Students	Our board's innovation research project contributed to improving student achievement and well-being as we were able to ensure many students received access and training on our suite of 21st century digital tools. We have also continued to invest in a variety of programs.
	The "Digital Student Certification Program" continues to be a staged approach with multiple levels of certification that help to provide equitable access to all students with opportunities to grow technical competencies through connecting,

	creating, and collaborating. In these "Classroom Summits", students can move from entry level technology skills to complex authentic peer-led models for learning. In the development of Global Competencies, we have found evidence of learning in the following areas:
	Students have participated in many coding sessions this year that encourage critical thinking skills. Using the suite of tools we have provided and the associated training, students are able to engage in deeper learning where they are required to think critically and make decisions to further their learning.
	School hosted STEM nights have exposed students to emerging technologies, and how these technologies are being used in real world applications. This promotes innovation and creativity.
	Protocols and workshops encourage students to become independent thinkers. Embedded within our blended learning strategy is a focus that emphasizes the need for teachers to ensure their students understand the learning process. Our summit series accredits student "digital experts" as those who have furthered their digital learning on their own accord.
	We encourage students to be collaborative when using technology. Throughout our program, students are regularly interacting with others (within the classroom, across our board, and beyond) to develop new learning. Through this "connectivist" learning approach, new knowledge and skills are developed.
	Our project encourages the use of a number of different technological devices. Exposing students to many different types of communication strategies has shown positive results. Video conferencing has proven to be a popular and effective way for students to learn from many diverse communities.
	Our quantitative data validates that our "Blended Learning Strategy" continues to impact the achievement of students in a number of ways. We have hosted over 43 classroom summits this year, as well as visiting every grade seven and eight classroom to encourage the use of TVO's homework help site as part of our renewed math strategy. From these visits, over 1000 students and staff have been directly impacted. This represents approximately 25% of our board's total student population who have participated in our "digital student certification program" this year.
	We also continue to fund the purchase of technology for student use. Board wide the TLF has now funded the purchase of over 3100 Chromebooks and 850 iPads which are predominately for student use. This approaches a 1:1 ratio of devices to students for our board. Finally, we have maintained funding of last year's purchase of Read and Write for Google (assistive technology).
Impact on Instruction	This year the "Expanded Blended Learning Training Program" has included three main aspects. The first is introductory training in blended learning strategies and

	technology. We continue to focus on ensuring that training in good pedagogical strategies occurs before training in technology. We also focus on communication and collaboration strategies within the classroom. A new area of training for this year has been to include a greater emphasis on how blended learning can be used within the "math classroom" and digital tools that are useful in mathematics instruction. The second aspect of our program is to offer advanced training opportunities for teachers. This training give teachers professional development into the more advanced features of the Google suite of education tools and how they can be used effectively to promote global competencies. We have also offered professional development on coding and robotics both internally and externally. We have had 31 new teachers from both elementary and secondary participate in our "Blended Learning Training Program" this year. Training is differentiated to meet the needs of elementary and secondary classrooms. Training also includes a "Blended Learning Kit" for each teacher consisting of 15 Chromebooks and 2 iPads.
Impact on System	Our TLF is developed in accordance with our Board's strategic plan. As a school board, we continue to host a system wide technology and leadership summit. This year's summit was held at the University of Waterloo Stratford campus. Teachers were encouraged to select eight non-traditional leaders within their schools to attend the day. Our Advanced Training Opportunities encourage leadership and have reached over 70 teachers this year. Our Google Certified Educator training included 45 teachers, we had 17 teachers attend training on how to use coding in the classroom, as well as 8 teachers who studied the use of coding and robotics in the classroom. In summary, over 87% of our elementary and 86% of our secondary teachers have accessed either the ministry licensed VLE (Brightspace) this year or an alternative VLE (such as Google Classroom) as part of their blended learning teaching. We also have approximately 77% of our staff and students using the Google Suite of Tools for Education on a regular basis for communication and collaboration. Through both current and previous TLF's we have been able to implement our "Blended Learning Strategy" with over 3500 students. Our innovation project has allowed us the ability to both place technology directly into the hands of students that need it, as well as providing opportunities for our teachers to learn how to combine good teaching with this technology.

Huron-Superior Catholic District School Board

Project Title	Teaching and Learning in the 21st Century - Delving Deeper to Continue to Impact Student Achievement Through Digital Learning
Description	Our board will focus on job-embedded training and support for our classroom teachers, through the placement of several Special Assignment Teachers/Tech-Sperts - Technology and Learning. Classroom teachers and the Special Assignment Teachers will work on providing students with enhanced learning opportunities with technology, with a focus on numeracy and literacy. While doing so, it is expected that some of the 21st Century / Global Competencies will be embedded within the curriculum.
	We will be using technologies such as Google Apps for Education, online portfolios and a variety of apps to provide students with the opportunity to explore their learning further and to support the development of 21st Century/Global Competencies.
Context	*Number of students:* 4,800
	Number of teachers: 240
	Number of schools: 21
	Grades/Program: K-8 Numeracy and Literacy, Gr.9-12 all subjects
Impact on Students	Google Apps for Education (GAFE) Usage Data
	During the 2016/2017 school year, our board completed a full roll out of Google Apps for Education (GAFE) to all staff and students. Furthermore, GAFE was one of the primary technology tools used to foster the development of competencies.
	Data analysis indicates that most users within our board are using the suite of applications on a regular basis. Approximately 83% of registered users have begun using the suite of applications. The number of documents created within the suite of applications continues to increase month by month.
	Student Sample Group Questionnaire Results
	To provide a greater level of analysis on student's interactions with technology and the development of the global competencies, a questionnaire was provided to a student sample group. Based on the analysis of the data collected, intentionally planned use of technology had a positive impact on student learning, engagement and achievement.
	Some gains have been made in the awareness and development of global competencies among our elementary students. Elementary classroom teachers were provided the opportunity to select the competencies they intended to embed into their curriculum with the support from the SATs and Tech-sperts. Data collected from the questionnaire provided to our student sample group indicates that students felt they had the opportunity to develop competencies most in three of the six areas: creativity, collaboration and communication.

Impact on Instruction	The Technology and Learning Project has played a critical role in building teacher awareness and capacity on the global competencies and the effective use technology within the classroom. Many of our teachers have indicated that they are regularly using the suite of applications within GAFE to communicate more effectively with their students, provide timely descriptive feedback and engage in learning opportunities that otherwise would not have occurred, had the technology not been present. Teachers have specifically noted that the use of Google Classroom as web presence for their classrooms has assisted students in staying organized, on task and providing access to collaborative spaces.
	References to our baseline data, which includes teacher surveys from 2014/2015 and 2015/2016 and analyzing a teacher sample group questionnaire from this year, indicate that teachers are becoming increasingly confident with the technology-enabled classroom instruction. Some teachers have also experienced a change in their assessment of student work by using some of the available tools. Most notably, this change has been noted in providing timely descriptive feedback through some of the applications available in GAFE.
	The results from the teacher sample group questionnaire also indicate that teachers are becoming increasingly aware of the benefits to establishing learning partnerships. This includes collaborating and sharing with their colleagues through the suite of Google Application.
Impact on System	Digital Learning Steering Committee
	Our Board made it a priority to establish a committee dedicated to providing direction and guidance on digital learning on items such as hardware and software acquisitions, planning for professional learning on digital learning and technology, and setting areas of priority and focus related to digital learning and technology. By including members from various groups, we have ensured that all stakeholders are invested in creating a sustainable model for our board.
	The Digital Learning Steering Committee was also instrumental in the design of our hardware refresh cycle. By assessing the needs of teachers and students, the committee provided board administration with different models on our hardware refresh cycle. The assessment of needs included collecting observations from classrooms and teacher and student surveys on the use of technology in the classroom. Through this process, the committee was able to present a 'hybrid' model of devices for classroom usage, including Chromebooks and iPads for students and Windows-based laptops for teachers and Early Childhood Educators. This model leads to scalability, as it greatly increases the number of devices available to students and complements the recent deployment of GAFE. We have double the number of devices in our schools and now provide a 1-to-1.5 ratio of devices to students.

| | Scalability and sustainability were also important factors with the committee's suggestion and Board's approval on the licensing of Read & Write assistive technology for all staff and students. It was suggested that the software be provided to all of our students as it may improve the learning for all. Our board was also able to improve our network infrastructure and internet connectivity by increasing board-wide bandwidth and increasing the number of wireless access points. |
| | The global competencies have been identified at our Digital Learning Steering Committee as an area of priority for our students. Overall, board-wide awareness regarding the global competencies has increased among all members within the board. Furthermore, we are actively exploring options on how to best embed the competencies within the curriculum to provide our students with opportunities to develop strengths in each competency. |

James Bay Lowlands Secondary School Board

Project Title	Improving Student Literacy and Success through Technology Use
Description	This round of the project will be to complete infrastructure upgrades and acquire technology to allow a full blended-learning environment that is authentic to student needs. Based on the success of technology use last year, all teaching members of staff have created online work spaces that they are using in a daily basis. This has allowed staff and students to remain engaged in their classes even when absent and provide new ways to assess and evaluate students using GAFE and other cloud-based, collaborative apps.
	Along with infrastructure upgrades, we are also continuing our acquisition of Chromebooks to allow for a near 1-1 rollout. With the technology acquisitions is also the app Read & Write, an assistive technology software. This app allows students to do speech-text and text-speech, but also allows students to learn research skills, practice reading, simplify pages for easier reading and provide audio comments in Google Apps rather than written comments. Based on the success of students using it for accommodative purposes on the OSSLT last year, it was decided that the features of this app would prove valuable to the entire roll, students and staff alike.
	It is anticipated that the increased use of technology will allow for greater authentic learning opportunities, better assessment and evaluative approaches, more opportunity for professional development, online learning and engagement, and greater success in school.
Context	*Number of students:* 150
	Number of teachers: 20
	Number of schools: 1
	Grades/Program: Gr.10 ENG2P and ENG2D
Impact on Students	Over this school year, many improvements have been made to infrastructure at NLSS. This has included the purchase and installation of higher capacity access points that allow for a greater coverage of the school as well as faster connection speeds.
	In a recent survey 77.8% of those surveyed responded that they use technology in their learning everyday with another 20% responding they use it weekly. These results are up from a 2016 survey. Technology is being used by 97.8% students on an almost daily basis in 2016-2017. In addition, 100% of students responded that they use Google classroom as part of their learning online. This has had a profound impact on student usage as demonstrated with the following quotes from those polled:
	A large focus for this year has been to increase conversation and collaborative

	opportunities for students as they explore deeper meaning in their learning. Using Google Apps, this has opened new doors into achieving these expectations.
	In terms of digital citizenship, students have become more aware of their role as members of the digital community. As well, student access to apps using school technology is more restricted in an effort to showcase proper modelling of digital citizenship approaches as well in preparation for success outside of school.
	A focus for this year, building on last year's trial with students writing the OSSLT, has been the introduction of Read & Write's availability to the entire student population. Students used the app for their EQAO assessments this year, the results of which we will receive at a later date.
	As part of the school promotion of numeracy, critical thinking and problem-solving skills in conjunction with the Renewed Math Strategy, the Grade 9 and 10 math courses integrated more technology into everyday usage. The use of Chromebooks and iPads allowed students to explore new concepts. In addition to the new Chromebooks introduced this year, the purchase of a new 3D printer has allowed students to explore and create new items in the technology class.
	In preparation for the OSSLT, the students in 2P and 2D courses had the opportunity to use technology to enhance writing skills. Through use of the collaborative features of Google Docs, students could share their work with colleagues and teachers in a manner that allowed feedback and opportunity for discussion based on their writings. The goal was to see an improvement in OSSLT scores using technology in everyday instruction and learning. The results, when using the successful/unsuccessful criteria that EQAO provides, did not appear as though technology had an impact as only 1 of the 17 students writing were successful. Upon closer inspection of the OSSLT results, 7 of these students scored 285-295, equivalent to a level 2+. When looking at these students' Grade 3 and 6 EQAO results, they scored on average a level 1+/2-. When using these results, students rose one-half to a full level, demonstrating growth.
Impact on Instruction	A survey was distributed to staff. All respondents reported they use technology in their practice at minimum 2-3 times a week with 45.5% of those responding they use technology every day.
	This impact is evident in that 80% of those responded feel comfortable or very comfortable using technology in their practice. The remaining 20% of respondents feel that they are not as comfortable as they do not have an opportunity to use technology every day, but wish to work in incorporating more moving forward.
	Assessment methods have changed. This is evident in the variety of ways in which teachers can now assess students, such as in-doc, through email, checklists, rubrics and voice feedback utilizing Read & Write.

	There was opportunity for teachers to attend technology conferences with three attending the GAFE summit in Kitchener in April, 2017 and two members attending CONNECTEd in Niagara Falls in April 2017.
Impact on System	The expansion of technology use has seen a change in the system-level. Technology is now a part of the School Improvement Plan as it's recognized as being integral to student learning across all subjects.
	As part of the PLC strategy, all staff took part in a How to Learn Math course offered by Stanford University. The purpose of this course was to develop new strategies to engage students in problem solving, critical thinking, and sharing their learning using technology. Along with this course, staff took part in bi-monthly meetings to share new learning and strategies in a collaborative setting. A large focus of these meetings was how technology can be integrated into professional practice in student learning as a means of promoting the skills above.
	Board staff and members have been set up with a Google account. This will allow for greater access to the same features that staff and students access. This will allow for board-level members to gain new technology skills and to have a better understanding of the technologies used by staff and students. A library revamp into a library commons is currently being implemented that involves the removal of the old stationary desktop computers to be replaced with a better environment that allows for exploration, collaboration/discussion and further development. Professional Learning Community groups this year focused on improving student conversations within classroom settings.
	Communication with members of the school community continues to be primarily through email, but the impact of social media led to the further development of the school's Twitter account, as well as the discussion to establish a Facebook page. This will allow for further engagement and transparency between school and parents/guardians/community members as well as an opportunity to showcase student learning.

Kawartha Pine Ridge District School Board

Project Title	New Pedagogies for Deep Learning and Innovations Inquiry
Description	Both New Pedagogies and Innovations Inquiry focuses on achieving deep learning through the development of the 21st Century Competencies. Teachers involved in these projects determine their student needs around the competency and then plan for learning to occur that will help support student development of the competency. Teachers leverage technology to allow students to research, document and showcase the learning that occurs through the inquiry process. In the past few years, KPR has looked at designing tasks to support deep learning and developing student's progressions in the 21st Century Competencies. This year we are continuing with this work and focusing on how teachers can plan and implement inquiry in the classroom with a focus on local and global issues.
Context	*Number of students:* 1,643 *Number of teachers:* 70 *Number of schools:* 18 *Grades/Program:* K-12
Impact on Students	In November, a call went out to the system asking for applications for innovative ways to integrate technology in the classroom. In their proposal, teachers were asked to indicate the global competency they wanted to develop in their students. They needed to reflect on how they could develop these competencies through the infusion of new technology. While a wide variety of technologies were purchased, we are using a robotics focus for this report. Teachers who purchased robotics kits, indicated that students were more supportive of one another, took on leadership roles and listened to each other. When learning to code both online and with robotics kits, students developed greater perseverance for tasks. One teacher indicated that 'this has transferred to their academics, they are now able to stick with other tasks in class'. The use of robotics and other technologies also increased their collaboration, critical thinking and communication. Students have indicated that they able to apply the skills of risk taking and perseverance in coding to academic tasks. Students also recognize that it brings out their creativity, while teaching them tools that they will need for their future.
Impact on Instruction	When teachers acquired new technologies for the classroom, results clearly showed that the pedagogical practices started shifting. Teachers looked to teach the curriculum with a global perspective and to bring the outside world into the classroom. Students were challenged to solve real life problems. Teachers became more of a partner in the learning as compared to their teaching before receiving the technology. Students had more choice and responsibility in

	their learning. It was clear that teachers were on a journey together with their students.
	Using technology also had a significant impact on the assessment practices of the teachers. One clear trend is that the use of technology has opened up the concept of what counts as evidence to teachers. There is more acceptance of products that aren't written, but that have used tools to allow for voice and creation to show evidence of learning.
Impact on System	The Kawartha Pine Ridge District School Board Strategic Plan places great importance on creating innovative learning environments accelerated through the use of learning technologies. Including a focus on modern learning in the strategic plan has made this a system focus.
	Through this initiative, successful applicants were challenged to construct a modern learning environment and to develop deep learning competencies in their students. At a recent principal meeting, principals were involved in a modern learning environment. They co-created a list of 'look-fors' for classrooms that are considered modern with an emphasis on the deep learning competencies.
	In looking forward to next year, teachers have indicated that they would like to 'go deeper' with the use of technology they have received. One teacher plans to integrate Skype sessions with First Nations communities, others plan to use different apps as a way to differentiate how students are able to demonstrate their understanding of a topic.

Keewatin-Patricia District School Board

Project Title	Creating a 21C Teaching and Learning Organization
Description	The focus of our project is to continue the implementation of the transformational work of creating a District School Board that is a 21C Teaching and Learning Organization. This transformation occurs at the system, school and classroom/learning space level. At the system level, we are continuing to work with Pearson Learning around using efficacy to transform all aspects of our leadership work in setting direction, focus and leadership for the Board. At the school and classroom level we continue to provide the resources and supports to principals, teachers and students to effectively move instruction, assessment and learning forward. The role of technology is crucial in this process. At the system and school level, platforms such as Encompass provide the tools to use leading data, improve communication, implement assessment for and as learning and provide seamless integration for various student management functions for both teachers and principals. Providing mobile technology for teachers improves efficiency in planning and communication with colleagues, parents and students. Personal student Chromebooks provide equity for all students in the Board and are an effective tool for enhancing learning.

Four 21C instructional coaches provide the instructional and assessment support for teachers and principals. These coaches meet teachers and principals where they are at and provide professional learning and supports.

Our outcomes lie in our Board's BSIP goal around independent learners in a 21C century world and includes the building of global competencies and the development of the whole student. |
| Context | *Number of students:* 5,000

Number of teachers: 800

Number of schools:

Grades/Program: |
| Impact on Students | KPDSB's technology-enabled innovation has continued to support our "Students Come First" board goal, phrased around the question, "What is happening at the student desk?" In the November 25th report, our research partner noted, "The kids come first mantra is more than just a phrase; it has resulted in cultural and behavioral shifts in thinking and practice in schools and board offices." We see this same shift occurring in technology-abled practices.

Classroom learning has continued to move along the SAMR model with teachers broadening their understanding of technology use and effective instructional practices. Making connections between classroom learning and the world has become more the norm than the exception. Many teachers have growing |

	awareness of their students' capability to accessing real-time information. This has increased engagement and amplified interest in learning. An understanding of growth mindset has continued to spread and students see themselves as learners in discovery of new knowledge.

Achievement in our ConnectEd (synchronous and asynchronous delivery program) speaks to the impact on our secondary students. Using Google Hangouts, students in our six high schools learn remotely from specialist teachers who are skilled in their particular discipline.

Students with identified learning needs use the Google platform to work within their IEP accommodations and modifications. Assistive technology apps are increasingly viewed as an integral part of student learning.

Upholding and promoting student voice has continued to be a mainstay in our work. Collection of ideas through various methods (Twitter chats, Google forms, surveys, etc.) has motivated students to become active members in their learning. |
| Impact on Instruction | Teacher practice continues to be the backbone of our technology-enabled work and a key indicator of how the BSIP goals are achieved. Student learning conditions are continually refined as teachers examine their work and consider how improved delivery may impact success.

Observations of students' experience with technology demonstrate our growing expertise. Task design, differentiated instruction and evolving assessment practices reveal a changing classroom for our learners. Collecting and recording data has been strengthened through the use of technology. We see their learning throughout the process and respond accordingly with opportunities that both challenge and spark their interests.

Teachers previously reluctant to move from their traditional practices are willing to use new technologies. Use of Google Classroom has increased at the secondary level. This platform supports efficient delivery and collection of assignments, thereby increasing the opportunities and time that teachers can conference with small groups, provide one-to-one assistance and authenticate the learning environment.

Realigning and focusing our direction on curriculum, instruction and assessment with visible, explicit connections to 21st century competencies has prompted teachers to examine instructional approaches. Opportunities to develop and use critical thinking skills include in-depth research, informed thinking and problem solving.

Parent communication and involvement is integral to our student success and teachers report a high level of accessibility through technology-based means. Use of parent features in Google classroom and Encompass means parents are |

	informed of their child's learning in a timely manner. Teacher and parent relationships are supported by technology with many parents expressing a high degree of satisfaction in their child's classroom learning.
	Collaborative, professional learning amongst our teachers continues to expand. Central staff focused on aligning current research on student learning with effective technology use. Some early evidence of this work indicates teachers are rethinking the direction their technology use has taken. Encapsulated within the Renewed Math Strategy work, teachers examined how online games (and related sites) must be strategically identified and planned for to ensure time on task is relevant and authentic. This focus will continue throughout the 2017-2018 school year.
Impact on System	Central supports, PLCs and cross-panel collaborative work has continued to create a "21C Culture of Learning" that KP can confidently move forward in. Stakeholders actively participate in strategic planning that synthesizes the needs of students, teachers and other KP employees.
	This Spring, administrators identified their learning needs as instructional leaders of their schools. Amongst the identified needs was a strong proponent of technology. In response to this, special assignment teachers attended Principal/Vice-Principal Learning Communities to share their expertise and build capacity with both content and relevant technology.
	System organization has been supported with increased awareness of the need to communicate amongst ourselves. A math portal website was created to support the RMS initiative and provide valuable resources to teachers. Beaver Brae High School and Red Lake District High School have developed comprehensive intranets which ensure effective, efficient and timely communication within their schools.
	KPDSB's 2016-2017 partnership with Keewatinook-Okimakanak Board of Education (KOBE) paired KP teachers with teachers in remote northern communities. Technology enhanced communication, provided opportunities for sharing expertise and supported learning amongst both groups.
	Our continued work to support FNMI learners has required efficient and timely use of technology. Our Four Directions Graduation Coach work throughout the Board uses Encompass to create an efficient and seamless communicative system with teachers and relevant adults to ensure that teacher response and instruction/assessment response is based on knowledge and understanding of each individual students.
	Aligning this learning with "21st Century Competencies: Towards Defining 21st Century Competencies for Ontario" will be integral to 2017-2018 school support. KP's central staff will support this work with both administrators and teachers.

Kenora Catholic District School Board

Project Title	Impact of Learning Technologies
Description	NWCDSB/KCDSB are collaborating on research related to educational technology for teaching and learning. The purpose of the collaboration is to share research resources and research results to improve the use of technology in schools that have a strong positive impact on students, specifically relating to student achievement, student engagement, and 21st Century Skills. The two boards have explored shared interests and have worked with an external researcher to develop research questions and processes relevant to each board. The boards will use the research results from both boards to inform next steps for using technology for teaching and learning. Within KCDSB we'll work with teachers engaged in various technology implementations (i.e. 1 to 1 Chromebooks) to determine effective instructional strategies.
Context	*Number of students:* 968 *Number of teachers:* 126 *Number of schools:* 5 *Grades/Program:* Gr.4-12
Impact on Students	Students reported that the most frequently used technologies in school were Chromebooks, Google Docs, Google Classroom, Google Slides. Least frequently used were iAnnotate, Go Animate, Desire 2 Learn. Student interviews highlighted their use and enjoyment of coding, robotics, and virtual reality technology for learning. Students were asked to identify their favourite technology and why. • 19% of students reported that Chromebook was their favourite technology because it is easy to use, you can type faster, you can touch the screen, they don't waste paper, because it is versatile, and they have daily access to it. • 16% of students identified Google products as their favourite because they can see all their work in Classroom, if they miss a day their assignments are available to them, they can share it with their teacher and teacher can help them out, because they can create aesthetically pleasing schoolwork, and it automatically saves your work. Students reported that using technology improved their research skills, their ability to create something new, ability to explore a new idea, ability to do school work with other students, and ability to communicate with teachers (50%). Student interviews highlighted the collaborative nature of problem solving around the use of technology for learning. Further, video interviews suggested that the technology is transitioning from a toy to a learning tool. Final comments from students included comments on the positive links between

	technology and future jobs, they wanted to bring their own technology to school or have school assign one to them for the year, and they identified potential risks of relying on technology too much (e.g., laziness, instability).
	Teachers reported that technology has a positive impact on their students at school. The areas most positively impacted are student collaboration, creativity, student effort on tasks, independence, interest and motivation. Technology had the least positive impact on participation in sports or clubs, learning self-regulation, and attendance.
Impact on Instruction	76% of teachers reported receiving professional development or other support for using technology at school. The professional development opportunities mentioned were: half-day workshops, learning offered on PD days, and accessing IT people with individual questions.
	Teachers reported that they are developing or proficient at:
	• Managing the use of technology in the classroom for learning.
	• Using technology to create learning experiences that align with provincial curriculum, student information, and educational technologies.
	• Using technology to access your professional learning network.
	• Using technology to create new learning environments (e.g., online).
	• Using educational technology to communicate/ collaborate with students, parents, and teachers
	Teachers report that they are in the initial stages of learning to:
	• Use technology to develop new roles for teachers and learners (.
	• Use technology to collect and manage data related to learning
	• Identify, use, and evaluate technology to support the learning process for all students through ongoing professional development.
	Teachers' most frequently used technologies in school on a daily basis were: Google Drive, Chromebooks, projectors, cell phones (42%). Least frequently used were iPad apps and some online applications like coolmath.com. The Google Suite is the most recently used technology, which over half the teachers reporting that they used it in 2106.
	Teachers reported that technology had a positive impact on their ongoing professional learning, technology-enabled instruction, their resources for planning learning for an individual student, assessment and evaluation of student work, learning partnerships with students.
Impact on System	The research collaboration between Kenora Catholic District School Board and the Northwest Catholic District School Board had an impact on our systems. The opportunity to work together allowed us to explore similarities, differences, and share lessons learned.

	• Although both school boards have Chromebooks and iPads available to students, the technology that students reported using at school this year varied by school board. For example, the most frequently used hardware was the Chromebook at KCDSB and the iPad at TNCDSB. This is likely because of the historical implementation and order of selected hardware.
	• Teachers at each board varied in the technology they used most often. At KCDSB Chromebooks, projectors, and cell phones were used most frequently. At TNCDSB Smartboards, iPads, and laptops were used most frequently.
	• In our collaborative research meetings, the strengths and challenges of technology clubs and moving technology into regular classroom practices was a topic of shared interest. This area may be explored in the future.
	• There was consistency between the two school boards in the student appreciation of cloud-based technologies that allow them to share, communicate, and collaborate with students and teachers.
	• There was consistency between the two school boards on the value that students placed on learning with technology and the impact it had on them.
	• There was consistency between the boards on the curriculum areas where educational technology was used weekly or daily. These curriculum areas were computer technology, French, language arts, math, and Ojibway.
	• Teachers at both boards reported that the main impact of educational technology on students was increased engagement, interest, motivation, and learning creativity. The achievement area most impacted was information technology and then language arts.

Lakehead District School Board

Project Title	Inspiring Technology-Enabled Teams
Description	We will enhance student achievement and develop global competencies using technology to expand how, when, and where learning takes place, authentically engage our students, and provide students with the skills to excel in a digital age. Focused training supports the use of technology to support teacher practice and student learning to: • document student thinking and learning • enhance anytime/anywhere learning • foster student inquiry • increase collaboration • support assessment for learning A particular focus this year will be on the role of Computational Thinking in K-8 Classrooms. System wide training of targeted groups will take place to connect coding, and robotics to student learning. Another focus will be particular grade levels that are receiving enhanced dedicated hardware (Grade 3, Grade 7, Grade 8, and Grade 9 Communications). Specific tools used to support the above include: • Explain Everything App & Reflector • Office 365 – including: OneDrive, Yammer and OneNote • Skype and VROC • Desire2Learn Learning Management System Training will be led by school based IT champions and system supports. Training will be focused to increase the understanding of global competencies and modern teaching and learning models, understanding that pedagogy is driving change in classrooms with technology as a support.
Context	*Number of students:* 9,000 *Number of teachers:* 660 *Number of schools:* 30 *Grades/Program:* K-12
Impact on Students	Students have given feedback that they are increasingly given access to digital tools and resources when they are having difficulties in class. Students are reporting that a wealth of online learning resources increases their ability to be self-motivated learners. Students stated that technology is being used to connect learning to student aspirations, to their life goals and the world around them. Students increasingly use technology to reflect on their own learning progress, give feedback and

	engage in learning with their peers. Fifty-seven percent of surveyed Grade 12 students agreed that they use technology in school to connect what they are learning with their interests and what they want to become and that they are encouraged to share their accomplishments online.
	Students are reporting that they are benefitting from increasing access to digital feedback on their learning. Sixty-three percent of surveyed Grade 8 students agree that technology is used in their classes to help them assess their progress, how they are doing, and that they receive feedback in a variety of forms (peer feedback, written, oral, video etc.).
	Students relate that adoption of a system wide Bring Your Own Device (BYOD) initiative has allowed them to learn with tools and resources that fit their needs.
	Eighty-one percent of surveyed Grade 12 students report that they are allowed and invited to bring their own devices (laptops, tablets etc.) in class to help them learn in their classes.
	Innovation research funding has significantly supported English Language Learners using mobile devices and translations apps to support their transition into English speaking schools using translation apps and visual supports to communicate student learning needs.
Impact on Instruction	A pre-survey from May 2014, and post-survey from May 2017 indicates significant changes in teacher practice with respect to technology integration.
	Teachers reported that technology is helping them to differentiate instruction to meet the needs of a variety of students. Survey data indicates an 8 percent increase of teachers that use technology to differentiate lessons and activities with a total of 87 percent of teachers agreeing that they use technology for this purpose. Teachers have reported increased use of technology to help students with critical thinking skills including searching, evaluating and organizing information from a variety of sources. Teachers have reported that the use of mobile devices and tablets has increased their ability to adapt their lessons to support student inquiry and exploration.
	Teachers reported an increase in the use of technology to communicate learning resources with students and parents.
	Teacher attitudes towards student-owned devices (BYOD) and their usefulness in the classroom to support learning have increased. Survey data indicates a total of 63 percent of teachers agreeing that they encourage the use of student-owned devices in their classrooms for educational purposes. Teachers reported that technology helped them change their assessment practice, and that it enables them to make specific observations regarding student work to collect and share evidence of learning. Teachers reported an increase in the use of technology to communicate with parents.

Impact on System	Our previous projects focused on the newly created role of "Information Technology Champion," a lead teacher at each school committed to 21st century teaching and learning and charged with demonstrating its potential to staff and students. To increase scale, we have assembled these leads into Technology Enabled Learning Teams that included multiple educators as well as an administrator from each school. The Technology Enabled Learning Teams have contributed to improving and sustaining of pedagogically-driven, technology-enabled practices by building leadership teams in every school. Teachers, administrators and early childhood educators took advantage of additional voluntary learning opportunities through the board Inspire program. Through participation in this program, participants received a board-owned laptop or tablet for professional use after attending 8 voluntary after school sessions.
	A continuing theme throughout the various projects has been encouraging school based leadership in the area of technology enabled learning and teaching. Through I.T. Champions and now Technology Enabled Learning Teams we have enabled school based leaders to enhance student achievement and develop global competencies through the use of technology to expand how, when, and where learning takes place. This theme has led to many self-initiated, voluntary and job embedded training opportunities.
	Our system continues to be committed to integrating technology-enabled learning. Because of our activities, it is evident that student learning in our schools is being facilitated by skilled staff incorporating sound instructional practice in safe and caring learning environments.

Lambton Kent District School Board

Project Title	"What impact, if any, does a professional learning program focused on technology integration have on leadership practices, teaching pedagogy and student learning?"
Description	During the 2015-2016 school year the Innovation Project focused the use of technology to document to the technology integration on leadership practices, teaching pedagogy, and student learning. In a tri-level research project within one grouping of schools, student artifacts being studied pre/post professional learning opportunities, teachers' articulation of their beliefs regarding education and learning pre/post professional learning opportunities and evidence of change in teachers' pedagogy, and leaders' articulation and implementation of their vision for a culture of innovation.
	An additional group of schools was included in the 2016-2017 to replicate the process from the previous year and to expand the scope of the first group of schools involved in the research. The experienced group of schools serve as mentors to the newer group of schools. The Apple Foundation Training is provided to all participants within the project. Both groups are working through three modules to facilitate the learning of teachers and administrators to better understand the role that information technology plays in the pedagogical documentation of the learning.
Context	*Number of students:* 3,391
	Number of teachers: 143
	Number of schools: 12
	Grades/Program: FDK-8Literacy and Numeracy
Impact on Students	Critical Thinking: Student learning benefitted from the leadership moves that principals implemented in supporting teachers in their professional development. Students were provided with rich tasks and opportunities to learn from and use technology to express their learning in the classroom. Students were better empowered to ask questions and seek the answers to those questions about topics of interest and real-life problem solving.
	Learning to Learn: Increased understanding of the SAMR model and the transformation of classroom activities engaged students in the learning opportunities that were improved by the enhanced pedagogy of the teaching staff.
	Communication and Collaboration: Students benefit from learning from their teachers but also from each other through collaborative challenge-based learning projects. One student with selective mutism was able to express his/her voice through the use of technology. Staff and parent were engaged in discovering how technology could open up learning for this student.

Impact on Instruction	Professional Growth: In many of the self-reflections, teachers recognized that with support and guidance they were able to push themselves to improve their instruction through the use of technology and, being able to document their journey, enhanced their ability to embed program and curriculum into their practice.
	Development Learning Partnerships: Through the collaborative nature of the research model, educators were better able to articulate their learning through interaction with peers and facilitators. By enhancing the leadership abilities of teachers, there was transformational change in the quality of the tasks.
	Communication: Through the refinement of technology skills, teachers were able to become more confident in communicating with students, peers and parents in a variety of electronic formats. Educators were better able to articulate their own learning and recognize the learning of their students. By enhancing the variety of ways students could converse, demonstrate and produce products that reflected understanding, teachers also learned how better to communicate.
Impact on System	Leadership Development: Through the intentional actions of principals, teachers at Vanguard and Spotlight schools have further strengthened their pedagogical practices through the lens of the SAMR model in developing rich tasks. Data analysis of the ETP gathered information allowed principals to reflect upon their decision making and determining their next best move. Going forward, the learning from elementary students, teachers and principals involved in this project will be informative as the Technology Enhanced Learning Program (TELP) moves into the secondary schools next year.
	Literacy and Numeracy: It is the hope that the use of technology will enhance instructional pedagogy and become a catalyst for better student outcomes with rich curriculum tasks. Teachers are better able to provide more variety of instructional methods to engage students into learning that reflects individual skills and interests with the use of technology.
	Special Needs: Individualizing the learning process for students by providing supports for where they are with their learning levels the playing field for students. Technology as a learning tool can assist students and teachers in gaining confidence to take risks and push themselves to learn more than initially thought possible at the start of their journey.

Limestone District School Board

Project Title	Going Deeper: Embedding Technology in Mathematics
Description	The Limestone District School Board Project, Going Deeper: Embedding Technology in Mathematics supports Board initiatives on elementary mathematical instruction in Grades 3 through 6. Technological hardware, software, on-going professional learning and continued pedagogical support is being provided to selected classrooms, based on equity of access to mobile technology, educator mindset, student learning and well-being. Classroom teachers in the project are being provided with seven iPads (with one dedicated to the educator) and release time for professional learning support from the Connected Technology teacher and Program Team to allow for 21st Century technology-enabled practices in mathematics.
	Through professional learning (in the form of workshops, co-plan/co-teach sessions and one-on-one mentoring) that models deep mathematical thinking leveraged with technology, our educators' instructional strategies and assessment practices are becoming more responsive to the needs of our students. Technology will be the tool to allow students to make their thinking visible, demonstrate creativity and innovation through research-based professional learning opportunities focused on sound pedagogy and grounded in the SAMR model. Technology enabled collaboration of student efforts, teacher-student learning partnerships, assessment practices to support deep learning pedagogy and learning partnerships among our educators is a focus for this project.
Context	*Number of students:* 1,850
	Number of teachers: 78
	Number of schools: 13
	Grades/Program: Gr.3-6, Mathematics
Impact on Students	Providing opportunities for our educators to become comfortable with their devices and focus on how to teach mathematics through the processes, while leveraging technology, is creating a culture of greater student ownership over their learning in our schools.
	Not only has there been significant improvement in the area of engagement, but this project has also contributed to greater communication of the mathematical strategies to solve problems and the visual representation of those strategies through the use of manipulatives. By embedding high-yield instructional strategies in all of our professional learning opportunities, and highlighting virtual manipulatives and opportunities to make learning authentic for students, we worked on creating a culture where students are able to make choices in how

	they demonstrate their learning. Students are taking the opportunity to explain how they know a concept rather than simply stating an answer. Our educators have told us that they can truly see what their students know when conducting these activities in their class.
	The global competencies are well represented in the classrooms participating in this project. Communication in math was one of our primary goals for this year. Communication has been demonstrated by our students in many different contexts through the use of presentation applications. They are learning and selecting the virtual manipulative that makes sense to them when solving problems, and communicating learning in a variety of ways.
	Students are working on more complex problems and creating innovative solutions to them. They are creating videos and reviewing materials for one another to watch and learn from. They are persevering much more when using virtual manipulatives on the iPad than they do with pencil and paper tasks and they look forward to sharing their creations with other classes. Many of our classes are moving into blogging as a way for students to reflect on their learning and constructively question others on their learning.
	This initiative has allowed us to lower the ratios of devices in our schools, exposing students to technology regardless of the predominant socio-economic status of the surrounding community. Educators have been able to use the devices to hold conversations with their students and support them in ways they would not have been able to before. Students are also able to work together to support new students and make them feel more comfortable in the classroom.
Impact on Instruction	Our goal is to provide well planned professional learning sessions that model critical thinking and the mathematical processes while leveraging technology. This year we are really noticing how our educators' instructional strategies and assessment practices are shifting towards 21st century methodologies.
	When we are reflecting and assessing this project for success, we are looking at postings to our group by our educators, the feedback they are giving us throughout the year, the work that they are completing in their classrooms when we visit, and comparing our pre-survey and post-survey results. Some of our greatest impact evidence shows the growth of some participants from basic substitution activities with a Number Line app to Explain Everything videos incorporating fractions. Success is monitored on an on-going basis by our team.
	We are providing support in a variety of ways: from creating an online community, to classroom visits to support educator and student learning, to arranging visits to classrooms outside of the program who exemplify the integration of technology into their pedagogy, and to Skype chats to help with any issue at all. The ongoing communication we have had with members in this

	project has been essential to see the growth that some educators have experienced and to see where support is necessary for others.
	One of our goals is to deepen the face-to-face learning partnerships that educators have together within the program. Our hope is to continue with more of a collaborative inquiry style project where educators spend the year going more in depth with a topic and this approach would be more differentiated to where they are in their own learning. We have also found from our data that some educators are ready to move forward and lead the groups in the year to come. We have many educators who are highly effective in utilizing technology to support student learning and they have joined leadership groups within the system.
Impact on System	This project has easily integrated into our professional learning for the Renewed Math Strategy with many sessions being held for math leads and then participants in this program. Practices that are beneficial for our participants are being shared throughout our district as they are focused on sound pedagogy and innovative assessment methods. Cross-district partnerships are being enhanced through our Office 365 group site as well as online through social media and at staff meetings. Our educators are developing a sense of confidence in their projects and are sharing their knowledge with others at their site, or new sites when they transfer locations.
	Through our after-school learning series and our LDSB twitter chat, we are differentiating the styles of professional learning that we can bring to our system and make the learning more sustainable over time. Our after-school learning series are facilitated by educators within Limestone as a way to promote leadership from the middle, and promote growth of the other educators around our system. Our facilitators are also encouraged to present their innovative practices and technological strategies at our Summer Institute as another way to share their effective pedagogical practices with others.

London District Catholic School Board

Project Title	Scaling a Culture of Collaboration: Shifting System and Individual Beliefs about the Virtual Learning Environment (vLE)
Description	Our TLF longitudinal project (Project A) continues to be built on the premise that if we provide technology (hardware and software) and professional learning to our Lead Learners (Elementary/Secondary Teachers and Librarians) then they will deepen their engagement with and learning of the effective use of the technology and student engagement and learning will improve. Each Lead Learner in all of our elementary and secondary schools has been provided with an iPad and HP ProBook. Three full day professional learning and networking sessions are provided to the Lead Learners. Success indicators include: • Integration of technology in the classroom to facilitate learning opportunities for students and 21st century competencies • Development of teacher-librarian, teacher-teacher, and teacher-student partnerships enabled by technology • Development of enabled by technology • Enhanced student engagement and global competencies in Lead Learner classrooms • Enhanced student learning in Lead Learner classrooms Through implementing a graduated release model for their colleagues, our expectation is that our Lead Learners will be comfortable, confident and proficient enough to share their knowledge and use of technology with their colleagues.
Context	*Number of students:* 1,491 *Number of teachers:* 63 *Number of schools:* 54 *Grades/Program:* JK-12
Impact on Students	The TLF Lead Learner baseline survey and post-surveys contained a number of questions related to the impact on student engagement, learning/achievement and learning partnerships as perceived by Lead Learners. We also asked Lead Learners to indicate to what extent the project impacted global competencies in students. As a result of their involvement, Lead Learners reported: • an increase in the extent to which teacher-student learning partnerships and librarian-student learning partnerships were enhanced • enhanced real-world authentic learning opportunities for students, as a result of their use of mobile devices and the vLE

	Lead Learners were also asked about the impact specifically their use of mobile devices and the vLE on student 21st century/global competencies. All global competencies were enhanced however, global citizenship, communication, collaboration and critical thinking achieved the highest gains.

Lead Learners participated in a Technology Enriched Learning and Teaching Virtual Learning Fair. This online learning module provided an asynchronous opportunity to explore and celebrate the professional learning experiences submitted by colleagues as a platform for learning new ideas and effective practices towards impacting student learning and achievement at their school.

Multiple lead learners noted that students are drawn to technology and therefore are naturally more engaged in learning when technology is integrated. There was the consensus that technology could be used in a variety of meaningful ways to facilitate engagement and learning.

Lead Leaners also indicated that technology enhances students' overall learning. Specifically, teachers indicated that they use different technologies to check and assess student understanding to ensure students have learned concepts before moving on and/or to help identify what needs to be clarified to deepen learning and understanding. Technology supports learning by providing more timely feedback to help students check their own understanding.

They cited technology as enhancing students' creativity and innovation in several ways in their artefact submissions, discussion posts, and reflections. Technology provides students with more variety/choice and therefore encourages students to be creative with the selection of how they present their learning.

Technology provided students with equal opportunities and a vehicle for closing the inequality gap amongst students, e.g., alternative options for shy or quiet students to participate, providing students who were unable to attend class the ability to either remain included in activities, remain up-to-date on what was done in class. |
| Impact on Instruction | Over the course of the 2016-17 project, Lead Learners have also become increasingly more comfortable in sharing a basic use of the mobile devices along with Office 365 and the vLE with their respective school staff. Overall, and on average, Lead Learners have become increasingly more proficient in the use of Board enabled technology resources.

From the Fall 2016 to the Spring 2017, Lead Learners have increased their use of Board enabled technology resources to share assessment and instructional practices, and similarly, teacher collaboration has also been enhanced.

Lead Learners most frequently indicated that the TLF opportunity, and technology in general, has enhanced the frequency and quality of staff collaboration. Teachers also noted that the ability to use technology increased their |

	collaboration through online opportunities with other staff members, especially using Skype. Many Lead Learners also collaborated with other staff members, providing them with additional teaching and/or lesson ideas that they have, or plan to, implement in their own work.
	Many lead learners referenced technology and the TLF opportunity as enhancing their role as either teacher or librarian. Some cited technology as simply expanding their resources and therefore increasing their teaching ability. Others emphasized that technology simplifies mundane tasks making their job more efficient and providing them with more time to focus on role related tasks.
Impact on System	The 2016-17 project provided an opportunity to continually sustain, as well as scale up the effective use of technology, so that it becomes enculturated and common practice within and across our elementary and secondary schools.
	As an illustration of scaling and spread, we are also seeking the consent of our Lead Learners to share their diverse array of exemplary technology-enabled practices and resources that currently exist within LDCSB schools. These results represent both depth and breadth of what educators and librarians can accomplish individually and collaboratively towards engaging students and enhancing student learning and achievement along with the development of 21st century global competencies.
	In alignment with our TLF 2016-17 project, we also engaged in a collaborative partnership with Apple. The project consisted of a research study which explored the question – 'How does technology enabled professional learning and ongoing access to mobile technology impact instructional practice and student engagement in Primary mathematics'. A mixed method approach to data collection (i.e., pre-post surveys, student drawings, interviews and focus groups and an observational protocol).

Moose Factory Island District School Area Board

Project Title	Building Capacity - Ministik School TLF 21st Century Innovation Research Project
Description	The purpose of this project is to increase engagement, participation and academic achievement in Special Education Services, Cree Language & Culture and Mathematics/Numeracy, and also continue to integrate technology into Health and Physical Education. Lessons will be delivered to determine the baseline data. After reviewing the baseline data, the project lead and the research team will devise an action plan best suited for their students. Technology will be integrated into the lessons and activities. Students will have the opportunity to use iPads to complete lessons, case studies, and questions in a way that is engaging and new to them. The focus will be on students in primary/junior and intermediate divisions. We are hoping to see student engagement/participation and student success improve with the use of technology based lessons and activities in Cree Language & Culture, Math and Health and Physical Education.
Context	*Number of students:* 300 *Number of teachers:* 9 *Number of schools:* 1 *Grades/Program:* JK-8
Impact on Students	This initiative continues to impact students' engagement positively. More students use iPads and Google Drive regularly during the week. Students are becoming more familiar with routines and understand expectations. Students like to use the iPads and Google Drive because it is something familiar to them. In Physical Education class, more assignments are being completed and submitted compared to assignments only using paper and pencil. Students using iPads in Physical Education class are exploring movie making and recording skilled movements. Students are able to research sport and rules quickly. Mathematics participation has increased when using iPads. Every student can work independently using the iPads. Students enjoy typing on the iPads and are staying engaged. Time on task has increased throughout the school year and students are getting more accomplished in less time. The IXL app allows for differentiation, each student can work at their own pace and appropriate grade level. When teachers used paper and pencil math problems, students would work independently for less time than when using the iPads. Special Education students have received additional training with their specific Assistive Technology (Chromebooks) and the use of Google Drive and Google Read & Write. Students worked towards individualized challenges which kept them interested and engaged.

Impact on Instruction	The Health and Physical Education teacher has implemented the use of iPads and specifically chosen iPad applications, as well as Google Drive and G-Suite programming, during individual and/or small group instruction, consolidation, and assessment portions of lessons. Teachers from each division have integrated math lessons into their regular math routines.
	Teachers have opportunities to use their smart boards to deliver lessons and content. Teachers who are not very familiar with the iPads are starting to use them more and learn more about them. Most teachers find them very useful. Our move to Google Drive and G-Suite is also increasing teacher comfort level and expertise with the use of technology to support professional and student learning. The technology is helping teachers grow and is challenging them in new ways. This is an important piece, teachers are reflecting and assessing their own teaching strategies. Teachers can look back and see what worked for them and what they will do differently next year. The project is keeping teachers current and the students are interested in using the technology.
Impact on System	This initiative has changed the way we have organized our school. With iPad carts available for teachers to sign out at different locations throughout the school, and increased the amount of assistive technology for students on an IEP, lessons can be mobile and travel throughout the school with access to Wi-Fi. Our school board has also invested a significant amount of funds into updating our access to the internet. Classes are able to take iPads in the school yard, look at different ecosystems and take pictures and videos and upload them instantly to their classroom file folder. These opportunities were not possible in the past.
	Technology is allowing students to gain hands-on experiences with devices that are relevant to them. It has encouraged students and teachers to learn and grow together. With the implementation of G-Suite and Google Drive, data collection, file sharing, and communication is significantly increased. For example, the use of Google Hangouts has improved our access to professional learning and supports that would have not been available to us before.
	The school is still working towards consistency with technology-based learning but there has been a tremendous amount of growth by both students and teachers in 2017.

Moosonee District School Area Board

Project Title	Using Technology to Engage Students for Literacy and Numeracy Skills Improvement and Engage Teachers in Pedagogical Documentation
Description	This project is focusing on enhancing 21st Century global competencies with teachers and staff. This will enable teachers and staff to model the competencies within their classrooms, the school, and the community. Applications such as Cloud-based educational applications (Google apps), Seesaw and other tools provide opportunities for feedback, assessment, collaboration and communication. The second part of the project focuses on enhancing student 21st Century global competencies for personal growth and skills development. Building on what teachers have modeled in the classrooms, students will increase their effective use of technology devices (Chromebooks, iPads, laptops) to improve their literacy and numeracy skills. Results from achievement assessments such as DRA (Developmental Reading Assessment), EQAO, and student report cards from Second Term (February - June 2017), will be analyzed to note any improvements in literacy and numeracy skills.
Context	*Number of students:* 252 *Number of teachers:* 14 *Number of schools:* 1 *Grades/Program:* ELK-8
Impact on Students	Confidence and Risk Taking: With regular use, students were able to build their confidence in using technology in various subject areas. This was made possible through one-to-one deployment of devices available to students in Grades 7-8. Student engagement and involvement increased as a result. Technology has become an everyday staple of the Grades 7 and 8 classes with increased use in all apps, such as Google Docs, Google Slides, Google Drawings and Kahoot. Fosters Well-being: With technology usage, stress and anxiety have been reduced. Students' increased success encourages them to participate and engage in classroom activities. When provided a task using technology, there is a higher rate of completion. Innovation/SAMR: Students have moved quickly from substitution into augmentation by creating a dynamic range of products and ensuring technology is used in their everyday learning. Examples of this shift include incorporating media into their presentations, using code to alter the appearance of websites within the web browser and using online tests and quiz tools providing immediate results and feedback. Authentic and Inquiry-based Learning: Students are able to generate ideas branching off from initial topics by using the variety of sources available online.

	Collaboration/Communication: Online collaboration tools allow for students to work together to create meaning within their learning. Self-regulation: Students are able to use technology as a means for trial and error in a manner that promotes problem-solving and coping strategies. Transition to High School: As the secondary school uses Google Classroom and Apps for all courses, it is important that students gain technology literacy skills that will allow of secondary school success. By learning these skills in elementary and having an opportunity to practice, students will enter secondary school with better skills and practice, enabling them to focus more on the content than on having to learn the skills.
Impact on Instruction	Developing partnerships: In the classrooms with Chromebooks (Grades 7-8), as teachers are learning to use and apply the technology more, it opens doors for collaborations and discussions surrounding technology integrations into everyday practice. Using Read & Write, teachers can work with students in the development of their skills in various areas. Assessment practices: Staff are able to provide new assessment methods using the technology and apps available. For math, students who have test anxiety can alternatively demonstrate their learning and understanding using other methods, such as Explain Everything or other apps. Using Google Forms as a test: Students feel more comfortable as technology allows them to think as they type while also providing the teacher with an interface that enables them to easily view data to determine next steps. Teacher pedagogical and assessment practice has changed using iPads, A large part of the project this year has been in how teachers are able document student learning through means other than traditional pen/paper when using technology. One tool that has had profound impact on documentation is the Fluency Tutor integration within the Read & Write app. This app allows students the opportunity to record themselves reading a passage that they can then send electronically to their teacher/EA or support. For math, staff focused on a new form of tracking student success using technology apps such as iXL. This app, which has the strands of the Ontario curriculums built into it, allows staff to set up tasks built around current learning. In a game-based environment, students are able to work their way through tasks that adjust to their skill level and success. This data is collected and reported back to the staff in analytics that allow for further review where students are succeeded and where they need support. Google Classroom has allowed staff members to share student progress via email updates at the end of every week.

Impact on System	Numeracy/Mathematics - Select staff members took part in an online course offered by Stanford University. This course introduced many new concepts involving problem solving and growth mindset delivered through technology. Concepts learned in the course have been implemented into practice as technology gains a larger footprint in system planning.
	Literacy - Technology is used to practice and prepare for EQAO assessments for students requiring assistive technologies. Other literacy assessments (CASI, OWA, DRA) are enhanced using AT, allowing access for all. Apps and strategies in use include Read & Write, alternative availability (PDF), interactivity, document cameras, Fluency Reader.
	Leadership Development - Administration is willing to expand their understanding of the role of technology in system/school, building consistency. Methods of doing so include offering PD and staff empowerment opportunities.
	Policies/Procedures related to EdTech - All staff and students have an email, Google classroom being used for internal communication, encouragement of EdTech use daily, ongoing support/PD, technology use agreement/understanding, empowering responsibility through a sense of ownership.

Near North District School Board

Project Title	Adaptive Technology to Support Success in Mathematics: Blended Learning in the Primary Math Classroom
Description	For 2016-17, our approach is two-fold. We are continuing the work we have done to establish and move forward with both Technology for Learning and Technology for Teachers, and supporting teachers in a variety of ways determined at the school or personal level. We are also continuing a research study of adaptive technology for learning and to inform assessment in our primary math classrooms. This is a significant addition to our work across the system, and holds promise as a model for future technology-enhanced teaching, learning and assessment initiatives. We will be incorporating a variety of new data collection processes as well. Technology plays an integral role in this project, including cloud and wireless technology, and home use. It also depends on effective and consistent use of devices by both teachers and students.
Context	*Number of students:* 1,300 *Number of teachers:* 90 *Number of schools:* 27 *Grades/Program:* Gr.2-3 Mathematics
Impact on Students	The global competencies that were measured in this study are critical thinking and communication. In order to examine the level to which students are able to transfer skills from Dream Box Learning (DBL) to "unplugged" computational tasks, we developed a brief assessment to measure how the students select and apply appropriate tools and strategies to solve grade-level computational math questions. This enabled us to observe whether the students are making informed decisions, connecting and transferring their learning, and engaging in authentic learning. In our research, we also looked for information and data on DBL's ability to deepen mathematical/ conceptual understanding using personalized tools that build number sense and fluency. We measured students' ability to transfer success from the digital environment of DBL to solve "unplugged" computational tasks using paper, pencil and hands-on manipulatives. We also observed students' willingness to take risks and apply their learning in a different context. Our study examined students' selection of appropriate tools and the creation of visual representations to communicate their thinking and justify their solutions – in both the digital world of DBL and the off-line environment. Our research showed a positive link between use of DBL for the completion of 4.5 lessons per week or more, and both strategy selection and accuracy. Students

	who completed 4.5 lessons or more demonstrated greater accuracy in their math responses, and had chosen more sophisticated strategies, moving from counting to working with numbers.
Impact on Instruction	In our study, we were interested in fostering teachers' comfort level with a variety of instructional strategies and approaches. We looked at the level to which:
	• Teachers have become comfortable in a digital Learning Environment
	• Teachers are in various stages along a continuum of adapting their pedagogical practices to a blended learning environment
	• Teachers are using diagnostic information to inform instruction
	• Teachers are leveraging digital feedback to plan personalized instruction
	As well, the use of DBL as part of the primary math program built teacher-to-student learning partnerships. Teachers had the opportunity to sit at the student's shoulder, to help clarify problems or explore how a given activity "works." The study also had an impact on assessment. One of the main features of DBL that might alter or augment assessment practices is the ability to see the progress of every student, every day, and respond to student needs accordingly.
	Our views regarding PD that is focused on DBL have changed and evolved over the course of our second year in this study. We no longer feel that the most important PD model is focused on DBL. We have become more precise in where we are positioning DBL. When our Math Facilitator is in schools, DBL is not the focus; the in-class experience of math teaching and learning has taken priority. The professional learning has stopped being solely about DBL. Instead it grew into an exploration of Fosnot's Landscape, Lawson's Phases, and strategies such as the concreteness fading continuum.
	Teachers gained a stronger theoretical understanding of math pedagogy, and are working to transfer this knowledge back to the classroom. Teachers are now better able to make connections between DBL tools and the larger picture of math learning and teaching.
Impact on System	System-wide professional growth opportunities have occurred in connection with the project. During January 2017, participating teachers attended a full day of system-wide professional development featuring DBL support. The sessions involved hands-on learning in DBL and the teacher Dashboard, and discussions about pedagogical practices that might evolve through the use of DBL in a blended learning setting. Approximately 30 teachers have participated live so far, with others able to access the webinars online after the fact.
	School-based instructional supports are provided on an ongoing basis by the Board's Mathematics Facilitator and by the five System Vice-Principals in the Families of Schools (FOS VPs). This support is ongoing, provided upon request,

	embedded in classroom practice and personalized to the individual needs of teachers and students.
	We believe that the key to systemizing the innovation is to ensure that use of a tool such as DBL is aligned with developmental math work as a whole, across the Board.
	Our professional learning has made a shift from using the tool (DBL) to understanding the mathematics. We now have a greater system-wide understanding of the intentions behind the activities in DBL, and can make more connections to face-to-face classroom activities. Our Renewed Math Strategy for our Board, thinking intentionally about how to support our Math Lead Learners in each school.

Niagara Catholic District School Board

Project Title	Effective Integration of Technology to Foster Transformational Learning
Description	We recognize that any system wide implementation is only successful if it is supported by professional development. This year, we have hired two K-12 digital learning coaches, who have specific focus on numeracy and literacy in addition to the effective integration of technology to support student learning.
	In addition, we continue to develop the technology enabled learning of our digital lead learners at all our schools. For the last six years, we have been working with teachers at each school to provide training on the latest technologies, the latest methodologies and approaches to effective technology integration in their classroom and schools.
	Last year, we developed a Google site, a Google+ collection and a Google drive containing resources for educators on how to integrate technology effectively in their classroom. We feel a comprehensive review of the location of the training resources as well as how to locate Ministry Digital Resources.
	This is our second year in our system wide deployment of G-Suite (formerly called GAFE) and distributions of Chromebooks to support learning in elementary schools. The majority of the Chromebooks that will be deployed will be based upon teacher submissions on how they intend to integrate technology in their classrooms to advance student achievement and improve student learning.
	We have purchased the SMART Learning Suite license for all of our SmartBoards. It allows us to install the software across all board provided systems as well as provide at home installation rights for staff.
	In conjunction with our Special Education Department, we have coordinated training for staff on how to use assistive technology. Read & Write has been purchased for all staff and students.
	In addition to curating resources to support digital discipleship, we have coordinated with the Office of Religious Education to develop a plan to integrate technology into our faith formation and student learning.
Context	*Number of students:* 630
	Number of teachers: 22
	Number of schools: 57
	Grades/Program: Gr.6-12
Impact on Students	Data Concerning Global Competencies
	Many of our educators in their surveys and conversations indicated that the use of G-Suite, Chromebooks and other technologies nurtured the development of all of the global competencies. The two global competencies frequently witnessed were communication and collaboration.

	Communication was frequently witnessed because many of the educators identified literacy as a learning gap. We tracked the influence of Texthelp Read & Write app for Google. The Assistive technology has an extremely important technology role in increasing opportunities for student voice. It allowed primary students to be more self-sufficient and better able to communicate with their teacher and fellow students.
	The change in instructional strategies and approaches used by teachers to help students learn represented a change in class mindset, where the global competencies of learning to learn/ self-aware and self-directed learning are more evident. The survey data show 85.3% of elementary students being involved in more self-directed learning, compared to 79% of secondary students. 100% of elementary teachers and 81.8% of secondary teachers indicated that students improved their self-directed learning.
	We provided Chromebooks to all our elementary and secondary faith ambassadors. Under the caption "What does faith in action look like" we asked educators to reinforce the principles of digital citizenship with students and provide students opportunity to demonstrate the principles. Global citizenship was a specific focus with our Digital Discipleship initiative.
Impact on Instruction	Instructional Strategies and Approaches
	When using Chromebooks in the classroom:
	• Allows for more inquiry based learning and greater student independence
	• Students seemed more responsive to more difficult tasks through the use of Chromebooks
	• The use of G-Suite and Chromebooks helps organize and motivate students to take control of their own learning and take risks to uncover further research
	Learning Partnerships
	• Increased the amount of communication between teacher and student. Furthermore, it provided more opportunities to assess for learning. As such, there was as increase in metacognition and more precision when it came to planning.
	• Students collaborate better with one another while having access to real world situations .... easy to provide student feedback and have them get it immediately no matter what the time was or day.
	We averaged 2201 daily Chromebook logins, with a peak of 3013 and a minimum of 122 daily Chromebook logins. This does confirm that teachers and students are regularly using Chromebooks as part of their daily process.
	Assessment Practices
	• Our survey responses indicated a trend to performing more diagnostic

	assessment using tools such as Google forms to inform instruction. Teachers also used video and audio as part of their assessment strategy.
	• Assessments were more efficient as data is collected quickly and organized through sheets. … Self-assessments and peer assessments were much more readily utilized considering the efficiency of data collections.
Impact on System	• System support – Hires of two K-12 Digital Learning Coaches to assist in training educators on effective technology enabled learning as well as support other departments to integrate technology in all their endeavors
	• Report to the Committee of the Whole of NCDSB, for the impact on the G-Suite and Chromebooks on effective technology enabled learning.
	• Purchase of Read & Write from Texthelp as an extension to Google for UDL initiatives in cooperation with special education department.
	• Professional development at different levels including senior administration, Digital Lead Learners at each of the schools.
	• Providing access to the Google Summits in Niagara as well as Waterloo and the ASET conference for assistive technology and the classroom.
	• Many of the schools have aligned with School Improvement Plan based upon the Strategic Initiative Model.

Nipissing-Parry Sound Catholic District School Board

Project Title	Coding to Learn
Description	Our action research this year will provide teachers with professional learning opportunities to include coding as a means to foster student learning using a collaborative inquiry framework to improve student learning, student engagement and teacher learning in Mathematics.
	Our innovation research focus for 2016-2017 has an explicit focus on building computational thinking skills through coding using a variety of tools. Teachers have been provided with professional learning community time (PLCs) to investigate how coding can impact student mindset toward problem solving and student engagement on mathematics learning. Specifically, teachers will be provided with central as well as school-based release time with the goal to develop mathematics learning activities that incorporates coding.
	An outside consultant has been sought out to be a critical partner in our coding to learn journey. The consultant will be supporting our teachers throughout the year, facilitating both face-to-face and online learning opportunities for our teachers. We also have a small group of teachers focusing on the integration of new technology in the FSL classroom, with the intention to captivate the attention of students and have them become more engaged in the learning process. These teachers will also be learning about coding, and will be developing learning activities for both mathematics and language lessons.
	Teachers will assess the student learning experience (engagement) and achievement throughout the developed learning activities in both Mathematics and FSL classes. Teachers will also monitor their journey throughout this experience for the impact on their professional growth and how the integration of coding has transformed their teaching practices.
Context	*Number of students:* 275
	Number of teachers: 14
	Number of schools: 8
	Grades/Program: Gr.2-8 Mathematics and FSL
Impact on Students	This initiative has impacted student engagement, learning, achievement and the development of global competencies to a great degree as measured through teacher anecdotal observations, student survey results, testimonials and achievement data.
	As a new tool for learning, students were consistently engaged in learning tasks that involved coding. The biggest impact that teachers noticed through their observations was that they were seeing students who wouldn't normally be involved in learning tasks, were suddenly participating in various forms.

	This new tool for learning has had a direct impact in fostering global competencies. For example, as most of the coding tasks involved group work, students showed improved communication and collaboration skills. They shared their expertise, communicated their thinking and ideas, asked questions and took turns in the various roles that coding in groups required.

Coding provided students with a new and exciting way to problem solve. When students are asked to complete a task with paper and pencil, solutions are often determined by completing a formula, process or other form of learning that is directed by the teacher. Coding has no one defined process that students are prescribed. Teachers are providing a means for students to experience failure, problem solve (or debug) solutions to their learning tasks, in itself promoting an environment rich with creativity and innovation.

As a result of integrating coding into instruction, the quality of student work increased as evidenced by teacher testimonials and the actual student evidence of learning. Teachers concluded that this was as a result of students being more resilient in completing tasks and willing to 'stick with it'. |
| Impact on Instruction | Our inquiry focused on deepening the understanding of how coding can be utilized as a vehicle for instruction, learning partnerships and assessment practices. It is important to note that coding within instruction was a new area of professional learning for most teachers in our collaborative inquiry. This initiative has impacted teacher practice to a great extent as evidenced by a participant survey focused on instructional growth, as well as observations made during classroom visits and professional learning sessions, conversations as captured during debriefing sessions of student videos, and products (teachers sharing evidence of student tasks and student engagement).

The impact of our innovation research inquiry on teacher practice and professional growth as it relates to technology-enabled instruction became increasingly evident as our learning progressed over the year through the seamless integration of coding skills within the instructional framework across content areas. Coding skills/tasks were not facilitated in isolation, but used as a means to demonstrate the understanding and achievement of expectations and provided various modes for communication of an idea. Seventy-three percent (73%) of the teachers indicated that the intentional use of coding has impacted their teaching immensely.

Learning Partnerships

As coding was introduced as a new skill this year, teachers were more inclined to collaborate with others. In planning for this project this year, our goal was to focus on the use of coding to enhance learning of math-related curriculum. Teachers worked leveraging the power of newly-adopted Google for Education Suite tools such as Classroom, Drive Docs and Hangouts. Without these tools, such learning |

	partnerships would not have been possible beyond the classroom walls in an effective manner.
	Seventy-three percent (73%) of the teachers indicated that the intentional use of coding has impacted their teaching immensely. Teachers were able to collaborate in groups to develop learning tasks that focused on the integration of coding to help support student learning, in real-time using Google Docs and Slides.
	Assessment Practices
	Teachers shared with us that the integration of coding into learning tasks has impacted their assessment for, as and of learning practices. Sixty-four percent (64%) of the teachers indicated that the intentional use of coding has impacted their assessment practices immensely.
Impact on System	Our Board's journey through our "Coding To Learn" Innovation Research focus provided a rich opportunity to continue to build upon the solid foundation for our system to scale up and sustain pedagogically-driven, technology-enabled practices that is rooted in sound assessment for and as learning practices. Our innovation work this year served to develop an awareness, understanding and introduction to the development of coding skills at the elementary level.
	In addition, our research this year continues to support and build upon our Assessment For and As Learning focus in our Board Improvement Plan For Student Achievement (BIPSA -3 year plan).
	Our action research this year provided teachers with professional learning opportunities to include coding as a means to foster student learning using a collaborative inquiry framework to improve student learning, student engagement and teacher learning in mathematics. Teachers have been provided with professional learning community time (PLCs) to investigate how coding can impact student mindset toward problem solving and student engagement in mathematics learning.
	Our system-wide collaborative inquiry served to form a strong foundation on which to build a sustainable model of teaching and learning. Our teachers and students were supported by our Technology-Enabled Learning and Teaching Contact and Student Success Leader.
	This innovation focus will also be expanded next year through a Teacher Leadership and Learning Project in one of our schools. We also plan to expand the scope of building coding skills to each school and our secondary school through making connections between schools and teachers who were involved in this year's Coding to Learn Innovation focus. This initiative has also contributed to our scaling up in our system by continuously building capacity of our educators at the elementary and secondary level to share their instructional and assessment practices enabled with technology in the area of coding.

Northeastern Catholic District School Board

Project Title	TOPS: Transforming our Practices for Success
Description	The purpose of our project is to determine the effectiveness and impact of the implementation of our standardized platform, as well as to continue NCDSB's educational technology phase training initiative for all staff members, and in turn, students. We are continuing to measure the skills acquisition of core applications adopted by NCDSB, and tracking the progress of technology usage in classrooms via surveys to gather qualitative and quantitative data. These applications include the board's launch of our existing Learning Management System, now revamped and rebranded as eHUB, fully integrated with our G Suite for Education apps. We will also continue to build capacity with the peripheral supports we have put into place in terms of hardware, for example, the LCD projectors in every classroom that did not have a SmartBoard. In terms of software, we are continuing to build capacity in using the Google Hangouts video calling/chatting platform for the purposes of collaborating and enhanced communication within teams, and creating virtual learning opportunities for our students. NCDSB's Ed Tech champions will be provided training by the Ed Tech team on the eHUB, and will in turn train staff members and students on how to log in using the new single sign-on solution. This will streamline the user experience. eHUB is designed to be a "one-stop shop" for all learning materials and Ministry resources for teacher and student use. It will also be utilized to deliver professional development content, mock EQAO and OSSLT tests and include a resource sharing platform dubbed the "Educator Network". NCDSB is a G Suite for Education school board, and will continue to utilize all Google tools. eHUB is integrated with G Suite, therefore teachers and students will continue to use these apps for teaching and learning and will be supported through our Ed Tech champion training network..
Context	*Number of students:* 2,174 *Number of teachers:* 144 *Number of schools:* 14 *Grades/Program:* Gr.4-6, 9-12
Impact on Students	The TELT-DELC extracted reports from the eHUB to compare usage rates of students prior to our official platform launch and total usage leading up to June of this year. The eHUB Usage –There has been an increase of 39% overall. Secondary users showed an increase of 48% overall. Both the board-wide launch and Ed Tech champ initiative demonstrated a clear impact on student use. As we move forward, long-term use monitoring by the TELT-DELC will show impact on student

	learning as the platform is utilized in their classrooms over time.
	The Walk With Us project is a digital storytelling project where Indigenous secondary students learned a variety of technologies, including various Google apps in order to support their community mapping and storytelling efforts, and utilized Google Hangouts and LCD projectors to connect with experts in photography, virtual tour building software, and storytelling for training, as well as their Chromebooks.
	Prior to this project, team members had not used these types of technologies. In a pre-survey, when asked about their feelings using this new technology, results showed mixed feelings with some nervousness and apprehension. In a post-survey, all team members felt excited about the technology, and would like to learn more. Our goal of "collaborating with colleagues, community partners and project partners from around the world via video conferencing" was met. In the post-surveys, team members unanimously agreed that the learning provided by Google Hangouts (GHO) was beneficial, and 100% of the students who responded felt that the use of these communication tools (GHO, Twitter, Google Classroom) were effective.
Impact on Instruction	A survey via Google Form was administered to staff members following a PA day, where the platform used to deliver course content was the eHUB. The majority of responses were positive, which is encouraging, and something we will continue moving forward. Next steps, according to some of the staff responses, could be to focus on how the day of learning is scheduled, and how much online content participants are expected to complete during allotted times.
	NCDSB's Program Team has also used eHUB to house online learning spaces to promote resource sharing and collaboration between teachers within school communities.
Impact on System	As part of our plan to increase the use of digital resources, Chromebooks and the LCD projectors, we needed a place where all students and staff could have quick and easy access to the many resources that were available. Earlier this year, we began working on plans to create the eHUB using the provincial Virtual Learning Environment.
	Once students and staff enter the eHUB they have access to dozens of digital tools and resources that they can use in their classes or anywhere they have internet access. One key factor in ensuring students and staff had further open access to all of the digital resources was to integrate or create pass-throughs to as many of the resources as possible. Therefore, most of the resources found in the eHUB do not require any username or password. This includes a deep integration to Google Apps for Education that allows students to access their Google Drives without leaving the eHUB.

	The response to the eHUB has been very positive. Usage of the eHUB has more than doubled across the Board. Having these tools and resources in one place for easy and quick access has had a great impact on students and teachers. Past issues with accessing the eHUB (too many logins/passwords) and not knowing what software they have rights to or how to access the software have been addressed with this platform.
	As we plan for the future we will create screencasts to highlight many of the various digital resources that exists in the eHUB. As part of our plans moving forward with the Ed Tech Champ initiative, we will continue with phase training during the next school year as we focus on more tools found in the eHUB that will have an impact on teacher practice.
	eHUB will be used as the platform to house digital literacy resources, both interactive and informational, and will be posted in the Educator Network to further support the use of these online learning spaces. Our hope is that these efforts will increase 21st century skills and will continue our transformation of learning and teaching at NCDSB.

Northwest Catholic District School Board

Project Title	Impact of Educational Technology
Description	Northwest Catholic and Kenora Catholic School Boards are collaborating on research related to educational technology for teaching and learning. The purpose of the collaboration is to share research resources and research results to improve the use of technology in schools that have a strong positive impact on students. The two boards have explored shared interests and have worked with an external researcher to develop research questions and processes relevant to each board. The boards will use the research results from both boards to inform next steps for using technology for teaching and learning.
Context	*Number of students:* 591 *Number of teachers:* 38 *Number of schools:* 5 *Grades/Program:* Gr.4-8
Impact on Students	Students reported that the most frequently used technologies in school were iPad, Smartboard, Pages, Microsoft Word. Least frequently used were online applications Desire2Learn, OneDrive, Google Read and Write. Students were asked to identify their favourite educational technology and why. 23% of students reported that iPad was their favourite technology because it is small, portable, easy to use, useful for recording video, you can print directly from them, because it helps with history and math and French, you can take pictures, you can make movies. 19% of students identified Prodigy math as their favourite because it's a fun math game, it helps students learn math, it improved their math facts and achievement, they can play with friends or join each other's world, and there is action. Students reported that technology was used daily for Math (39%), Computer Technology (39%), Language arts (35%) and French (35%). It was almost never used for Physical education (59%) or Geography (22%). In the "other" comments, students reported using technology for Music and Ojibway. Students reported that using technology improved their research skills, their ability to create something new, ability to explore a new idea, ability to do school work with other students, ability to solve a problem. Students said technology did not improve their ability to communicate with teachers or other students. Students were asked the impact that using technology had on their life at school. The top themes were fun, friendship, and communication. Students linked these themes with helping them at school. Final comments from students included comments on the benefits of technology

	for learning, keeping the iPads and the Chromebooks for the whole year (grade 8), give more freedom and trust, they want to use their phones at school and have the Wi-Fi password, want access to technology at lunch to finish work, need more updated technology, and emphasized the links between learning/having fun/technology.
	Teachers reported that technology had a positive impact on their students at school. The areas most positively impacted were learning independence, interest and motivation, creativity, achievement in reading. Technology had the least positive impact on participation in sports or clubs and attendance.
Impact on Instruction	80% of teachers reported receiving professional development or other support for using technology at school. Professional development mentioned were: iPad training, half-day workshops, learning offered on PD days, and accessing IT people or other teachers with individual questions.
	Teachers reported that they are developing or proficient at:
	• Managing the use of technology in the classroom for learning.
	• Using technology to access your professional learning network.
	• Using technology to create learning experiences that align with provincial curriculum, student information, and educational technologies.
	• Using technologies to support student-centered learning strategies for all students (e.g., student-lead learning)
	• Using educational technology to communicate/ collaborate with students, parents, and teachers
	Teachers reported that they are in the initial stages of learning to:
	Identify, use, and evaluate technology to support the learning process for all students through ongoing professional development.
	Teachers reported that technology had a positive impact on their ongoing professional learning, their resources for planning learning for an individual student, assessment and evaluation of student work.
Impact on System	The research collaboration between Kenora Catholic District school board and the Northwest Catholic District school board had an impact on our systems. The opportunity to work together allowed us to explore similarities, differences, and share lessons learned.
	• Although both school boards have Chromebooks and iPads available to students, the technology that students reported using at school this year varied by school board. For example, the most frequently used hardware was the Chromebook at KCDSB and the iPad at TNCDSB. This is likely because of the historical implementation and order of selected hardware.
	• Teachers at each board varied in the technology they used most often. At

	KCDSB Chromebooks, projectors, and cell phones were used most frequently. At TNCDSB Smartboards, iPads, and laptops were used most frequently.
	• In our collaborative research meetings, the strengths and challenges of technology clubs and moving technology into regular classroom practices was a topic of shared interest. This area may be explored in the future.
	• There was consistency between the two school boards in the student appreciation of cloud-based technologies that allow them to share, communicate, and collaborate with students and teachers.
	• There was consistency between the two school boards on the value that students placed on learning with technology and the impact it had on them.
	• There was consistency between the boards on the curriculum areas where educational technology was used weekly or daily. These curriculum areas were computer technology, French, language arts, math, and Ojibway.
	• Teachers at both boards reported that the main impact of educational technology on students was increased engagement, interest, motivation, and learning creativity. The achievement area most impacted was information technology and then language arts.

Ottawa Carleton District School Board

Project Title	System Scale of Deep Learning
Description	Our Challenge of Practice: What leadership actions are needed to have the global competencies and elements of deep learning implemented in all 83 schools with the goal of increased student achievement?
	In response to this challenge, and based on the transformations observed in schools involved in year one and year two of our New Pedagogies for Deep Learning (NPDL) pilot, our Board has adopted the NPDL framework for learning and teaching across the system. This will allow us to achieve district transformation, focussed on student acquisition of skills, global competencies and knowledge.
	In this first year of our Board-wide adoption of Deep Learning, we are focussed on building a common understanding of the language of Deep Learning – specifically, the global competencies and four elements. To this end, all centrally-supported professional learning networks will explore how educators can leverage the four elements (which include 'Leveraging Digital') to develop global competencies and deepen student learning. All networks will make explicit connections to and embed the language of the global competencies and/or the four elements.
	All opportunities for professional learning for administrators will also include a focus on Deep Learning to assist them in completing the NPDL School Conditions rubric, embedding global competencies and the four elements in their School Innovation Plans for Student Achievement and Well-Being.
Context	*Number of students:* 44,292
	Number of teachers: 3,190
	Number of schools: 83
	Grades/Program: K-12
Impact on Students	Leveraging digital is one of the four elements of Deep Learning and a key dimension in the development of global competencies. Technology has been a tool for student learning in our Board for a number of years, but Deep Learning has helped to increase its ubiquity and its use in new and exciting ways. All students are increasingly accessing digital content and using their preferred digital tools to demonstrate their learning through various digital creations. The increased use of robotics is providing our students with an introduction to the foundations of coding, and providing new ways to access curriculum. Some students are beginning to co-construct a common understanding of what each of the global competencies looks like, sounds like and feels like in a classroom. This is equipping them with the language that allows them to articulate their own strengths and next steps. As a result of our focus on Deep Learning, students are increasingly seeing themselves as global citizens with a responsibility to enact

	change in the world. Often tied to Catholic social teachings, students are undertaking real-world problems and collaboratively putting their solutions into action - from entrepreneurial activities to support community causes, to presenting their proposals to panels of experts.
Impact on Instruction	As our Board focused on building a common understanding of the language of the Deep Learning framework this year, all centrally-supported professional learning made explicit connections to the four elements of Deep Learning: Pedagogical Practices, Learning Partnerships, Learning Environments and Leveraging Digital. Thus, all teachers have adopted this terminology and are using it in reference to their own and one another's practice. The various collaborative inquiries led by our central departments have supported educators as they are exploring the impact of flexible seating and student choice in their learning environments. More and more learning partnerships are forming between grades, between schools and within our global community as educators are increasingly leveraging digital to engage in collaborative global projects. Makerspaces are emerging both in learning commons and in classrooms, as networked learning has engaged educators in explorations of design thinking and innovative ways to address curriculum expectations using robotics.

Those who are further along on their Deep Learning journeys are invited to deepen their own learning, while sharing their experience with others. These inquiries tend to focus more on how the transformation of their classrooms is impacting their assessment practices, and how to engage students in self-assessment around the global competencies. They are using the NPDL rubrics to assess their students' development of global competencies and co-creating success-criteria and rubrics with their students to engage them in this process.

Superintendents, principals and vice-principals are learning from one another, and together with school staff. They have been intentionally embedding deep learning in their school-based professional learning, making connections between the four elements and their school's goals and priorities. |
| Impact on System | Thanks to a common vision and goal across the system this year, Deep Learning is spreading throughout our Board. Explicit connections to Deep Learning are now for part of our District Process template and School Innovation Plans for Student Achievement and Well-being. School leaders have been challenged to select a school-wide focus on a global competency next. Embedding Deep Learning in all of our central networks has allowed for both spread and sustainability, as common language and framework has been established this year. Questions around Deep Learning formed part of leadership preparation and interview processes, and school conditions rubrics guided school leaders in their reflective conversations with superintendents. An interdepartmental steering committee, which includes union representation, continues to monitor our implementation and recommend best next steps. |

Ottawa Catholic School Board

Project Title	Creating a Culture of Co-learning in Life After Labs
Description	As our district continues to shift its model of access to technology from a lab centric model to an embedded model, it has been increasingly evident that teacher support through professional development and coaching is essential for the model to be effective. One of the biggest challenges for teachers is the shift in practice from using a one to one PC based environment to a multi-screened tablet and Chromebook selection of devices where the ratio is usually 5 students to 1 device.
	Over the past three years, our Digital Learning Advisors (DLAs) have been our two-way line of communication between the school staff and the district IT department. It became evident in 2015-2016 that these DLAs were becoming the onsite experts for how to implement educational technology in a meaningful way but were struggling with lack of time and support in the unofficial role. In 2016-2017 we have evolved the role of the DLA to Digital Lead Learner (DLL). Each school principal will be asked to select a teacher to take on the role of Digital Lead Learner who would be interested in helping build capacity in the area of digital learning.
	Three half days of in service plus a full day conference were offered to each DLL to help build their skills in the areas of digital tools and their application in pedagogical practice as well as the soft skills needed for mentoring and coaching. Principals were given an overview of the role of the Digital Lead Learner as well as the role they will play in working collaboratively with the Digital Lead Learner to plan for capacity building activities in the school. Principals were encouraged to include their DLL on the school learning plan teams. Each Digital Lead Learner was also given 3 full days of release time to use at their school for the purpose of working with staff for capacity building.
	Planning for the professional learning for the Digital Lead Learners was carried out by central staff from the three central academic departments. Because co-learning was our focus, Digital Lead Learners were also encouraged to participate in the delivery of the professional learning where possible. An online community was created to allow for a continued discussion amongst the Digital Lead Learners in between the Professional Learning Networks.
Context	*Number of students:* 72,341
	Number of teachers: 4,073
	Number of schools: 151
	Grades/Program: K-12
Impact on Students	Teachers and students have technological tools such as Chromebooks, iPads and laptops available for use in their classrooms, as well as access to cloud computing applications (Google Apps for Education, Google Classroom, Desire to Learn).

	However, it has been a challenge to provide training in and to encourage its use. Now that one teacher in each school has been trained as a Digital Lead Learner (DLL), students and teachers have on-time, available "in house support" in the use of technology in the classroom. This has increased the number of classrooms where students are using technology to demonstrate their learning.
	More teachers are becoming familiar with Google Apps for Education, Google Classroom and/or Desire to Learn. This has provided more blended learning opportunities for students where learning is provided both in the classroom and online allowing them to collaborate on assignments, to receive timely feedback and to continue their learning and exploration outside of the classroom.
	Students are receiving training and encouragement to use assistive technologies such as Google Read and Write. With more students using devices and assistive technology, this has normalized its use and the students who truly benefit from the assistive technologies have been more inclined to take advantage of the assistance that it offers and no longer feel singled out for using it.
	More students within the district have access to learning with robotics and coding. These opportunities have extended to some of our system classes that support students in the Autistic and Behavioural Intervention Program and have provided them with new ways to demonstrate their understanding and learning.
	Students are demonstrating 21st century competencies. They are collaborating with peers and teachers using shared documents and comment features. They are demonstrating critical thinking and problem-solving skills in coding and work with robotics. They are learning lessons in digital citizenship and effective communication through their use of internet and social media resources.
	Technology is becoming less of a novelty for our students. We are moving from speaking about student engagement with technology, toward students learning with technology.
Impact on Instruction	With the Digital Lead Learner (DLL) is a member of staff in each school, teachers receive onsite coaching and support in the integration of technology in their classrooms, in a way that fits the needs of the teacher and the school. With increased teacher awareness of and coaching in the different ways that technology can be used in the classroom, teachers are beginning to explore using technology to support their students in their learning. Digital Lead Learners have been provided with and have benefited from a variety of professional development opportunities that they have shared with their colleagues.
	Workshops that have been tailored to the needs of the DLLs have increased their understanding of issues around digital citizenship, use of technological tools and platforms and blended learning. The DLLs are then better able to meet the professional development needs of their staffs through ongoing support and

	resource sharing through central curriculum, assistive technology and technology coaches and a Google+ online community.
	Teachers have benefited from having a trained colleague, in the form of the Digital Lead Learner, within their school. Having a known and trusted colleague who is modelling technology use in the classroom, and who champions its use, has served to highlight the value of technology use in the classroom. Staffs are making use of the training that the Digital Lead Learners have received through one-on-one, small group instruction and co-teaching opportunities within their school buildings.
	Principals have seen an increase in the number of teachers who are using technology to support student learning and who are becoming more familiar with the use of technology to document student achievement.
	Surveys, self-assessments and interviews indicate there has been movement along a continuum from awareness to emergent and deep use of digital tools and platforms. However, these also show there is room for continued growth as both Digital Lead Learners and teachers work with supporting student learning with technology. There is awareness that students will benefit more from technology use if it is used not simply as a substitution for another method but more to redefine how the learning can happen.
Impact on System	Digital Lead Learners allow the district to effectively transmit knowledge to more teachers and not just the few who are most interested. Because DLLs are already known and trusted teachers within a school, an element of trepidation and fear around introducing technology into classroom instruction has been removed. Other staff members are becoming more open to experimenting and asking for help as they introduce learning opportunities for their students using technology.
	For the district, embedding and modeling co-learning is proving to be an effective and broader method of professional development. The central departments have worked together to provide targeted professional development for the Digital Lead Learners around assistive technology, digital citizenship and privacy, use of blended learning platforms, and a variety of online tools.
	A Google+ Community has provided an online forum for Digital Lead Learners to post questions that they and their staff have on teaching with technology and receive answers quickly from not only Central Coaches but also from other Digital Lead Learners.
	Over the year there has been a growing awareness among principals and teachers about the role of the DLLs and the opportunities for professional development around technology and digital learning.

Peel District School Board

Project Title	Empowering Modern Learners – Supporting Grassroots Innovation
Description	Our Empowering Modern Learners document is an attempt to re-conceptualize teaching and learning throughout the PDSB. While the document is intended to provide direction to staff, students and parents about 'modern' learning it's central tenet is the need to innovate practices so that learners are empowered and in control of their own learning.
	We believe that teachers know what is needed for their classes to maximize learning. This inquiry work is an effort to empower teachers to try new approaches to teaching and learning within their classrooms. Specifically, we are looking at the incorporation of project based learning opportunities, design thinking opportunities and a renewed focus on inquiry (broadly defined) within our classrooms.
	Enhancing these pedagogical approaches through the use of technologies including online software: G-Suite, Scratch, Internet of Things, as well as Board Wi-Fi and hardware. In addition, students will be encouraged to use personal devices (when/where appropriate). These technologies will be used to support the act of design, creation and communication.
	In addition, Technology will be used to track and communicate among participants. This will include social media, email and online blogging platforms.
Context	*Number of students:* 545
	Number of teachers: 21
	Number of schools: 14
	Grades/Program: K-12
Impact on Students	This project had several components all of which were intended to support the empowerment of students. Learners were engaged by the design tasks that gave them choice and ownership over their learning. The design tasks helped learners see themselves as collaborators and creators. Having an authentic audience for their work help build learner resilience even during their failures. More than anything educators noted the increase in empathy among learners supporting their growth as contributing global citizens. We have noted the following impacts:
	Critical thinking: Impact was evident daily during sessions, programming and other, in which design ideas were put into place. Students were in a constant cycle of creative thinking (ideas for the game; solutions to problems) ▯ problem solving ▯ critical thinking (fixing bugs, taking feedback into consideration).
	Innovation, creativity: Again the impact was evident daily as students were in a constant cycle of creative thinking (ideas/solutions for their projects) ▯ problem solving ▯ critical thinking. Risk taking was observed in the form of "growth

	"mindset" behavior, especially when facing obstacles. This attitude was modelled by teachers consistently and adopted by students.
	Learning to learn: Students were "in control" of their projects. Each student was responsible for ALL aspects of the design cycle and project completion (i.e. their computer game). This required self-regulation and self-advocacy.
	Collaboration: Putting empathy and feedback to work is a hallmark of the design process and these students were required to and were observed doing exactly that. For example, during our coding project:
	• students in the Grade 2 class noted with satisfaction that their regular feedback was indeed taken into consideration by the Grade 5 designers
	• face-to-face meetings with students were student-regulated and offered 'just-in-time' support to produce their game projects
	Communication: Aligned with collaboration efforts, communication skills and listening skills were expectations in this project. Regular and predictable structures were put in place to support students' oral and written communication about their projects with each other and with other users online.
	Global Citizenship: Responsible and respectful use of technologies was practised and expected using online discussion groups in student blogging and student feedback with Google Classroom. Issues that arose that involved respect and communication online were discussed and appropriate actions were taken.
Impact on Instruction	We believe that teachers, as learners and professions, when provided with the environment to truly 'modernize' their pedagogical and assessment practices can and will improve the learning for students. The collaborative inquiry sessions supported through the project did this.
	For many of the educators this CI was their first attempt at leveraging design thinking in their practice. Many noted that seeing the impact of having an authentic audience for their work and taking the time to empathize with the end user changed their practice. They also noted the power of using an approach that gave student's voice and choice.
	In addition, the following specific impacts were noted by our participants:
	Instructional strategies: Through teacher- teacher partnerships, there was a clear development of "learning-to-code" vs "coding-to-learning" sets of instructional strategies. Each of these may serve as goals but a crucial decision (and subsequent course of action) must be made—which will be the focus with students. In the case of this project, "Coding-to-learn" was the educational goal. That is, coding provides a vehicle through wish other concepts and skills can be learned.
	Assessment practices: Assessment is tied to success and to educational goals and the instructional strategies used. Problem-based learning (as was used in our

	projects) demands a specific, flexible assessment framework. Collective evidence of learning occurred through the collection and analysis of four key sources: 1. Student interviews and conversations 2. Observations of student work 3. Creation of a product over the long term 4. Reflections of the design process.
Impact on System	Empowering Modern Learners vision for teaching and learning provides a roadmap regarding our teaching and learning beliefs and strategies for the next few years. A significant component of the vision is the 'empowerment' of all learners through the application of new pedagogical methods – which need to be tested by teachers.
	The work that we completed provided:
	• a clear indication that the Board truly supported the direction/work articulated in the EML document
	• a celebration of the professionalism of the teachers involved
	• a sense of data to help direct our work moving forward
	We feel that design thinking has the potential to provide educators a framework that will innovate models of learning. While focused on design and problem-based learning the project was connected to a curricular goal. In this respect, the projects demonstrated that curriculum can be covered in ways that leverage technology and new learning methodologies – in ways that are engaging and empowering for the learners involved (teachers and students).
	Educational technology can be seen to provide agency and empowerment to three groups: students, teachers and the system. It should be a system goal that the primary purpose of educational technology is to empower each student and transfer and support agency in each student.
	This project demonstrated that students with these tools can self-regulate and be responsible for the creation of a product that has impact both to other uses and themselves.

Peterborough, Victoria, Northumberland and Clarington Catholic District School Board

Project Title	Leveraging Technology to Support Learning and Leadership
Description	This is our third year involved in the New Pedagogies for Deep Learning project. The purpose of this project is for classrooms and schools to engage in deep student learning through four learning areas: pedagogical practices, leveraging technology, learning environments and learning environments.
	The second purpose of our innovation project is the provide infrastructure in the school, with space, resources, access to technology so that our students will graduate as Catholic Digital Citizens, who continue to lead, learn and serve in the 21st century. The vision for our Learning Commons is that the Learning Commons will be an inviting, open, common area where rich learning is experienced, either face to face or virtually, through collaborative co-learning and co-teaching opportunities. The Learning Commons will be configurable to facilitate the learning with resources that are mobile and easily accessible.
	We are at the point of our project where we would like to track usage of Learning Commons' time by classrooms, determine self-efficacy of our Library staff and implement and track Makerspace tables. We would also like to track co-teaching opportunities with teachers who are involved in NPDL Projects and use of the Learning Commons.
Context	*Number of students:* 1,510
	Number of teachers: 45
	Number of schools: 6
	Grades/Program: K-12
Impact on Students	The vision of our Catholic Learning Commons is that the spaces are inviting, inclusive, flexible and learner-centered spaces for collaboration, inquiry, innovation and imagination. Students report that when they are no are no longer "hushed" and instead invited to engage in the learning process with peers and mentors in a relaxing, creative environment, they are better able to effectively communicate, collaborate and construct knowledge. Students felt they had more access to technology, more choice and ability to be more creative in their research and demonstrate their knowledge.
	Makerspaces have allowed for innovation and the pursuit of new ideas that support students taking risks and persevering through failed attempts at creating. Students have created milk bag mattress for third world countries, taken apart and rebuilt an assortment of electronics, learned about Canadian history by creating underground railroad quilts, debated politics on a graffiti wall and explored robotics and coding.
	Students also report that the Catholic Learning Commons have been a "safe

	space" for them and have helped deepen their understanding of themselves as a learner. This understanding has led to increased development of self-regulation skills which foster personal well-being and support student achievement. There has been a great response from students of engaging in local and global initiatives through technology. This has encouraged and facilitated deeper inquiry learning in every classroom.
	During student focus groups in all regions of the school board, students who are involved in New Pedagogies for Deep Learning have shared that they have experienced the following:
	• increased engagement and ownership over their learning
	• questioning skills
	• use of technology to create innovative student projects
	• decrease need for self-regulatory interventions
	• better overall well-being
Impact on Instruction	The innovative space that has and continues to be created in the Learning Commons has demonstrated a model for learning environments that enhances imagination and creativity. Many teachers have been reflective of how intentional design of space has helped to foster 21st learning skills. Together with this understanding and with an eye to increasing self-regulation skills for students, many teachers in our system have changed their classroom setting: flexible seating, space for collaboration and independent work and access to technology.
	Over the course of the year, six full day learning sessions were provided. The majority of library staff report they view themselves as lead learners, facilitators, technology innovators. Most feel strongly that they are champions of 21st century skills including critical thinking and problem solving; communication; collaboration; and creativity and innovation in their schools. This newly acquired self-efficacy has allowed for library staff to support teachers in improved instructional strategies and approaches, development of learning partnerships and personal growth opportunities for all educators.
Impact on System	Our Catholic Learning Commons (formerly 21st Century Library) initiative began in 2012. Our role out plan was a four-year cycle, taking schools for the first three years on a voluntary basis. This was intentional planning, based on the change adaption model. We have provided intensive professional development for all library staff to help increase the sustainability of pedagogically-driven, technology-enabled practices in the Catholic Learning Commons.
	Our vision for the Catholic Learning Commons is a derivative of Ontario's Renewed Vision for Excellence and filters down through the Board's vision, mission and strategic priorities, to our School Board Improvement Plan for Student Achievement and Well Being, to a strategic focus of our Technology Enabled Learning Plan.

| | Our system plans, organizational processes and structures, leadership development all reflect a commitment to establishing a Catholic Learning Commons that is inviting, inclusive, flexible and a learner-centered space for collaboration, inquiry, innovation and imagination. |
| | The board embarked on developing new Board Strategic Priorities and conducted 65 focus groups, four town hall meetings, 1,000 survey responses - overwhelmingly teachers wanted to learn more about deep inquiry learning. Teachers talked about the impact of having their own technology to support student learning and the need to keep current with how to effectively use technology in the classroom (moving through the SAMR model).. |

The Protestant Separate School Board of the Town of Penetanguishene

Project Title	Technological Growth and Empowerment
Description	"If you build it, they will come." This is the mantra of our new and multi-facetted 21st Century Learning Project. An integration of many projects, this year's project is really focused on developing students' ability to lead and choose their own learning and to transfer and connect learning across strands, subjects and outside of the walls of the school building.
	We have provided 1:1 Chromebooks for all students in grades 5-8 within our board; we have recreated our library and computer lab into a fully functional and diverse makerspace; we have ensured that all classrooms in the board are equipped with interactive whiteboards; we have a computer lab with stationary desktops and a rolling bank of laptops that may be shared between classes; we have 5-6 tablets per primary classroom.
	The purpose of the project is to harness new pedagogies. Using the words of Michael Fullan, we wanted to create "a new model of learning partnerships between and among students and teachers, aiming towards deep learning goals and enabled by pervasive digital access."
Context	*Number of students:* 165
	Number of teachers: 17
	Number of schools: 1
	Grades/Program: JK-8
Impact on Students	Through various inquiries, students and teachers have learned from one and other to co-construct knowledge. Depending upon the task/inquiry, students' roles are varied within the team. The growth of students in recognizing the importance of cognitive discourse for the purpose of gaining greater understanding and knowledge has been instrumental in moving students' thinking forward.
	Students' former sense of communicating was more passive in school. They were not as actively engaged in the learning process. Through technology and increased collaboration in learning inquiries, students have become owners of their learning, and in turn, communication has become active and instrumental in deepening and broadening their knowledge.
	During learning opportunities like "Genius Hour," students have developed greater understanding of the landscape of learning. From initial planning and goal-setting to monitoring, reflecting and modifying, they are deeply engaged in the process and thirsty for more.
Impact on Instruction	Teachers are shifting their teaching practice from one of isolation to one of collaboration. The role of the teacher is also shifting from one where teachers

	held the knowledge and wisdom that was to be 'given' to students, to one where the teacher is a co-learner with other teachers, students, and community/global partners. Teachers are increasing communication with parents so that parents are becoming a partner in their child's learning as well.
	Teachers are openly admitting, "I don't know, but let's see where we can find someone or something that can help us learn and understand." They are willing to take risks, and seek out information and learning opportunities to support themselves in their professional development as well as the students within their classroom. Teachers are also more willing to allow students to share their knowledge in a variety of ways to suit the students' needs and for the purposes of assessment.
Impact on System	Prioritizing equity of access throughout our system has been instrumental in allowing students to drive their learning. All students in grades 5-8 have their own Chromebook. The Board is committed to ensuring, on an ongoing basis, that Chromebooks will be provided and properly maintained for all students in grades 5-8.
	Recognizing that increased usage resulted in an increased need for broadband bandwidth, the board petitioned its case for being involved in the ministry's first phase of broadband modernization program.
	Teachers are receiving PD in small groups (3-4 teachers) with our TELT/DELC based upon their needs and requests. Through these sessions, we are developing other teacher leaders/coaches in each division to spread and deepen the learning among staff. Some teachers attended the Google Summit; others received professional development opportunities through adobe connect sessions with Read/Write, while others connected to ministry supports.
	Monthly opportunities are given to staff for sharing and teaching at staff meetings about learning and questions regarding technology.

Sagonaska Demonstration School – Provincial School

Project Title	Moving Beyond BYOD
Description	We continue to investigate how to ensure that our teachers and students are getting meaningful opportunities to use 21st Century skills to support and extend their learning. We have the personal technology in place for both students and staff, and have been focusing on the use of "head ware" instead of "software".
	Our focus is on moving students from being "literate" users of technology to "fluent" users of technology has allowed students to demonstrate their thinking and learning at a whole new level. We are amazed as a staff at the difference in the artifacts we are collecting at this stage in the project as compared to the earlier years of the project. Our staff is excited to be able to share this learning with other schools in the Provincial Schools Branch. We are also embedding the principals of our project into the Professional Development that we provide to other school boards.
	Our staff and students have developed strong skills and good confidence with the use of personal technology. We now need to identify how we are using this technology to move into the transformational real of learning and technology use.
Context	*Number of students:* 250
	Number of teachers: 55
	Number of schools: 8
	Grades/Program: Gr.5-10
Impact on Students	Sagonaska Demonstration School
	The "technology fluency" of our students is noticeable in both 1st and 2nd years. Our school focus on technology means that our students are quick to understand how their mobile technology will support their learning. Their tech skills are developed very quickly at the beginning of the year and practiced daily. We are seeing students move from "tech literacy" to "tech fluency" are a much faster rate.
	We are seeing students "self-identify" which tech tools they prefer to use to support and demonstrate their learning.
	Students are articulating clearly how they use mobile technology in an academic environment and then use the same technology in other environments for personal use.
	W. Ross Macdonald School
	We have been leveraging devices and apps to use "BlindSquare" (among other apps) in the school and around the community. It is a GPS app that provides directions wherever the user is-it can tell you if the reception desk is 5 feet to

your right in the same way as it can tell you what intersection you are on. It has required extensive learning by both staff and students, but it has the potential to be transformational. As we move towards an age when our students will be able to access driverless cars, this is the type of technology that will drive (literally) their future.

Many of these apps allow for user input to create a better experience for blind users. How can we encourage our students to begin to engage with social powered apps, recognizing that they can have a positive impact on their own lives and those of their blind and visually impaired peers?

E.C. Drury School for the Deaf, Elementary

Through the use of mobile technology, teachers are improving their skills and increasing their comfort level of using these tools, in order to successfully build a classroom of digital citizens.

Beginning in early 2016, our school has had access to iPads and apps. With proper guidance and modelling, our students have become fluent users of particular apps to aid them in their continued exploration.

Several teachers have stated that students have independently used iPads to video record themselves reading a story in ASL, in order to later watch their recording, self-assess their language usage/presentation skills, etc, and even make edits to their videos. As Deaf learners, using digital technology to improve communication is a critical component to their academic and social goals.

Starting in April 2017, our school has been using a set of Chromebooks. We explored the use of Google Read & Write, Snapverter, and how to use Google drive/Google classroom with their students. Our students are developing into media creators and digital citizens.

Amethyst Demonstration School

With the addition of the 3D printer at Amethyst, students have been able to explore the world of 3D design and see their creations brought into the real world. Students have been designing maps for geography class and building cars to play with and have developed a new found interest in the world of 3D creation which can be adapted to a world of future careers. Once students design their own creations for the printer, they begin to explore Thingiverse, a website where people can share their 3D designs with the world.

Chromebooks (Google's Apps for Education) students are discovering digital creativity. Chromebooks allow our students to share devices safely and access their content, created by them or shared with them.

Centre Jules Leger

Students are now able to better edit work (video and sound recording) on the iMac computers allowing for a much better product. The students will use the

	iMacs to create more multi-media projects and be able to continue working on them in both school and residence which will increase motivation and engagement.
Impact on Instruction	At Sagonaska teachers have become so comfortable using technology as a teaching and learning tool with their students that it has become part of our "school culture". There is noticeably less discussion about which platforms students will use to demonstrate learning and more discussion related to purpose and depth of learning.
	Teachers have embedded tech use into workshops presented to teachers from other boards. The workshops focus on supporting LD Learners in the classroom not specifically on technology. The technology piece is embedded into the workshop allowing participants to experience how tech supports learning as they participate in hand on activities.
	Teachers at other sites are beginning to show more curiosity about how mobile technology is being used in different schools and boards. Sagonaska has been hosting visits from other Provincial schools staff and is working to help provided some guidance and support as these school continue on their own learning journey.
Impact on System	A number of schools have joined the project. Sagonaska is engaged in conversations with these schools to help them refine their questions and goals to help move the projects forward more quickly.
	Technology has been purchased to support each schools focus.
	School are developing their own Collaborative Inquiries that take into account the goals of this initiative, the goals of the original Provincial and Demonstration School project and the global competencies.
	Time is being provided for teachers to meet and continue to discuss, plan, implement and reflect on their projects.

Rainbow District School Board

Project Title	Making Math Thinking Visible through the Use of Technology
Description	Mathematics achievement is an area of growth provincially as well as for the Rainbow District School Board as indicated in our Board Level EQAO results is an area of growth for Rainbow DSB (Primary Math - 54%; Junior Math - 42%).
	Schools who chose to focus their professional learning for the year on math were invited to apply to be part of the TLF project to measure how the use of technology would enhance their students' ability to articulate their math thinking in ways that positively impacted their math achievement.
	Schools are using apps and programs that allow students to express their math thinking in ways that they may not have been able to do previously when the only option was paper/pencil task. The use of the Explain Everything App, virtual manipulatives and spaced practice to develop automaticity with numbers and fact fluency are ways that the technology is changing the way our teachers teach and the way students can demonstrate their learning.
Context	*Number of students:* 420
	Number of teachers: 17
	Number of schools: 10
	Grades/Program: Gr.1-6
Impact on Students	Development of Global Competencies
	In general, technology has typically been used in math classrooms in our system for practice of computational skills. This project was innovative in that we have begun to shift our practice towards the use of technology to make math thinking visible, allowing students to express a deeper understanding of the concepts.
	Analysis of Student Survey Results
	According to our student survey results, we saw gains in students' ability to use technology to understand math concepts and explain their math thinking. We believe these gains occurred as students were guided by their teachers to select and use appropriate applications, as well as online resources, that were tailored to their individual learning needs. As students developed familiarity with the new applications, they worked collaboratively with peers on authentic tasks to communicate their understanding of mathematical concepts.
Impact on Instruction	Instructional Practice/Professional Growth
	We saw an increase in confidence regarding the assessment and evaluation of the impact of technology on students in the math classroom. We noticed an increase in beliefs around the ability of technology to allow for the modelling of mathematical ideas. We saw an increase in technology's ability to offer educators options for adapting instruction to meet the needs of individual students, which

	was at the heart of our research inquiry question. During school based professional learning, educators could connect with each other and support each other's learning in the effective use technology in the math classroom, specifically with respect to students with a learning disability.
Impact on System	The elementary schools that received technology this year as part of the project will continue their work into the 2017-2018 school year, as the teachers involved felt they were just beginning to gain momentum and build confidence in the use of the technology to support their learners. They are committed to continue to explore ways to use the technology they received this year to make student math thinking visible, especially for our students with a learning disability who often require alternative ways to demonstrate their learning (paper/pencil tasks rarely capture what a child really knows).
	School-based professional learning will continue to provide opportunities to deepen teachers' understanding of the use of technology, as well as the exploration of new applications and online resources to support students in the math classroom.
	System plans for next year will continue to focus on students with a learning disability. Key learnings from this project will influence system planning in the following areas: allocation of devices, distribution of curriculum consultant support, and enhancing collaboration between elementary program and special education departments.

Rainy River District School Board

Project Title	Teaching and Learning in a Digital World
Description	The Rainy River District School Board will be extending our research project from Round 5. Last year Chromebooks were deployed 1:1 in grades 7 and 8, and the project was deemed a success. The improvement in student engagement and achievement resulted in our decision to expand the scope of the project to grades 6 and 9. Teacher training will focus on using Google Apps for Education to improve collaboration, creativity, communication, and critical thinking skills. These global competencies will enable both teachers and students to evolve and enhance their educational practices. In addition, teachers will receive elbow-to-elbow and system-wide training to use technology to support their numeracy instruction and assessment. This focus was determined by analyzing last year's EQAO and report card data, which indicated a need for support in the area of numeracy. Teacher and student training will focus on: • Software programs which support numeracy instruction • Assessment practices which integrate technology to provide immediate feedback • Student collaboration and peer-to-peer learning using Chromebooks and GAFE
Context	*Number of students:* 794 *Number of teachers:* 36 *Number of schools:* 14 *Grades/Program:* Gr.1-3, 7-8
Impact on Students	The 2016-17 project allowed for the acquisition of 1:1 Chromebooks for students in Grades 4, 5, 6, 9, 10, 11, and 12. This technology acquisition allowed all students in Grades 4 – 12 to: • Engage in authentic learning through the use of software such GSuite, virtual field trips, and WeVideo • Regularly share their work with parents and caregivers through Seesaw and Google Classroom • Enhance critical thinking and computational strategies through the use of Chromebooks and websites such as Code.org • Effectively use assistive technology to complete EQAO language assessments • Utilize software such as Knowledgehook and Mathletics to practice and improve math skills

	In addition, having 1:1 Chromebooks has allowed students to regularly utilize assistive software such as Read & Write. This has increased their independence in completing language-based assignments and assessments.
Impact on Instruction	The 2016-17 project enabled 81% of teachers in our board to receive professional development in the area of technology. Training was provided through a variety of forms, including elbow-to-elbow co-planning and co-teaching, PLCs, central PD sessions, and Professional Development Days.
	This training allowed teachers to:
	• Become familiar with assistive technology software, which enabled students to become more independent (e.g., Read & Write).
	• Utilize programs such as Knowledgehook to engage students and increase their math skills.
	• Regularly integrate technology into their lessons, which allowed for routine discussions about online safety and etiquette.
	• Collaborate and share resources, lessons, and strategies through Google Drive.
	Survey data from teachers regarding technology integration indicated a positive correlation between PD sessions and teacher efficacy.
Impact on System	Our project clearly aligns with the following goals outlined in the Director's Annual Operational Plan:
	• Implement best practices with students that utilize technology in the classroom as a tool to facilitate peer-to-peer learning and to foster collaborative thinking skills.
	• Promote our communication with, and engagement of parents in their child's learning and well-being.
	• Support staff in the promotion and development of 21st Century competencies.
	Professional development through the "elbow-to-elbow" co-teaching and co-planning model will continue to increase teacher capacity in the area of technology and global competencies.
	The goals outlined in our project are directly aligned with the Renewed Math Strategy. Teacher efficacy in supporting students' engagement and acquisition of math skills through the use of technology is an ongoing goal which continues to require the support of the TLF. One area identified as a need is continued training in the use of technology as a school – home communication tool.

Renfrew County Catholic District School Board

Project Title	Building Strong Pedagogic Practice on a Foundation of Technology Rich Classrooms
Description	Our funding is used to create Networked Learning Communities (NLCs) that bring together teachers from across our system for four or more full days of professional learning. This approach is helping educators build a larger platform on which to discuss the latest research, share new knowledge, create new resources and generally support each other as they begin to create the conditions for technology enhanced 21st Century teaching and learning. The vision behind the creation of NLCs is for the educators involved in the collaborative project to become teacher leaders and "more knowledgeable others" who will help spread new and innovative teaching practices being tried and tested throughout the Board and in other leading educational institutions. This year we have four main projects: a primary NLC with 25 teachers, a JR/INT NLC with 28 teachers, a secondary project with 14 teachers and a Music Project that includes all 7 of our Board's itinerant Music teachers. Although we are maintaining and scaling up using the same (established and proven) Networked Learning Community model from the previous three years, how we organize our professional learning sessions is evolving. We now know from the feedback we have received that teachers want more opportunities to hear from each other in regard to sharing their successes and challenges as well as to ask questions of each other. They really want to see real examples of technology-enhanced learning in action in real classrooms.
Context	*Number of students:* 3,325 *Number of teachers:* 74 *Number of schools:* 20 *Grades/Program:* K-12
Impact on Students	Although we don't have quantitative data in relation to impacting student achievement at this point, we do believe the projects are having a direct impact on: the growth of 21st Century competencies, student engagement, accessibility to information and necessary learning tools made available through Google Apps for Education, digital fluency, capturing and highlighting student thinking and learning and student meta-cognitive skills. With devices and the learning tools now more accessible to our students, both at school and at home, we feel we are better meeting the needs of all of our learners. Critical Thinking: We have explicitly focused on the development of critical thinking skills within the context of evaluating sources of information both online and in hard copy. Additionally we have focused on students thinking critically

	about the quality of their work and the depth of their knowledge, understanding and their thinking. Communication: Our project has focused heavily on how technology can be used to improve our student's ability to communicate their knowledge and understanding and their thought processes. There is ample evidence that the level of communication between students and teachers during the learning process has increased substantially. We dove deeply into the ways that teachers can improve the school to home communication using Digital Portfolios, Online Classrooms Remind and Twitter Problem Solving: We spent a great deal of time looking at the importance of students having the opportunity to solve authentic real life problems in a variety of subject areas and we had several teachers showcase what this looks like in action in their classroom. Learning to Learn: Throughout all of our projects we focused on both the importance of improving student metacognition as well as developing the skills. Collaboration: Our data showed that our projects have significantly improved collaboration between our students (students to students), our students and our educators and also amongst our educators. Some of the most significant influences on this improvement have been: the introduction and increased use of collaborative technology platforms (Google Drive, Google Docs and Slides etc.) and also new approaches to teaching and learning (inquiry based learning, Genius Hour, Passion Projects, and other rich collaborative projects). Student-directed Learning: In each of our projects we have a research and theory section on the benefits of inquiry- based learning and also what that can/does look like at the various grade levels and various subject areas. Global Citizenship- Digital Citizenship: From our discussions, and also the scaling of our projects across our District we have noticed that individual schools and also their school councils have begun to concentrate more heavily on both awareness and building digital citizenship skills.
Impact on Instruction	This year's data collected via observations, conversations and numerous pre and post surveys indicated that teacher practice has been impacted in the following ways: • Increased comfort level integrating technology into their practice • Increased expertise using technology for both teaching and learning • Increased knowledge and understanding of how to provide opportunities for students to use technology to demonstrate their learning • Increased knowledge of online tools available and how they can be used to enhance the delivery of the curriculum

	• Increased understanding of how tech can be used to improve lesson design and assessment strategies • Increased knowledge and understanding of what it means to use a triangulation of data for assessment for, as and of learning • Increase frequency of technology being used in the classroom • Increased knowledge of ways to capture evidence of student learning • Increased ability to implement and manage student inquiry (e.g. the process and how the students access relevant and reliable sources of information) • Increased understanding of how to create and use student portfolios • Improved organization and integration of technology in relation to delivering and supporting the delivery of the curriculum • Greater connection and collaboration with other colleagues Many of those answers directly relate to teacher learning and they also greatly impact student engagement, learning and achievement as they are being transferred into the classroom.
Impact on System	We have now had the majority of our elementary classroom teachers; many of our Secondary teachers and all of our Music Specialists take part in one of our projects since they began in 2013, and as a result we are noticing the widespread use of technology- enhanced teaching and learning across our District. In order to sustain the momentum beyond 2017 our Board has taken the following steps: • we have continued to refine our professional learning model to better suit the needs of our educators, • we have made a conscious effort to concentrate more on leveraging the leadership opportunity/stance of our School Leaders, • we have embedded specific goals related to 21st Century teaching and learning into our new five year Learning and Technologies strategic plan and also in our Board's new 5 year Strategic Plan. We are strategically using a NLC model to provide a support for our educators, to spread ideas and innovations and to build capacity across our system. We are providing equalized funding to all schools within our system at a steady rate, which has allowed us to continue to strengthen expertise in the area of technology-enhanced learning. We are committed to building teacher leadership through this project by having numerous teachers join us (the facilitators) for the planning, design and facilitation of the professional learning sessions. We have presented at the Leadership Team Meeting several times this year to explain and update the principals on our innovation project(s). We also send regular updates to them via email.

| | We have strengthened our ties with other Program Team members by having them play a more active role in the design and facilitation of the project. |
| | The number of our teachers who have received the technology and training through this project is incredible and the work that they are doing in their classrooms is inspirational. Teachers from previous rounds are showing great leadership in the field of technology-enhanced learning and they are continuously emerging as leaders amongst their peers within their schools. |

Renfrew County District School Board

Project Title	Getting Started with Deep Learning
Description	We are exploring and implementing NPDL framework for Deep Learning to see if the use of the tools provided as well as a focus on developing global competencies in students, will lead to students' growth in those competencies. Within the framework we are working with specific schools on the development of learning partnerships, learning environments, pedagogical practices and leveraging technology all with a focus on design deep learning task and deep learning for students.
Context	*Number of students:* 320 *Number of teachers:* 16 *Number of schools:* 4 *Grades/Program:* K-8
Impact on Students	Overall, the focus of our research project was the development of the global competencies, and New Pedagogies for Deeper Learning project targets. 'Leveraging Digital' was an integral part of doing so. This was achieved by students working through a series of 'deep learning tasks', which focused on one (or more) global competencies as well new pedagogies, leveraging digital, learning partnerships, and learning environments as means to deepen student learning. Students used technology to communicate their learning by using the GSuite for Education tools to consolidate and share their learning. Some specific examples include creating reports, slideshows, videos, and green-screening to showcase learning. Through the process, students used Google Forms (surveys) to provide feedback, students' voice, and to reflect on themselves as learners. Students used technology to collaborate by working together simultaneously on G-Suite tools. They were greatly impacted by using technology to connect with outside experts using Skype, and with the school and parent community using Twitter, and Facebook. Students used a variety of tools to create. Students used coding platforms such as 'Scratch' to create curriculum-linked video games, created accessibility apps for students with exceptional learning needs, and videos to summarize their learning. Access to technology at the point of learning allowed students to more independently seek out information through their inquiries and support them in 'Learning to Learn'. This took a variety of forms as students developed research, critical thinking, and digital citizenship skills.
Impact on Instruction	As part of our deep learning project all teachers and administrators from the 4 schools involved attended 3 central meetings for professional learning. In

	addition to these meetings, each school team followed a collaborative inquiry cycle where they met 6 times to plan, assess, and reflect on their projects.
	The framework had a great impact on teachers as it provided a way for them to think about these elements all at once and at various stages of learning.
	In the past teachers considered assessment practices, using digital, and learning partnerships when designing and reflecting on their task design. However, we have seen tremendous growth in teachers' ability to mesh and to monitor their use of all three elements throughout the learning process. In our conversations during the collaborative inquiry meetings, teachers consistently reflected back on the framework ensuring that learning partnerships, leveraging digital, and assessment practices were considered.
Impact on System	There have been many opportunities for teachers, students, and principals to share their success stories and engage the broader school community in their NPDL work. As such, new groups are reaching out to learn more about the project and process. This include teachers in schools who are currently a part of the NPDL research project and both elementary and secondary schools not yet involved.
	As the District re-develops the Strategic Plan, many elements of the NPDL framework and emphasis on developing global competencies are emerging. In the draft Strategic Plan, these NPDL elements emerged as part of the 'Excellence in Teaching and Learning' and 'Student Success and Well-Being' portions.
	Due to the overlap in the leadership and teachers of the NPDL research project and the Renewed Math Strategy, the concepts of global competencies and Deep Learning Design of Tasks are beginning to spread as best practices in our math work.

Simcoe County District School Board

Project Title	STEAM
Description	The purpose of our inquiries is to support Ontario's renewed vision though:
	• supporting teachers as they collect and analyze triangulated assessment data
	• providing opportunities for students to share with authentic audiences
	• promoting students as meaningful partners in their learning
	• promoting parents as meaningful partners in their children's learning
	• making learning visible through digital documentation
	• creating professional learning networks for teachers
	For 2016-17 we are focused on STEAM and leveraging digital tools to enhance student learning. In our priority system-wide inquiry, staff from each elementary and secondary school are participating in our STEAM (Science, Technology, Engineering, Arts, Mathematics) – Integrated Learning Inquiry. Each elementary school team is comprised of the Teacher Librarian and two Grade 4-6 teachers. In secondary schools, the team is comprised of the Teacher Librarian and three teachers from Science, Technology, Arts and/or Mathematics. Our goal in STEAM education is to give students opportunities to build skills, including problem-solving, as well as conceptual understandings across subject areas while applying those skills to authentic tasks.
	As a result of students and staff participating in STEAM learning, we expect them to develop their communication, creativity, critical thinking, collaboration, character, and citizenship skills. During this inquiry, participants have opportunities to explore STEAM based on a theory of action that addresses urgent staff and student learning needs. We will explore connections to makerspaces, tech renewal, science fair, and community partners.
	We have two other system-wide inquiries. In Transforming Assessment through Technology, educators and students will authentically leverage digital tools to support the collection and analysis of triangulated assessment data. In Leveraging Digital Tools for Deep Learning, will investigate the use of digital tools and resources in helping students develop 21st century learning skills.
Context	*Number of students:* 5,600+
	Number of teachers: 210
	Number of schools: 104
	Grades/Program: K-12
Impact on Students	The impact of the STEAM collaborative inquiry on student learning has been observed in the following ways:
	• Teachers reported that more students are making use of learning goals and

	success criteria during rich tasks.
	• Students were more frequently giving each other feedback during the design process and making better use of feedback to help themselves improve. Improved use of success criteria and feedback indicate that students are becoming partners in the assessment process.
	• In the STEAM post-inquiry reflection, teachers indicated that students improved their competency to collaborate with one another, specifically their understanding of the importance of roles during group work.
	• This post-inquiry reflection also provided evidence that students had improved ability to generate multiple solutions to a problem, an indication of strengthened creativity, critical thinking, and problem solving.
	The impact of the Transforming Assessment Through Technology collaborative inquiry on student learning has been observed in the following ways:
	• With a focus on making thinking visible, students became more autonomous learners and were better able to articulate their learning.
	• Students improved in their understanding of learning goals and success criteria.
	• New technology tools improved parent access to their child's daily learning, leading to a stronger partnership between home and school.
	The impact of the Leveraging Digital Tools for Deep Learning collaborative inquiry on student learning has been observed in the following ways:
	• Students leveraged technology to take an active role in choosing, achieving and demonstrating understanding of their learning goals.
	• With a focus on making thinking visible, students became more autonomous learners and were better able to articulate their learning.
	• Through engagement in authentic tasks, students developed their skills in global competencies.
	• Students explored local and global issues and used collaborative technologies to work with others to investigate solutions.
	• Increased student participation in local and global community.
	• Increased student autonomy and a more reciprocal learning relationship with teachers.
Impact on Instruction	The focus of this year's STEAM inquiry was to support teachers in the purposeful planning and assessment of cross-curricular, authentic tasks. The increase in teacher confidence with the design of cross-curricular, hands-on, open tasks indicates improved comfort with use of a variety of technological tools in the classroom. Participating teachers chose technology that directly supported urgent student needs in each school. Teachers are seeing themselves as partners in

	learning rather than knowledge-keepers. This was most evident in the post-inquiry reflection, where many respondents reported that they had improved their ability to be flexible during the learning process and model a growth mindset in the classroom.
	Teachers became more comfortable with cross curricular learning in service of an authentic and personally meaningful tasks for students. Teachers both built and renewed relationships with local and global communities to support student learning.
Impact on System	Our system-wide professional learning opportunities focused on supporting the goals of the Board improvement plan, Achieving Excellence, the Renewed Math Strategy and identified student and educators learning needs to deepen achievement in numeracy and literacy, assessment, and technology. All of the collaborative inquires kept improved student learning and well-being at the core while striving to develop the 21st century competencies of communication, creativity, collaboration, citizenship, critical thinking and metacognition.
	This year, teachers involved in the STEAM inquiry helped co-create a web-based resource for sharing STEAM lesson ideas, inspiration, and best practices. The resource offers multiple entry points for teachers in our system who did not formally participate in this learning. This web resource will also act as informal learning network that will allow educators to continue to share and collaborate long after the inquiry is over.
	In our Transforming Assessment through Technology and Leveraging Digital Tools for Deep Learning inquires educators had multiple opportunities to learn from each other, engage in professional discourse and develop leadership skills through co-facilitation.
	One of the key components of our Innovation Projects continues to be capacity building. Our Program and Innovation team of Instructional Resource Teachers have engineered, implemented and refined these projects with the expressed goal of building collective teacher efficacy.
	Measurement of 21st Century Competencies: We have made progress in measuring these competencies in our NPDL schools using the Learning Progressions for communication, cooperation, creativity, critical thinking, character and citizenship. Our difficulty is in spreading this practice across the district. As we are transitioning to the Ministry's 21st Century Competencies for next year, we will support all staff with understanding and assessing these competencies.
	Equity of access to technology: We have inequities across the system in terms of access to devices and expertise with effective technology-enabled learning environments. Our ongoing challenge is to try and support schools with

| | technology acquisition and build capacity among staff in using it to enhance learning opportunities and outcomes. |
| | Learning Goal before technology: Another challenge is the tendency for some to start with the device or tool and then look for a meaningful activity or task. We have been working with staff to start with the learning goal and then determine, based on the technology available, which tool is right for this task, for this student and this time? |

Simcoe Muskoka Catholic District School Board

Project Title	Lead Learners Project
Description	To build capacity for innovative practice in our secondary schools, volunteers (one from each secondary school) would commit for a two-year period to participate in central PD and receive technology to support their teaching practice, with a focus on trying new/innovative strategies with technology. The starting point would be the OCGEs and 21st Century Competencies document from the Ministry. Volunteers would be responsible for facilitating workshops for teachers at their school and contributing to a central repository of lesson ideas and tips for innovative and effective integration of technology. Volunteers would also be asked to participate in a board-wide sharing day (a kind of innovation fair) where they could share their work with other teachers. The focus is on providing students with innovative, authentic, experiential learning opportunities in one or more of the following areas: • 3D Technology / Virtual Field Trips • Digital Literacy - Mining the Web for Relevant / Reliable information • Makerspaces • Robotics • Programming • Assistive Technology • Building Global Learning Communities
Context	*Number of students:* 510 *Number of teachers:* 12-18 *Number of schools:* 12 *Grades/Program:* Gr.7-12
Impact on Students	In our first year of implementing Read & Write for Google across our board the adoption and impact of the assistive technology has been wide-spread and evident. Over 100 of our Identified students used the technology to complete their Ontario Secondary School Literacy test. Since our decision to license the software for all students in our Board, the use of it is now ubiquitous and has eliminated much of the stigma that students feel when using SEA, or other assistive technology tools. The biggest impact to technology-enabled learning this year was the introduction of the VEX EDR robotic kits in all 9 secondary schools. As part of a co-curricular activity, students designed assembled, and tested a robot that would compete in our board wide "Nothing but Net" team challenge. This project demonstrated when STEM projects are introduced to students in an inquiry-based approach, students use problem solving, cooperative learning, and

	subject integration; it encourages students to work together to design solutions to problems in an authentic environment using real-world data.

Over 24 teachers from our elementary and secondary schools explored the global connection opportunities with some of our community partners. These on-line school linkages will enable students to engage in meaningful educational projects with peers in their countries and around the world.

With regards to the impact on 21C competencies, the summary of the VEX Robotics Survey results showed students felt that the experience helped improve their problem-solving skills, understand the value of working as a team, improve self-confidence, and how STEM is used to solve authentic problems. A high percentage of students felt the experience helped them learn or strengthen their ability to solve unexpected problems, weigh issues and possibilities before making a decision and talk with people to get more information. |
| **Impact on Instruction** | Modern teaching and learning require students to be actively engaged in cooperative learning environments where their instructors help facilitate creativity and inquiry learning. As a result, instructors undergo professional development aligned and designed to help then to use an integrated curriculum approach. It was clearly evident that students were driving the learning while teachers were supporting and facilitating.

All teachers in our Board were trained in the use of Read & Write for Google during a series of rotating PA days in the fall or 2016. |
| **Impact on System** | Plans are being made to improve the delivery and support for Assistive Technology Support for our IEP students using Read & Write for Google.

The success of our first VEX Robotics Challenge has all schools requesting that the project be scaled up so that more students can be involved. We would also like to introduce a "Jr." competition that would include Intermediate students from our elementary schools. Through our community partners and critical friend, the Cyber Gnomes, we have been invited to submit teams to the regional qualification event in January of 2018. This was the first opportunity to support a board-wide STEM-centric project and we believe it was not just a success, but will be the catalyst for similar events in the future. |

St. Clair Catholic District School Board

Project Title	Pedagogy, Assessment and Technology that Improves Conditions for Learning in the Applied Stream
Description	The purpose of this project is to build the capacity of secondary teachers and leaders in addressing the learning needs of students in the Applied stream, with a focus on students with an IEP.
	The learning will be focused on the following topics:
	• differentiation/responsive instruction
	• inquiry based learning environments
	• assessment practices (AFL and Assessment of Learning)
	• pathways planning and connections
	• effective use of technology to engage students and improve achievement
	The expected outcomes will be an increase in student engagement and achievement as measured by a variety of data indicators.
Context	*Number of students:* 500
	Number of teachers: 65
	Number of schools: 2
	Grades/Program: Gr.9-10
Impact on Students	For selected grades 9 and 10 Applied courses, report card data was used to look at course pass rates and the percentage of students who achieved at level 3 or higher over the past 5 years. The following was reported.
	• improvement in the percentage of students achieving level 3 or 4 over the previous 5-year average for students without an IEP in identified courses
	• improvement in the percentage of students achieving level 3 or 4 over the previous 5-year average for students with an IEP in identified courses:
	• improvement in the pass rates of students in each of the applied courses over the previous 5-year average for students without an IEP in identified courses
	• improvement in the pass rates of students in each of the applied courses over the previous 5-year average for students with an IEP in identified courses
	Student interviews indicate that they are developing a deeper understanding of what it means to be an effective 21st Century learner. We are seeing increases in student engagement in classes that leverage technology to support students in solving complex, real work problems across the curriculum.
Impact on Instruction	Teachers have shown an increased willingness to de-privatize their teaching practice through collaborative inquiry. Many teachers who have a history of resistance to change demonstrated an increased receptiveness to doing so.
	Teachers embraced technology as a vehicle for embracing student voice. This

	student voice was utilized to impact teacher practice.
	Some teachers revealed an increased interest and ability to assess global competencies in addition to the traditional practice of knowledge assessment.
	Some teachers continued to further embrace inquiry and problem solving, enhanced by technology, in their secondary classrooms.
Impact on System	This project allowed for the intersection of various departments within our system. We saw the interaction of information technology, secondary curriculum, school leadership, special education and student success. It is becoming clear that our departments must not work in silos if we are to improve conditions for learning.
	School leaders are becoming more familiar with the learning conditions that exist in their buildings as they co-learn with their teachers during collaborative inquiry.
	The collaborative inquiry has resulted in a deeper understanding and use of triangulation of data. We are seeing the learning environments evolve to more deeply reflect 21st century pedagogy.

Sudbury Catholic District School Board

Project Title	Continuing a Culture of Collaboration While Transforming Libraries into Learning Hubs
Description	Our focus is on the development of active, digital communication and collaboration between all stakeholders. These partnerships, rooted in our faith, will allow the leverage of expertise and leadership of all. By fostering a growth mindset and developing 21st century competencies, we will facilitate a shift towards digital communication and an adoption of a culture of collaborative professionalism through evidence based practices.
	Digital collaboration will allow for more self-directed, problem based learning where students use and continue to develop a number of 21st century competencies to solve authentic problems.
	Familiarity and comfort using technology enabled devices as tools for teaching and learning will continue to be encouraged at all levels within the board.
	We will continue to leverage expertise and experience within our organization and encourage digital collaboration in order to foster new learning communities and connections. Teachers willing to learn about new ways to communicate and collaborate digitally will be recognized and asked to take on a mentoring role within their school, grade level, or subject area in order to help build sustainability within our board.
	Our success will be measured by the number of stakeholders actively using digital forms of communication and collaboration, as well as information gathered from conversations and observation around the effectiveness of this means of communication for all stakeholders.
Context	*Number of students:* 3,000
	Number of teachers: 450
	Number of schools: 4
	Grades/Program: Gr.7-12
Impact on Students	Students within our secondary schools have been directly impacted by the transition from a library to a learning commons. The number of students who now make use of the newly created learning commons has increased from 20%-50%, depending on the month and school.
	We have found pockets of students who prior to the creation of the learning commons could be found wandering the halls during lunch or spare periods actively engaged within the learning commons. Some have found a constructive place to socialize, some have been drawn by the enrichment events and activities, and some have reported feeling less isolated and having somewhere to go where they feel they belong.

	The learning commons now includes a number of different low and high technologies that encourages creativity and authentic learning. Students have started attending the learning commons to borrow and access the equipment for school projects as well as for projects of their own design. When choosing the equipment for the learning commons the librarians worked with students to get their feedback regarding the type of equipment they would like access to. Many of their recommendations were purchased. Overall, the feedback from students has been overwhelmingly positive. The goal of this ongoing project is to create a learning commons in each of our secondary schools using a whole-school approach, presenting exciting opportunities for communication and collaboration. It has an integral and transformative role to play in implementing a fresh and innovative vision for education. It supports teachers and students and promotes innovation and equitable access by providing services, space, resources, tools, centres and devices that will enhance and enrich the learning experience.
Impact on Instruction	The feedback from teachers, specifically the librarians has been positive. The librarians have begun to fully embrace the vision of a learning commons as a school wide hub for sharing, collaboration, innovation and the development of integral lifelong 21st Century skills for students, as well as staff. Many teachers started asking what they could use the technology for, as opposed to how to use the technology. The learning commons provides the opportunity for students to learn how to use the tools. The teachers were then freed up to do what they do best, focus on the creation of pedagogically sound, content-directed learning. The students then used the technology to demonstrate what they had learned. Principals have also noticed the buzz in several of our schools and have begun to hold staff meetings in the learning commons. This goes hand-in-hand with our Board's vision of the learning commons being the hub of learning within the school.
Impact on System	The transition from a library to a learning commons at the secondary level was very well received by a number of different stakeholders. There is a plan for next year to transform several elementary libraries using the same model that was used at the secondary level. The plan is to eventually transform all of our libraries into active vibrant hubs at the centre of our school communities.

Superior-Greenstone District School Board

Project Title	Technology Champions
Description	In order to support capacity building and scalability throughout Superior-Greenstone District School Board, we have identified a teacher in each school to support all learners in their school. The goals of the project are multifaceted, and include: • to develop digital literacies, capacity and efficacy among the Technology Champions • to support on-going professional learning of Technology Champions • to connect our geographically large Board and build community via social media • to support ALL learners in the schools and school community -to model 21st century skills and connected learning- The focus of the PD for the Technology Champions in Round 6 is on learning to code and supporting the development of computational thinking and technology within all schools, and across both panels. As a result of the professional development provided to the Technology Champions, we were able to successfully implement a Board wide, 6-week computational thinking challenge. With the support of the Technology Champions and the increasing awareness of technology enabled learning and teaching, Superior-Greenstone District School Board participated in the global Hour of Code event. Because of the high level of student engagement and curriculum connections, several of the Technology Champions have started or supported the creation of Technology Clubs with their schools.
Context	*Number of students:* 1,535 *Number of teachers:* 164 *Number of schools:* 16 *Grades/Program:* K-12
Impact on Students	Students most frequently reported their favourite technology was Google products, especially Google Docs because they were easy to use, could be shared with other students and the teacher, and helped students stay on track when absent from school. Students reported that their teachers and their friends were the top two supports for their use of technology. Technology Champions (TC) were not in the top three, probably because contact between the TCs and the students varied. Most frequently, students agreed that technology improved their research skills, getting feedback from teachers on their work, creativity, writing skills, and collaborating with friends and teachers. The main impact of technology on

	students' life at school was that it was fun, it facilitated sharing with peers and teachers, not losing school papers, and handing in work to the teacher. A few students commented on negative impacts such as reducing 'in-person' communication since most communication is done online.
	Final comments from students focussed on: getting more technology, upgrading technology, getting reliable internet service, unblocking access to 'good' websites, having computer-based assessment.
	In general, teachers reported that the overall impact on students using technology was positive. There was a large positive impact on student engagement, especially interest, motivation, and sense of belonging, as well as a large positive impact on learning independence, and collaboration.
	The top three areas of students' 21st century competencies impacted by technology are:
	Problem solving: Most teachers who commented on problem solving stated technology was beneficial. These benefits tended to be in math (where problem solving has a specific meaning). There were a few teachers who said that student problem solving was negatively impacted by technology because they rely on information from the Internet without critical thinking
	Collaboration: Students collaborate more because of technology. They collaborate with classmates at online, shared spaces (e.g., Google Docs), with students at other boards in other geographic locations.
	Connections: Students are more connected, and make more connections, because of technology … "connected to the world" through the Internet, staying connected to school using their devices at home, connections between students, and also making cognitive connections between learning subject matter and applications in different contexts.
	Technology Champions either directly impacted the learning of students with classroom visits or technology clubs or indirectly by supporting the classroom teacher who then provided opportunities to the students. The TCs reflection shows a high level of student leadership opportunity, engagement in learning with technology, an improved growth mindset, sense of learner community and 21st century competencies development. Students were co-learners in the classroom with their peers and their teachers and this shifted the learning environment in the schools.
Impact on Instruction	74% of teachers reported having received professional development or other support for using technology at school. There is significant growth in the use of technology with students in the last five years, with approximately triple the number of teachers using technology with students. 27% of teachers were implementing technology with their students in 2011 and 81% were

	implementing technology with their students in 2016.
	Teachers report that using technology at school has had a positive impact on technology-enabled instruction, resources for planning learning for an individual student, responding to the needs of individual students, and teacher professional learning. Other comments by teachers were that learning about technology takes time and one must be patient, there are barriers to sharing technology for learning with others; lack of interest, lack of relevance, lack of time, heavy workload. Learning about technology and sharing knowledge is an ongoing practice, not an isolated learning or sharing event.
	There are two types of TCs in terms of accessing technology: TCs that access the technologies months in advance of supporting teachers and students. Other TCs access the technologies at almost the same time as teachers and students. Both of these approaches have benefits. TCs who learn first teach second may build confidence with the technology uses and may distil information into efficient packages for the teachers and students. TCs who learn and teach all together may role model openness and risk-taking and collaborate for problem solving as the technology-enabled learning progresses.
	The impact of TCs on teaching practice depends on the time/experience that the person was in the TC role and the accessibility of the TC to teachers. When the TC was in the role for a while and the teachers had easy access to TCs, then the impact of TCs on teachers is positive. When the TCs were new or when they were not accessible to teachers, they did not have much impact on teacher practice.
	The TCs report that the opportunities to connect and learn with their colleagues allowed all involved to have a renewed sense of connectedness, increased curiosity about the potential of technology in the classroom, and a greater understanding of 21st century competencies. Most importantly, the TCs have communicated a shift in school learning cultures. Most specifically: • increasing awareness of the connection to technology use and curriculum • shifting from teacher-directed to student centred learning • shift in thinking of teachers as co-learners
Impact on System	TCs have the greatest influence on their schools and boards. TCs are active in provincial initiatives about technology and education and are making international connections with other learning professionals. Twitter is a key mechanism through which TC influence others' learning and share knowledge, followed up by more direct personal communication.
	The TC's are modelling connected learning and through this modelling and at- the - elbow support, they have encouraged educators in their schools of influence to join Twitter. As a result, an increasing number of educators, and all schools within the Board, access Twitter and Facebook to share their joy in learning with their

| | students, their wonderings and their celebrations. Their sharing allows the school community to see the celebration of learning, and to participate in the engagement process with our students at home.

The TC's are a model PLC for future initiatives. They support and challenge each other and use reflective practice to inform their next steps. They are committed to risk-taking to improve their professional practice and student achievement. They leverage tools that allow them to share, collaborate and leverage a global PLN for improved practice. |
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Superior North Catholic District School Board

Project Title	Building Relationships through Collaboration and Communication
Description	Behind effective collaboration and communication are strong relationships. Our long term goal is to use technologies to increase relationships between and among our schools, students, teachers, principals, administrators, and communities. The focus is Improving Collaboration and Communication through: • Google Apps for Education • Social Media (specifically Twitter) • Problem-Based Learning (Genius Hour and 20 Time) • Physical environment as the "Third Teacher" Each school has a Digital Learning Volunteer (DLV). The DLV is a teacher who has an interest in technology-enabled learning. They meet virtually once every month for 0.5 of a day with the Technology Enabled Learning and Teaching Contact to learn about the focus of the project. Their role is to then provide at-the-elbow support for the teachers, principals, and students in their respective schools. Outcomes Include: • Teachers, principals, and administrators will be connecting and collaborating using the Board Twitter • Our Grades 5-8 students will be using their Chromebooks to support problem-based learning (participating in Genius Hour/20 Time) • Students and educators will work together using Google Apps for Education. • The Digital Learning Volunteers will become leaders within the Board.
Context	*Number of students:* 319 *Number of teachers:* 58 *Number of schools:* 9 *Grades/Program:* Gr.5-8
Impact on Students	The goal of the project was to continue capacity building with educators and students to strengthen relationships, collaboration and communication. There were many successful projects that supported the goals and objectives of the project, they included: • Building capacity around GAFE • Experience Superior North (Adobe Connect Session) • Staff increase usage of social media • DLV in each school (9 DLVs - 1 in each school, 2 release days per month) • Chromebooks in Grades 3 - 8 • Problem-based learning through robotics

	• Innovative learning spaces transition to learning commons (Third Teachers)
	Innovation/Creativity, Collaboration, Communication, Learning to Learn
	Grades 5- 8 students participated in a Google summit. Students were able to share their learning with their parents, during the parent summit in the evening. SNCDSB has been supporting students using GAFE in the classroom to demonstrate their learning through the use of GAFE, specifically Google Drive, Google Slides, Google Docs, Google Draw and by using their Google Classroom.
	Students are using Google Docs specifically to collaborate using a single file. All students within the group can work on the assignment simultaneously. Students are able to communicate with one another, while working towards achieving a common goal. Students have also used their Chromebooks to participate in "Genius Hour" and "Hour of Code".
	Teachers have observed that students are more engaged when using technology to complete their assignments, there has been an increase in fostering peer mentorships and leadership. Speaking to the Pathways for Success Document, students see the value in problem solving through coding, learning that there are careers that rely on coding.
	Students who have special needs that require programs such as Google Read to gain independence in their work, have been supported through the TELT contacts and classroom teachers.
	Collaboration and Communication
	Through the Experience Superior North project, students had the opportunity to collaborate using technology and face to face. There were two Adobe Connect sessions that joined 5 schools within the board with Toronto Catholic District School Board and Crescent School students. In the first Adobe Connect session, students investigated the inquiry questions that are foundational to the Pathways to Success (2013) Ministry of Education document. Working within their groups, students analyzed themselves thinking about whether they have a growth or fixed mindset. Students then shared with one another in their groups, their breakout sessions and the wider group. In the second technology-based meeting, students explored "A Balanced You"; this topic focused on student well-being. The culminating collaboration was when the students from Toronto made a trip to the Superior North Catholic District School Board to meet their new friends face to face. The week long itinerary engaged students in learning about Indigenous culture through experiential learning.
	To use our school environment as a "Third Teacher" to play a role in student engagement, achievement and wellbeing
	The transition from a traditional library to an interactive, collaborative, innovation learning commons has shown an increase in student engagement.

	Within the updated space, students use robotics kits, work together to complete challenges. Students explore, solve problems by critically thinking how to work through the steps involved to complete the challenges.
Impact on Instruction	The Digital Learning Volunteers became leaders within the Board, forming a network to share ideas and help spread and support deep learning through technology. The DLV role within each school was paramount to the success of the Experience Superior North Adobe Connect Sessions. DLV supported the setup of the technology in each school to ensure students had a seamless Adobe Connect experience collaborating with their peers across school boards. DLVs set goals and objectives at the beginning of the school year specific to their school. The DLVs worked one-to-one with a number of teachers in order to develop and enhance learning of technology.
	Teachers have expanded the GAFE tools to support instruction, pedagogical documentation and assessment in their classrooms. Educators are using Google Classroom to differentiate instruction, Google Forms as an exit ticket to perform formative assessments and Google Docs and Slides to support student collaboration.
	Teachers, principals, and administrators connected and collaborated. The first professional development day for staff as the Google Summit encouraged staff not be nervous to press the button, to have a growth mindset and take a risk using different technology and tools. Teachers selected GAFE sessions that met their personal needs as an educator.
Impact on System	As a system, efficiencies have been established through the use of GAFE. The school board is using technology to support building and sharing agendas, working documents, sharing information, facilitating collaboration, collecting data and for hosting meetings.
	The Director of Education, Superintendents, Principals, TELT contacts and DLVs were able to support the entire system using Google Hangout to facilitate professional development. Each school held their own Google Hangout and worked through the agenda collaboratively online. All staff were enthusiastic about the positive outcomes as a result. Educators were able to identify how the technology reduces barriers due to geographic location.
	The increased use of Twitter across the system has supported educator professional development through sharing classroom pedagogy and instructional tools and techniques. Educators are using Twitter to document the learning happening in their schools and classrooms. The benefit has been teachers sharing their practice and taking risks using technology.
	Through the GAFE, specifically Google Forms, data has been collected throughout the year.

Thames Valley District School Board

Project Title	Project-Based Learning
Description	TVDSB will engage in a pilot project centering on Project-Based Learning with 30 of our 159 schools. The goal of this project is to build upon previous projects which focused on Inquiry Learning.
	As we move through this project, we hope to see classrooms engaging in PBL experiences, including the required changes in assessment techniques, and the increased use of student voice and choice.
	Internet-enabled research includes opportunities to connect virtually beyond the walls of the classroom to work with subject-specific mentors, to share their work product with authentic audiences, and to increase the variety of options that students have available to them to demonstrate their learning.
Context	*Number of students:* 3,137
	Number of teachers: 120
	Number of schools: 30
	Grades/Program: JK-12
Impact on Students	The competencies that we focused on in this project were collaboration, communication, creativity and critical thinking, although teachers in the focus group articulated that they also observed global citizenship, learning to learn, innovation and entrepreneurship as being evident in their classrooms during their Project-Based Learning (PBL) work.
	Collaboration is a centerpiece to PBL. Students are encouraged to group together with those studying like topics and to share resources and information. While much of the research work and learning is done together, students are often asked to demonstrate their individual learning in a way that can be evaluated. Tools like G Suite are invaluable for collaboration because they allow for group work to continue through physical separation such as when working from home, and also for different people to collaborate (both peers and the teacher may be contributing to a Google Doc). Over the course of this project, we saw the number of teachers who identified that "students were ALWAYS collaborating" in their classroom move from 12% to 32%.
	The portion of communication that is tied to our students' demonstration of knowledge was greatly altered by the introduction of PBL. Teachers were more likely to allow students to pick from a variety of digital platforms, and no longer was the concern around teacher comfort with the app or program, but the larger consideration was whether it was the ideal tool to communicate their knowledge and learning. Over the course of this project, we saw the number of teachers who identified that "Students were ALWAYS communicating" in their classroom move

	from 25% to 43%.
	Creativity was evidenced through the autonomy that students were given to determine the product that could best demonstrate their learning. When given the freedom, we saw a wide range of choices – some of which were entirely digital and some which combined tangible projects with digital aspects. Over the course of this project, we saw the number of teachers who identified that "Students were ALWAYS creative" in their classroom almost triple from 7% to 19%.
	Critical thinking was encouraged in many ways, but initially though the use of the Question Formulation Technique. Because the students were asked to create their own questions and could pursue the areas of a larger topic which most interested them, they began to think critically about how they would find information, whether their research made sense within a larger schema, and the implications of their learning. Web-based research was key to the development of students' critical thinking. Over the course of this project, we saw the number of teachers who identified that "Students were ALWAYS thinking critically" in their classroom from 9% to 16%.
	Devices continue to be used by students to research, to provide peer feedback, and to communicate their learning utilizing different apps. Teachers are utilizing the same technology to assess the daily work in their classroom through the use of Google Forms or other apps, to provide formative feedback, to connect with experts, and to share completed student work, where appropriate.
Impact on Instruction	A main goal of this project was to provide learning for teachers around different ways that learning can be structured in their classroom. The Project-Based Learning model encourages the role of the teacher to be a Project Manager as opposed to the more traditional model of teacher as information provider. In our survey, between 80% and 83% of teachers indicated that they had taken on the role of Project Manager, co-planned, reflected with others, and refined the implementation of the PBL project more than once throughout the year.
	As part of our final survey, teachers were asked to rate the level of impact the PBL projects had on their practice. 59% indicated it had a large and or very large impact on their practice. 75% of the teacher respondents indicated they would be using the PBL approach in the future
	Many teachers utilized the power of having a school team. They took advantage of the school-based release that was available to them to co-plan, co-teach, and to reflect.
	One of the most pressing questions that teachers identified after the first day survey centered on assessment. With an emphasis on formative feedback, we presented a variety of ways that teachers could 'check in' with their students both formally and informally (e.g., Google Forms, the commenting feature, Kahoot,

	Smart Amp, stop light tent cards, selfies). In many cases, this has revolutionized the ways that teachers are both communicating with, and assessing, the work of their students.
Impact on System	The 2016-2017 project incorporated portions of previous projects (e.g., Inquiry-Based Learning, Cloud Computing) as well as extending further to include the principles of Project-Based Learning (PBL).
	Due to a concentrated focus on assessment, the teacher as Project Manager, and student questions driving learning more generally within our project, we are confident that we are producing both pedagogically-driven and technology-enabled practices within our Board.
	There are strong connections between our work and our Board's current 'Rethink Secondary Learning' initiative that encourages schools to explore alternate programming and school day designs that will ultimately benefit student learning. The work that we have done with PBL complements the multidisciplinary approach that many schools are investigating.
	As a direct result of our emphasis on connecting with experts, Board policies pertaining to privacy and video conferencing were updated to reflect the current landscape of digital communication.

Thunder Bay Catholic District School Board

Project Title	Educating for the Future - Preparing for the World
Description	The purpose of this project to leverage technology for teaching and learning to achieve the TBCDSB Collective Commitments: • High Expectations & Academic Optimism for All • Closing the Gap (meeting the needs of vulnerable students) • Relevant and Complex Learning Designing (lessons that are based on real-world situations) • Balanced Programming (creating lessons that focus on guided practice and the development of student independence) • Personalization (providing instruction and assessment that are tailored to students' particular learning and motivational needs) • The Feedback Cycle (including learning goals, success criteria, descriptive feedback, self and peer assessment and goal) We are scaling up include providing opportunities for students to: use technology to articulate their learning; recognize how to improve their work; engage in inquiry-based learning; think critically; reason and communicate effectively.
Context	*Number of students:* 20 *Number of teachers:* 10 *Number of schools:* 2 *Grades/Program:* Gr.9-12
Impact on Students	We worked with a researcher to better understand what students are currently doing in respect to global competencies. Students shared their stories about their favourite projects from a selection of secondary school courses. The competencies that seemed to be alluded to most frequently through the stories were: critical thinking, character, communication, collaboration, creativity, and citizenship. Students' explanations of the reasons for a project being their favourite included reflections of various competencies. They appreciated the freedom to define project parameters (critical thinking), to be actively engaged in the design (creativity), and to direct their own learning to accomplish project goals (character). Engagement in projects often took on a larger role, a desire to extend and understand impacts beyond the classroom. A sense of ownership was reflected in not only a focus in meeting an audience's need, but also the amount of effort invested in the project. Learners are developing a variety of competencies through active, experiential, and authentic projects.

Impact on Instruction	Due to labour issues, we worked with a researcher to better understand the teacher perspective related to global competencies. When looked at as a group, the overall prioritization of competencies was critical thinking, communication, character, citizenship, collaboration, creativity.
	There were predominant barriers that teachers perceived to impact the implementation of competencies into their teaching practice. When looking at an aggregation reported by all domains, the top one was the perception as a lack of support from both school administration and from parents. More specifically, teachers mentioned a desire for consistency with administrative support and the establishment of shared values related to school and subjects, both inside and outside of the school. Additional barriers included a lack of student accountability (ownership of one's learning, responsible use of technology, logical consequences), lack of attendance (students feeling disengaged and disenfranchised), and lack of time (for teachers to try new things).
	Teachers' perceptions of the role technology can play to support their efforts to develop competencies in their students:
	• Technology can support learning associated with various competencies
	• Technology can provide greater access to information
	• Technology can facilitate communication among teachers, students, and parents
	• Technology can provide online assessment tools
	Teachers identified learning as the primary role that technology would take when considering the implementation of competencies into their teaching practice. This role is further described as supporting differentiation and accommodating various styles of learning, supporting the development of information literacy skills, and supporting practice, exploration, and adaptive learning.
Impact on System	By far, teachers felt that support should be invested in two areas. The first was time to collaborate with peers. Teachers identified collaboration as an enabler for the implementation of competencies into their teaching practice. The second was student ownership, described as having students engaged, accountable, and buying into the value of their education. This is a little more challenging, as it speaks to the attitudinal state of students and not as easy to potentially address as something more tangible like curricular or technology changes. Student ownership of their learning may be considered a system-level issue that requires a holistic and partnered approach.

Toronto Catholic District School Board

Project Title	Coding and Grade 5 Mathematics
Description	Teachers will explore math curriculum and coding concepts to discover connections between the two. The goals of this project are: • inquire into connections between coding and the mathematics curriculum • explore coding and its potential impact on student achievement • design learning activities that develop computational thinking to address the specific learning needs of students • effective integration of technology and potential impact on teacher practice • effective integration of technology and potential impact on teacher and student engagement This professional learning opportunity will take place over two sessions for each teacher. Teachers will be spending part of the time getting familiar with the coding program called "Scratch". Teachers, using provided web sites, will get acquainted with or explore further, block-based coding. Teachers will work in teams to create projects using content from a math strand. The sessions include time and opportunities to share the materials broadly with participants. If teachers are able to implement some of the resources they create in these workshops in the classroom that would be the first major step.
Context	*Number of students:* 6,500 *Number of teachers:* 169 *Number of schools:* 169 *Grades/Program:* Gr.5 Mathematics
Impact on Students	In order to understand any potential realized impact on students it is important to highlight that 50 teachers participated in one or both workshops. As a result, 453 students participated in the pre-survey; 229 students participated in the post-survey. These surveys provide the greatest evidence of impact. • Overall, the data gathered indicated positive experiences for students in using Scratch and coding for learning math. Given the short time span between pre- and post-survey, noticeable changes in student perceptions were not very evident but there are some indications of positive change in student engagement. • Many students reported that what they enjoyed the most about learning math with Scratch was creating shapes using degrees and angles, figuring out how to the move the sprite, the games or creating games. • While the findings summarized here are not conclusive, they appear

	promising. More follow-up is needed to determine the long-term impact.
	• Throughout our journey we highlighted the global competencies. However, both teachers and students were primarily at the entry level stage of exploring mathematics and coding, so focusing on fostering global competencies was difficult. Going forward there will more of an opportunity to infuse how to foster global competencies in the activities teachers create.
	Overall, the global competencies were fostered as a result of the activities teachers tried to implement in their classrooms. Going forward we suggest that the global competencies be formally shared with students, and that students become part of the exploration of these competencies to appreciate the skills they need to develop to thrive in our society.
Impact on Instruction	Overall, the data gathered indicated positive experiences for teachers in using Scratch and coding for learning math. It should be noted that of the 50 teachers who participated in the workshops, only 10 teachers provided feedback. Therefore, due to the small sample, one should exercise caution in interpreting the results and drawing conclusions.
	• All teachers indicated they were able to make connections between the grade 5 mathematics curriculum and coding.
	• 5 teachers reported that the use of Scratch somewhat had an impact on student engagement; another 3 teachers indicated they did not know.
	• The majority of teachers indicated that they will continue to use Scratch and/or coding with their class next year.
	Throughout our professional learning journey teachers continued to share, and connect with one another to develop activities. Some led sessions back at their school to continue building capacity. Teachers joined a Google classroom and formed a professional learning community.
	The most significant challenges remain to be the appropriate integration of coding with curriculum and assessing coding activities. Going forward these areas may become our areas of focus while fostering global competencies.
Impact on System	All 169 Elementary schools were invited to participate by involving one class of Grade 5 students and one teacher in the project.
	The goals of the project were exploratory, focusing on examining if there can be an impact on student interest and engagement in math, with learning math through coding and Scratch. Data collection included teacher and student perceptions, and examined the extent to which students were engaged or interested in math.
	Centrally our mathematics department have continued exploring how coding can effectively be integrated with mathematics. From the learning experienced by everyone, we have started brainstorming ideas for next year.

Toronto District School Board

Project Title	Fostering Deeper Learning and Global Competencies through Steam Education
Description	In 2016-17 our STEM/STEAM Innovation project continues to focus on going deeper and scaling up in order to provide a strong STEM/STEAM foundation and learning for all. Overall, the TDSB Innovation Project focus is to foster learning environments where global competencies are defined by deeper learning, digital citizenship and supported by pervasive digital technologies enabling students to achieve high levels of literacy, numeracy and digital fluency.
	Specifically, the focus will be on changes in student learning and engagement and teacher engagement and practices in STEM/STEAM teaching through educational technology, coding, robotics, STEM Digital Lead Learners (STEM-DLLs), STEM/STEAM pedagogy, teacher engagement, deeper learning, global competencies and equity and inclusive learning.
	Our focus is on continuation and going deeper with the STEM/STEAM Strategy, Coding and Robotics, along with the added component of improving Numeracy Achievement, enhanced by technology, through STEM/STEAM pedagogy (Trans-disciplinary approach to Inquiry and Problem Based learning that fosters Collaboration, Creativity and Innovation in all students).
	Coding and robotics will remain a focus as we go deeper with specific curriculum connections that develop the use of robotics and computational thinking in a relevant, purposeful and meaningful way to enhance the curriculum content and lead to deeper learning. To incorporate mathematics and numeracy in our next steps, our goal will be to go further and include technology-enhanced improvements in numeracy achievement through STEM/STEAM pedagogy.
	To this end we will be including specific Mathematics focussed actions which will continue our technology and STEM focus but also emphasize mathematics and numeracy. We will expand the DLL (Digital Lead Learner) model, which is presently comprised of both DLL and STEM-DLL, to include the new MATH-DLL.
Context	*Number of students:* 4,000
	Number of teachers: 200
	Number of schools: 90
	Grades/Program: JK-12
Impact on Students	Comprehensive research is being carried out that compares classrooms within the same school that have a technology and robotics component to those that do not.
	• Our field study findings suggested that the most commonly cited successes were increased student engagement and enthusiasm for the initiative.
	• Teachers and administrators report positive impact is among student

	engagement, especially with students who traditionally do not respond to conventional learning practices.
	• Other impacts include a growth mindset among students and teachers, more problem solving, critical thinking, and collaboration.
	• STEM allowed for engaging students who might not fare well under conventional learning methods. This was especially true for HSP, Special Education students, ELL's and students from low economic backgrounds to succeed. It also allowed for differentiated learning, hands-on learning, and access to technology.
	• Students who have had continued participation in STEM showed increases in achievement and engagement reported in report cards. In schools where STEM is in its second year, students demonstrated an increase in learning skills (responsibility, organization, collaboration and self-regulation), increased scores in reading, math and science.
	Integration of Robotics and Technology into the classroom study indicated increased student engagement, self-esteem, and perseverance and Increased abilities with collaboration, inquiry/problem-based learning, creativity and innovation.
	Robotics has been associated with improvements in elementary student academic achievement and learning skills as measured in report cards and standardized tests. They further show improvements in responsibility, organization, independent work, collaboration, initiative and self-regulation learning skills and habits as graded by their teachers.
Impact on Instruction	STEM has helped teachers improve their engagement, integrate more technology into their classrooms, and increased their abilities at teaching with STEM, robotics and coding.
	Overall, teachers and administrators had a variety of opportunities to collaborate, co-plan, and coordinate activities; however, more consistent and equal opportunities across schools are desired. For administrators, successes included professional growth among them and their staff with STEM. For STEM coaches, the main successes were increased implementation of STEM pedagogy.
	For teachers, the main successes were increased teacher collaboration and better assessment practices that are better reflective of student learning. STEM teaching and learning has had an impact on creating more student-centered teaching practices. It also allowed for differentiated learning, hands-on learning, and access to technology.
	Key findings on the impact on teachers from the Robotics study include:
	• Increased understanding and ability to connect robotics to other technologies
	• Improved confidence in choosing the most appropriate pedagogical approach

	to teach students about robotics
	• Improved confidence in ability to help students when they have difficulty with robotics
	• More dynamic and learner focused teaching
	• High levels of teacher emotional and social engagement when teaching
Impact on System	Research into STEM has generated data that shows how the initiative is affecting the entire TDSB. This effect can be viewed both in terms of how STEM will be further scaled up or implemented, and what resources the TDSB expends to maintain and expand STEM. Scaling up, maintaining, and running a large scale initiative like STEM requires significant contributions from central leadership, school administrators and STEM coaches - all provided various support and resources that allow STEM to flourish.
	Efforts have been made to scale up the initiative both within the school and across the board. Another area is the extension of the instructional coaches across the system as a means of growing the STEM strategy. This outcome is due to the realization that STEM coaching provides increased teacher self-efficacy and delivers a variety of positive effects for students and teachers engaging in STEM activities.
	Recommendations for scaling up include:
	• Coaching Model – consistent access to coaches, more time with coaches, help with co-planning/co-teaching
	• Professional Learning – ongoing and meaningful professional development that progressively teach new concepts
	• Resources and Technology – technology in schools needs to be upgraded, ensure enough technology for STEM initiative

Trillium Lakelands District School Board

Project Title	Coding Classrooms
Description	Components of our innovation research project include: Job-Embedded Professional Learning As our district promotes accelerated uptake with integrating technology in the classrooms, consultants are supporting teaching staff in their classrooms by providing job-embedded professional learning through co-planning and co-teaching with classroom teachers. Earn-A-Device (EAD) The "Earn-a-Device Program" provides teachers the opportunity to obtain a Board laptop or iPad for professional use both at school and at home. Sessions are hosted in-person and online. Teachers complete a minimum of 6 professional learning sessions to earn a new device. Complete a minimum of 4 professional learning sessions to earn a replacement device. Coding Classrooms In the first year of this project, we engaged junior grade teachers and students in computer block-coding/programming. This year we expanded this project to include the primary, junior and intermediate divisions. By learning how to write code, students learn not only how to consume technology, but to also be imaginative creators of technological artifacts. Secondary Technology Champion Every secondary school in our district has a volunteer Secondary Technology Champion. These individuals have created a high level of support in their school and have provided another means for dispersing information in our schools. Digital Learning Classrooms (DLC) – Elementary & Secondary These classroom teachers receive job-embedded professional learning to embrace technology-enabled educational practices in their classrooms. This school year we have increased our elementary DLC classrooms from 38 to 60. There are 10 Digital Learning Classrooms across our 7 secondary schools providing enough technology to support a 1:1 device ratio based on largest class size. Teachers had a choice between iPads and Chromebooks or a combination of the two.
Context	*Number of students:* 5,855 *Number of teachers:* 524 *Number of schools:* 48 *Grades/Program:* K-12
Impact on Students	Coding helps to build skill sets, such as logical thinking, problem solving, collaboration, communication and persistence. Teachers and students have both

	indicated that students are more comfortable and confident in taking risks and learning from their mistakes when programming their activities.
	Coding is based on a foundation of creating code, running it, and revising it to improve the efficiency and effectiveness of their program. Most students find themselves working very hard to accomplish their desired outcome. Regardless of the time and effort required, students are persevering when challenged with a difficult situation. Students are also working side-by-side with other students and teachers to communicate and collaborate on their programs. At this time, for most students, we are not seeing these skills carry over to other areas, such as mathematics and literacy, but we are confident and optimistic on this changing as we move forward with coding.
	Students are eager to share their work and provide feedback to their peers. Our Junior and Intermediate Coding teachers create studios in the Scratch environment so that students can post their programs for others to view.
Impact on Instruction	Almost every one of our 41 elementary schools has one Primary, one Junior, and one Intermediate Coding Classrooms teacher. Having 3 lead teachers in each school has really helped to make an impact throughout our schools. For example, we have Coding Buddies in a lot of schools where a class or group of students work with other students from a different class and teach them how to code.
	We provided 2 iPads and 2 Dash & Dot kits to the Primary Coding Classrooms; 5 Chromebooks and 2 Makey Makey kits to the Junior Coding Classrooms; and 5 Chromebooks and 2 mBots to the Intermediate Coding Classrooms. The technology is being shared among the coding classrooms at the schools and also with the classrooms that are not directly involved with our Coding Classrooms initiative.
Impact on System	The Technology Services Consulting team has supported the expansion of coding at our Board in many ways. Training was not just provided to our Coding Classroom teachers, but also to all consultants in our board. By training consultants in other departments, it helped expand their own knowledge of coding and provided them the confidence to work with teachers.
	Teachers and administrators are seeing the value of students learning how to code. To expand beyond the Coding Classroom projects, some teachers applied for, and received, grants to run coding nights at their schools. Students were able to share with parents their knowledge about coding and how it relates to their learning skills.
	Coding in our district will continue next year and we look forward to seeing the impact it will generate in teacher practice and student learning.

Upper Canada District School Board

Project Title	PD Learning Cycles for eTeachers (PDLCeT)
Description	Our Round 6 research project (PDLCeT) directly supports our Board's mission statement "we prepare all students for a successful life". A positive online experience for our students will allow them to fully embrace 21st Century skills and competencies making them successful adults and global citizens.
	As demand for eLearning courses increases, so do the demands for high quality, engaging and current content which prepares our students for success in the 21st century. Professional development will be provided in cycles during the semester with varied content aimed at meeting the needs of our eTeachers. Our professional development sessions will increase understanding of the changing role of the teacher as an activator of learning, the development of rich learning tasks, the effective use of technology to engage students, and supporting students to increase 21st century competencies.
	These cycles will offer one-on-one learning between the eTeacher and the Technology Enabled Learning and Teaching contact (TeLTc), as well as group sessions so that professional learning can be individualized and shared to support capacity building and promote learning partnerships by leveraging the expertise of more seasoned eTeachers. This will create a culture of collaborative professionalism and build professional capacity so that eTeachers can exchange ideas, best practices & resources and support each other during the implementation phase of the project.
Context	*Number of students:* 875
	Number of teachers: 23
	Number of schools: 15
	Grades/Program: Gr.10-12
Impact on Students	The focus of our Innovation Project in the 2016-17 school year was placed on growing and improving our Day School eLearning program, but more specifically on improving instructional practice by providing opportunity for the professional growth of the educators that could make a difference for our students. Thus, the impact on students was not a planned element, but rather an opportunity to create a baseline which could be used in the next phases of the implementation of our project.
	During phase 1, we could discern some impacts on student success in online courses by looking at quantitative data. Student success rates in terms of credit attainment, class averages and attrition rates were collected and compared to similar data of online courses from the previous school year. The data indicates that in future phases we must attempt to decrease our attrition rates and

	continue to focus energies on student engagement and satisfaction in online courses. It was clear that frustrations arose due to technological issues associated with the learning management system (LMS) and the clear and concise communication of expectations that some students required.

We are encouraged by the increases, however slight, in student achievement. We have also documented the feedback offered to us by students. Student comments will guide us in planning sessions for next year's eTeachers. |
| Impact on Instruction | New digital tools and teaching practices meant to improve content, communication and feedback to students were introduced to eTeachers. Many of these digital tools were tried and tested in many units and in real time with students. During the collaboration days, eTeachers discussed the merits of these tools and decisions were made on their value, ease of use and ability to engage students and improve instruction.

Communication in the online environment was an area our eTeachers sought to improve in their online courses. The use of audio and video was explored and employed using video conferencing software such as Lync, audio visual feedback tools such as Office Snip and integrated tools found in our virtual learning environment.

According to eTeachers and from continuous observable evidence, collaboration was essential to the success of our PD Learning Cycles. Meaningful time spent in discussions and hands-on practice with colleagues helped to inspire and to support the participants.

Participating teachers expressed their desire to use the resources collected in the shared OneNote to help enhance their face-to-face classroom practices. The promising, evidence-based practices and resources found within can easily be adapted in blended, face-to-face classes since they benefit all students.

We remain committed to improving online courses so that their pedagogy remains current with the developments we see in our global community. This can only be achieved if we pledge not only time, but funding and resources that will strengthen our teachers' ability to ensure that our students acquire the fundamental skills to succeed academically and professionally in their chosen paths.

We acknowledge that we must review and revise our approach to learning and teaching in order to move forward. Our teaching practices and pedagogy must be connected and relevant to our students' everyday lives. It is our goal to prepare all students to not only develop the necessary skills for success, but to draw upon and to transfer these skills into life situations where self-reliance and continuous learning will be required. |
| Impact on System | Our PD Learning Cycles for eTeachers align closely with our system's vision of providing the best programming we can to our students. The collaboration and |

professional development which were an essential part of our Innovation Project also reflect our system's belief in equitable, purposeful, ongoing and open exchanges of ideas. We believe that the measurable improvements we have made in our online programming is a direct result of the implementation of our PD Learning Cycles project.

Our eTeachers are at the forefront of understanding how our eLearning courses need to structured and delivered to effectively impact student learning. Our ePrincipal was closely involved with the ongoing planning of the PD Learning Cycles for eTeachers and often participated in and led discussions with participants.

There have been some immediate changes and some planned restructuring in the policies and procedures which govern how we administer our eLearning program. PD Learning Cycles for eTeachers is in and of itself a new approach to how we deliver professional development to our teachers. A job-embedded and ongoing format such as our Innovation Project attempted is new in our eLearning program. It is our belief that the consistent and continuous format of the PD that was delivered was the most useful part of the model, echoed by most of the participating eTeachers. Therefore, we have already planned to continue the format next year.

It has been decided that, as we offer a new round of collaboration days in the format we used this year with our PD Learning Cycles, it would be an efficient use of time if we invited Guidance Counsellors and Office Assistants. As a board which is experiencing growth in our eLearning program (ie. going from 36 eLearning sections to 51 sections), we believe that eTeachers working in isolation is counterproductive. The success of the collaborative model of our PD Learning Cycles needed to be replicated at the school level.

Our board is working towards structuring a district-wide timetable that will permit a consistency in bell schedules and programming for all our schools. Once this district wide timetable is in place, our eLearning department will be poised to deliver synchronous eLearning courses between schools in our board. We believe that the eLearning Commons room pilot will offer insights into how we can take advantage of a board-wide consistent timetable and the technology to connect multiple classrooms, teachers and students.

Upper Grand District School Board

Project Title	Is Dreambox an Effective Tool to Support Student Learning in Math?
Description	The purpose is of bringing Dreambox into our system is to use it as a tool to identify and target gaps in primary students' mathematical understanding. Gaps in students' early mathematical understanding have been identified as a learning need across the system, using EQAO results as evidence. The purpose of the research component is to evaluate what impact Dreambox is having on our students' mathematical understanding. We will be using the 2017 EQAO results to attempt to measure the impact.
	This project involves purchasing 5000 licenses and allocating them to teachers who want to leverage this tool in their classroom to identify and target gaps in math. A Google Form signup was sent electronically to all principals to forward to their staff in early June of the previous school year. Grades 2 and 3 classrooms were given priority. The remaining licenses were allocated on a first come first served basis.
	To support teachers, 2 after school sessions were held. Teachers were shown the different learning environments, the features in each learning environment, and how to use the program effectively was a main topic of discussion. The second after school training session focused on the effective use of the Dreambox dashboard to identify and target gaps.
	Technology is being used to provide students with opportunities to use math manipulatives to deepen their mathematical understanding and to assist in fostering conceptual understanding. The deeper learning in this project is for teachers to use the dashboard to inform what they are doing in their mathematics classes, so they can target gaps. The deep learning will happen if teachers are collaborating by having critical discussions on the information contained in the dashboard and how this will inform their next teacher move outside of Dreambox.
Context	*Number of students:* 1,454
	Number of teachers: 82
	Number of schools: 65
	Grades/Program: Gr.3
Impact on Students	Most teachers who are using the tech tools are making concerted efforts to bring the virtual manipulative into the regular classroom. In the teacher survey, it was noted that many teachers are finding that students are using the manipulatives they have used in virtual environments in their regular classroom math activities. The majority of teachers surveyed noted that the use of virtual manipulatives was transferring to problem-solving situations. This shows that under the right

	conditions the use of manipulatives and learning can transfer from a digital environment to classroom math activities.
	Just over half of the teachers surveyed said tech tools helped with their student's visual communication in math. The use of virtual manipulatives are definitely finding their way into how students are communicating their mathematics understanding. Teachers are generally trying to push students towards the abstract end of the concrete, representational, and abstract continuum, and the use of technology is allowing students to draw on a variety of representations.
	Upper Grand was looking at the impact a blended learning environment has on the global competencies. In order to develop students who will be ready to respond and adapt to a rapidly evolving world, students who are able to communicate, collaborate, innovate, be creative, and can learn on their own.
Impact on Instruction	The greatest impact on teachers in the course of this innovation project was seen at the schools that aligned this initiative with Upper Grand's move towards collaborative inquiry as a vehicle to drive professional learning.
	One school aligned their collaborative inquiry in the primary division directly with the goals of this innovation project. Their collaborative inquiry question was "How can we foster number fluency with our students so they can have multiple strategies to solve addition, subtraction, multiplication, and division problems." Two of their theories of action were directly tied to the goals of this innovation project: (1) If we use diagnostic assessments to form small groups, then we will be better able target instruction in small groups, and (2) if we provide a blended learning environment rich with math learning, then the learning will transfer from the online environment to the regular classroom. Working through the collaborative inquiry process of plan, act, assess, reflect, the teachers found that they could impact student learning.
	Teachers have noted that some tech tools have greater effects on collaboration than others; how the tool is used, also has an impact on how effective the tool is in the classroom. Following the SAMR model, technology that is used at the substitution level often times does not help foster many of the global competencies, including collaboration. Anecdotally, teachers are saying that robotics and coding technologies are providing opportunities for collaboration well beyond applications that provide students the opportunities to practise skills.
	In order to differentiate instruction and meet the interests and needs of all learners, this year the focus was to bring the use of technology in math into small group instruction. The evidence shows that that this is beginning to shift, as few teachers involved in the innovation project are beginning to target instruction in small groups.
	It was noted in previous rounds that the assessment opportunities that some

	tools provide, both diagnostic and formative, could be leveraged to identify and target gaps in student learning. At the beginning of the year multiple mandatory after school sessions were devoted to support assessment practices when using technology. More than half of the teachers in the teacher survey are using this data as outlined in the workshops.
	This evidence points to the need for professional learning on how to leverage assessment for learning to inform instruction and to target gaps in student learning.
Impact on System	Our evidence is pointing to the need to target specific grades if a substitution tool is going to be used system wide. Anecdotally, teachers and students are saying that engagement wanes when one tool is used throughout multiple grades. Our current evidence suggests that - in the case of Dreambox - the target grade should be grade 1. An analysis of the data shows that grade 1 students made the most progress when filtering for minutes within the game and lessons completed.
	Upper Grand has seen the need to diversify the tools being used in class to encourage the transfer of learning, target all the global competencies, and to prepare students for the rapidly changing world they will inherit. One tool alone will not meet the learning needs of all students or help foster all the global competencies. Upper Grand will continue to support robotics, coding, virtual manipulatives, and other online applications so that students become adept at using a variety of tools and so that all global competencies are developed.
	By continuing to share and highlight best practices around use of technology in the classroom, teachers who are just beginning to use technology in the math classroom will have direction and support on how best to leverage these opportunities.

Waterloo Catholic District School Board

Project Title	Evolving Educational Practice through New Pedagogies for Deeper Learning
Description	This Mathematics (TLF-M) project bridges math curriculum learning and 21st century competencies spanning the junior division. Mathematics content knowledge and big ideas will focus on geometry and spatial sense through the use of math-tech enabled resources.
	The goal of this cross-school network is to construct understanding of the curriculum expectations/big ideas and continuum of learning from grade 4 to grade 6. This will be done by building capacity of effective teaching and learning of transformational geometry through classroom embedded collaborative inquiry that incorporates different school contexts, 21st century competencies and technology. Teams of educators will conduct in-class investigations of student work and lessons in classrooms, using a collaborative inquiry process. In this process, participants identify and build knowledge about mathematics instruction in reference to the use of technology and the development and assessment of 21st century competencies that work to improve student learning and achievement.
	In order to measure the impact on student achievement we will conduct pre & post assessments of entry and exit expectations for transformational geometry (location & movement - grades 4 - 6).
Context	*Number of students:* 720
	Number of teachers: 24
	Number of schools: 6
	Grades/Program: Gr.4-6
Impact on Students	Mathematics (TLF-M) bridged math curriculum learning and 21st century competencies spanning the junior division. Mathematics content knowledge focused on the curricular big idea of location and movement with a heightened focus on transformational geometry, through the use of math-tech enabled resources.
	Analysis of the pre- and post-tests that measured student performance on Grade 3 and Grade 6 EQAO questions related to transformational geometry show that overall, scores improved significantly for participating students.
	From the perspective of teachers and students, it was clearly evident that development of 21st century competencies through Math (TLF-M) was a commonly observed student outcome. Researchers observed many students who were deeply engaged in learning and actively solving problems.
	TLF-M supported the development of deep learning competencies: creativity, critical thinking, communication, character, citizenship and collaboration. TLF-M

	improved student knowledge and understanding of transformational geometry
	Many students shared the creative ways that had devised to share their learning through peer teaching (creating games and interactive quizzes), comics, presentations, designing websites, and even a dance. Classroom visits offered countless examples of how students were engaged in critical thinking, investigating, and problem solving. Peer teaching projects, whereby older students were designing learning tasks for peers as well as younger students related to transformation geometry offered a clear example of how students were developing communication skills in combination deeper understanding of math concepts.
	The digital tools, combined with the math concepts often posed challenges for students as they engaged with new technologies and new math concepts. Students exhibited persistence and commitment to learning to overcome the challenges and most challenges were seen as engaging and motivating. Underlying the persistence and much of the discussion about questioning and wonder, was a sense that many students were not merely engaged in activities to learn content knowledge, but were being allowed to experiment and investigate things that interest and engage them - they were learning how to learn using digital tools. Some students who discovered they have advanced aptitude to understand digital tools experienced pride in that they were leaders that could help others to learn.
	Teachers suggested that using technology in the classroom brought out the strengths and gifts of students who may not typically be as engaged in the traditional classroom.
	All of the classes engaged math concepts in a way that connected to real world implications. One class in particular, embedded math concepts within a broader framework of science and global issues. Many students shared that collaboration with their peers was enjoyable, motivating and amplified their learning.
	Conversations with students revealed that for many students, these learning environments, were indeed experienced as new, engaging and meaningful ways to learn math concepts. Many students revealed that what made their learning meaningful was that they had agency and personal stake and commitment in the design and implementation of their learning activities related to transformational geometry. A number of students observed that the tools engaged them in deeper learning about transformational geometry because the technology allowed them to experiment and explore the concepts in new ways.
Impact on Instruction	Teachers shared that taking on a new approach was often uncomfortable, but ultimately rewarding. The shift in teacher role is perhaps most key. Many teachers described how they will continue to maintain and expand pedagogical

	shifts, including: leveraging digital, building more student choice and voice into student learning, connecting learning tasks to the real world, and integrating new learning partnerships. Teachers also shared evidence of lasting impacts of professional collaborations and a desire to integrate NPDL throughout their classes.
	A number of educators brought community members into the classroom in person or virtually that engaged with math concepts and the impact of those community learning partnerships.
	Throughout the initiative there has been a consistent use of pedagogical documentation - teacher reflection, student learning artefacts (project plans). Educators co-plan and co-learn in the spirit of collaborative professionalism, to drive their learning about problems of practice and sharing findings to make learning visible.
Impact on System	Key impacts have been system-wide efforts at sustaining and supporting teacher transformation and movements in teaching practice and efforts at evaluating the approach to digital learning.
	Our Board has aligned our innovative teaching practices designed to promote deeper learning and the development of global competencies with our multi-year strategic plan and BIPSA.
	We are beginning to create a shared vision of global competencies by creating conditions that model them and using the lens of new pedagogies for deeper learning to inform our decision making (budget priorities, organizational /operational structures, professional learning goals). We have also focused on creating, developing and supporting co-learning networks at different levels (within schools, between schools, outside of district via our education innovation conference, mentoring programs and collaborative inquiry professional learning cycles) involving different levels of leadership through the use of technology and social media.
	With this year's project we have begun refining the processes for gathering, sharing, and analyzing impact evidence that informs decision making for student success and focused on student need. For example, we utilized pre- and post-math and global competency assessments, triangulation, marker students, and research partnerships to assess the impact of the project on students and educators.
	In order to reflect on our digital learning initiative, we gathered our educational leaders to review this framework. It is designed to help our Board reflect on our current stage of development in digital learning and inform our progress moving forward. The rubric contains five major areas: Leadership, Professional Learning, Technology & Infrastructure, Content & Instruction, and Data & Assessment.
	Through this process leaders have been collectively documenting, discussing and analyzing where the Board is across the five major areas and noting opportunities for growth and development.

Waterloo Region District School Board

Project Title	System Learning Process for Improvement
Description	The purpose of the project is to deepen understanding of the system learning process and identifying the factors and conditions for scaling change that improves learning and teaching. Technology will be utilized as a disrupter in an effort to build professional capital and create a culture of collaborative professionalism.
	There is a focus on areas of collaboration (teacher-teacher, student-student, explicit teaching, opportunities to collaborate), critical thinking/problem solving (authentic tasks, problem-based learning), student voice and choice (authentic learning opportunities, self-directed learning), feedback (peer, assessment for learning), communicating thinking (utilizing technology to make thinking visible), and curriculum (essential learning, spiraling).
	The WRDSB Digital Learning Project is a multi-year project which began in 2009 with a goal to envision the future of education as affected by technology. Our direction and work has become more precise as we have shifted our research towards finding how can we change teacher practice to align with the future of education as empowered with technology as an instructional and assessment tool.
	For Round 6 the project is focusing on teachers' voice and choice regarding their learning through adopting the principles of collaborative professionalism. We are hypothesizing that if we give teachers voice and choice in their professional learning, their learning will be much deeper and permanent. At the same time, there continues to be the focus on explicitly teaching collaborating and providing students with opportunities to collaborate. The project continues with the Futures Forum Project teachers, English and Geography Digital Learning teachers, grades 7-8 mathematics, and grade 9 Applied mathematics teachers group of teachers.
Context	*Number of students:* 1,369
	Number of teachers: 61
	Number of schools: 32
	Grades/Program: Gr.7-12
Impact on Students	Technology has been utilized to support students' access to authentic audiences and demonstration of learning for authentic purposes. Deeper learning, including about global competencies, came from the transferability of learning - teachers created opportunities to engage students in learning through authentic situations.
	Students collaborated in more networks using technology. Teachers increased the opportunities for face to face collaboration, either face-to-face or online.

	Students were provided with the voice and choice that allowed them to co-construct learning.
Impact on Instruction	Teachers examined their instructional and assessment practices to enhance student engagement and achievement. One aspect that was highlighted was collaboration that can occur because of technology. Teachers learned together but also alongside students as they shift to becoming facilitators of learning (vs. sage on the stage). Teachers were provided with system wide capacity building sessions. We run learning networks for a variety of grades and subject areas. Teachers were supported to develop an improved understanding of specific classroom look fors in terms of collaboration, student voice and choice and providing and collecting feedback.
Impact on System	There was a system focus on mathematics and strategies to support graduation. Participating teachers became leaders within the system with regards to enhancing instruction and incorporating use of technology into everyday classroom practices.

Wellington Catholic District School Board

Project Title	Math and Computational Thinking
Description	Elementary Schools (8) are working with consultants and experts to explore the link between the Grades 3 and 4 Math curriculum and computational thinking (Coding) using the web-based platforms of Scratch and Python.

The reason for choosing Grades 3 and 4 students was to expose these students to coding at a young age. We also targeted this age group because the gaps in math achievement begin to widen at these grade levels and engagement in math curriculum begins to drop.

We hope to see a substantial change in student engagement. We hope to have ready-to-use Scratch activities aligned with each strand of the math curriculum so that teachers who were not part of the innovation project can pick up an activity and implement it into their classroom with a clearly defined alignment to existing math curriculum.

Teachers have access to Chromebooks and Robots (Spheros) which provide instantaneous feedback to the success/next steps of the students' learning through them seeing their work in two and three-dimensional space. |
| Context | *Number of students:* 184

Number of teachers: 8

Number of schools: 8

Grades/Program: Gr.3-4 |
| Impact on Students | Students in Grades 3 and 4 are using Scratch to link Math with computational thinking skills. Critical thinking/problem solving, collaboration, and innovation skills are developing most immediately in our students. Many of the tasks have students deeply engaged in solving challenges and, at the same time, consolidating math content knowledge. In many cases, students are provided with minimal instructions and must problem solve and take risks in order to achieve success. The immediate feedback of Scratch (2-D Space) and Robots (3-Day space) helps students understand that risk taking can reap reward. Without this technology at their fingertips, immediate feedback would not be possible.

Several teachers have reported that students are going home and coding on their own time. This shows a deep engagement in the task. Students are also using coding activities as "reference points" to activate prior math knowledge. |
| Impact on Instruction | When promoting this initiative we wanted to clarify that it was a "Math First" project with coding being used as a tool to consolidate learning and make connections for students. Technology plays a vital role in this regard as it provides students and teachers with instant feedback where students can problem solve and make adjustments to enhance their outcomes. |

	When working throughout this process, teachers always reported that the learning was rich, deep, and authentic when students were engaged in coding tasks; however, they struggled to find ways in which there was concrete assessment measures in order to document this deep learning. The digital team met for a day with these teachers to develop rubrics, success criteria and curriculum connections for target activities so that these teachers, along with their colleagues would have concrete guidance as to how student learning could be assessed in these activities.

After several interviews with teachers we discovered that many still struggled with how to assess work students were completing relating to math and computational thinking. A series of assessment measures were created that would uncover some of the learning students were engaged in during this time. We also looked at measuring student engagement more explicitly than simply a matter of "yes, they are engaged, or, no, they are not." |
| Impact on System | The feedback from the coding and math workshops was so overwhelmingly positive that our system decided to expand the project from 8 schools to all 18 elementary schools within the district in the middle of the year. We now have an elementary teacher in each of our schools who has received this rich professional learning. We look to the 2017-2018 school year to expand our leadership network from one teacher in every school to a much broader audience.

In secondary we are in the process of developing two credit packages that links Grade 10 Math (both Academic and Applied) with Grade 10 Computer Science. We are involved in consultation with Brock University to help with development of the course. |

Windsor-Essex Catholic District School Board

Project Title	Everyone Can Code K-12: Robotics and Coding Initiative
Description	This project will focus on how coding based on inquiry-based learning impacts teaching and learning and cross-curricular expectations. • Students will engage in various cross-curricular activities while using coding as a vehicle to meet curriculum expectations. • Invite teachers to examine their pedagogical practices and to facilitate growth in the implementation of inquiry based learning in their classrooms. • Teachers will learn how coding/robotics can be accessed to provide hands-on learning experiences • Students will recognize coding as a way to solve real-world problems that often require repetitive actions. • Teachers will present problems/challenges to student that will require them to collaborate, communicate and access their understanding of coding and manipulation of their robotics devices to solve (or simulate a solution) • Teachers will collaborate to broaden their understanding of computational thinking and how they can provide real-world challenges to support their students in understanding curriculum expectations across the curriculum • Students will recognize the value in perseverance and persisting through a challenge as debugging is often required when writing code • Students will view coding as a new communication tool that allows them to manipulate their environment and the world around them
Context	*Number of students:* 1,500 *Number of teachers:* 35 *Number of schools:* 35 *Grades/Program:* Gr.3
Impact on Students	The introduction of coding/robotics in the classroom has a very positive impact on our students. When presented with a coding challenge, for example coding a robot to demonstrate the characteristics of a 2-D shape, students demonstrated a genuine desire to learn. As they worked through the coding, their understanding of side length and angles of various shapes was brought to life through the robots and Scratch coding app. When their program did not work correctly, students demonstrated an ability to think critically to de-bug their program ensuring accuracy. Each time they hit "play" on their program, they observed their work and instantly began self-assessing and looking for ways to improve to ensure the accuracy they had imagined. This demonstration of metacognition was evident each time they worked through a coding challenge. Tasks like these demonstrate a deeper student understanding as they could not

	simply rely on their ability to recognize a shape. Students became producers of shapes, not simply consumers able to differentiate shapes by looking at them. While completing tasks like these, teachers noted students displayed a genuine desire to learn and work through each task until completion. Students were constantly engaged in discussions about the blocks they selected for coding, distance travelled, and the relevance of angles measured. Their collaboration was genuine with each student contributing and finding success. While observing students, teachers noted numerous examples of critical thinking, learning to learn and collaboration. Teachers noted that the hands-on experience and instant feedback provided while coding kept students motivated and excited to learn. Students were constantly reflecting on their learning, communicating and supporting their peers and challenging themselves to master any task their teacher provided.
Impact on Instruction	Coding and robotics is a new initiative in the WECDSB. From the initial rollout in January, teachers immediately recognized the possibilities and began sharing ideas, classroom examples and assessment strategies in our Google+ Community. Common themes found in teacher posts/discussions were focused on how coding engaged all students, roles in the classroom are changing and the impact of coding/robotics on feedback and assessment. Teachers observed that the hands-on nature of robotics/coding provided students with a stronger understanding of the concepts. They were more capable of explaining and demonstrating their understanding to both peers and teachers. As a result, teachers found their role shifting. Students were taking an increased ownership of their learning and teachers recognized that their roles were shifting to more of a facilitator. This provided comfort for those teachers who were hesitant to embrace coding and robotics as they feared they would not be able to provide the support their students might need. Teachers noted an increase in their ability to provide assessment for learning during coding/robotics activities. With an increase in student engagement, desire to learn and de-bug their programs, teachers found they had more time to conference with students, provide timely feedback and make anecdotal comments on student understanding of concepts. Teachers stated that they focused a lot on assessment for learning. With the increased student engagement and resilience, teachers indicated they spent more time observing and engaging students in conversations about their understanding of the concepts.
Impact on System	The WECDSB has leveraged the project funding to initiate many activities that scale projects, sustain current projects, and add new ones such as the robotics and coding initiative. Examples include:

	• Student Led Technology Summit: To build on last year's successful Student Led Technology Summit we expanded the number of schools, students and teachers accessing this initiative.
	• Switch On Learning Summit: 150 WECDSB staff (teachers, administrators, educational assistants, occasional teachers, secretarial staff and custodians) attended a voluntary technology summit held on a Saturday.
	• Presentation to WECSDB Executive Staff and Board Trustees: Grade 3 students attended a WECDSB Board meeting to share their knowledge of robotics and coding.
	• Family Code Night: There are several schools planning a Family Code Night in the fall of 2017. These evenings will invite parents to join their children at their respective schools to learn about the benefits of coding and robotics.
	• #WECDSBcoding: Coding challenges are being created to provide specific examples of how coding/robotics can be embedded in the classroom.

York Catholic District School Board

Project Title	21st Century Learning Workshops/Technology Innovation System-Wide Strategies
Description	To further complement our past strategies, our goal for 2016-17 will include all K-12 educators to facilitate further spread of innovative teaching and learning throughout our system. For the 2400 elementary teachers, a half day workshop was offered to each teacher, with topics differentiated by teacher based on interest provided through surveys. For the 1200 secondary teachers, a subject-specific PA day was held offering each teacher two workshops of their survey choice.
	This year, an innovative, new software application was created for BILC-SAW, (Board Improvement Learning Cycle for Student Achievement and Well-Being) and SILC-SAW (School Improvement Learning Cycle for Student Achievement and Well Being). This application is designed to align School Improvement Planning and Ministry Funding, for synergy and coherence of many initiatives.
	An after-school coding program was initiated this year, delivered by York Catholic DSB teachers for students. This strategy invests in teacher learning which will also help spread coding and robotics opportunities to more students within the school. 18 schools participated in our Fall 8 week program in Level 1 Coding using Scratch. Another component of this extension is an after-school robotics course to be delivered in the spring of 2017.
	Six secondary schools are in the process of implementing the Individualized Personal Plan (IPP) using an e-portfolio application. Teams of teachers from these schools are collaborating to pilot an application to support students' understanding of the four inquiry questions and to measure the extent to which e-Portfolio helps Gr. 9 students develop the knowledge and skills to make informed education and career life choices.
Context	*Number of students:* 43,265 *Number of teachers:* 3,026 *Number of schools:* 106 *Grades/Program:* K-12
Impact on Students	The elementary project, more widely known as the ePortfolio, was implemented from K - 8. The focus of the ePortfolio, or the "All About Me" Portfolio project was a scale up from last year. Workshops were offered to teachers in the elementary panel that extended the work that we did with them last year. Each one of our 84 elementary schools were provided funds which they could use for release time or to purchase iPads or Chromebooks for pedagogical documentation and to support the younger students who otherwise might not be able to contribute the reflective pieces to their "All About Me" portfolios.

	Through participation in the pilot (The Individual Pathways Project - ePortfolio/ Digital Learning Portfolio, students in the six pilot school not only gained a greater understanding of the 4 inquiry questions (Who am I? Who do I want to become? What is my plan? What are my opportunities?). They indicated that by working with G-Suite, they gain a better appreciation of how they can leverage technology for use in other classes for other assignments.
	Pivotal and the most impactful practice we hoped to encourage with our work with the IPP was for students to develop their metacognitive skills by reflecting on the artefacts that they curated on their google sites as part of their digital learning portfolio.
	Impact on secondary students:
	• students had the opportunity to become better acquainted with the tools and applications available to them through G-Suite
	• students were taught the importance of creating an organized online infrastructure with regards to how and where to efficiently store their artefacts
	• students were encouraged to be creators of their own content through a variety of different learning tools
	• students were encouraged to conduct career exploration through another online platform called: Career Cruising, which allows them to select courses and explore a variety of pathways to postsecondary destinations and careers
	• there was also work with students around the importance of a positive digital footprint, personal branding and global digital citizenship
Impact on Instruction	The Individual Pathways Plan Project (ePortfolio/Digital Learning Portfolio)
	In addition to supporting the development of students' technological skills, the focus of the research project was to encourage teachers, through technology-enabled teaching and learning practices to:
	• increase student engagement and achievement
	• assist in the assessment of student performance
	• facilitate communication and collaboration
	Through participation in the pilot and the wider roll out, we engaged staff and administration in a process to build the competencies necessary for them to become more comfortable with creating a more technology-enabled learning environment.
	Professional learning teams were created at each one of the pilot schools. As part of the implementation strategy 5 students from each of the 15 secondary schools in our Board (75) were invited to form the nucleus of tech team that will help with supporting staff at the schools manage the technical aspects of the

	implementation of the ePortfolio and will in future, be encouraged to lead tech workshops for both staff and students
	A professional learning network was established between leaders of each school via a Team Drive on Google that will allow school leaders to share best practices and ideas.
	Through this project, we were able to focus on the importance of creating a tech enabled environment that enabled students to put themselves at the centre of their own learning
Impact on System	In an era experiencing such rapid changes in all sectors, the importance of school leaders cannot be undervalued. Our focus with the administrators has been on building competencies such as creativity, problem solving, risk-assessment and risk-taking skills, relationship-building and communication skills
	By focusing on building these competencies with our administrators, the intent is to create a learning environment that will support staff and students in their work with the ePortfolio.
	The following is a list of some of the infrastructure that we have been able to put in place in order to encourage project spread:
	- administrators are the project leads in each of the schools - school teams were formed which cut across departments - teachers and admin were provided with release time not only to be trained and in-serviced but they had time to develop an implementation plan specific to their own school culture - IPP teams created school teams of students who provide students with the technical expertise, ongoing training workshops - a team drive was created in G-Suite so that admin teams can share best practices with each other

York Region District School Board – Project #1

Project Title	Authentic Student-Directed Learning
Description	The Authentic Student-directed Learning projects is designed to allow students to pair passion with purpose and in doing so, inspire real world connections.
	Students will develop creative, collaborative problem-solving and communication skills in a manner that is engaging and learner driven. Teachers will demonstrate how curriculum expectations and assessment opportunities can be easily incorporated into authentic learning experiences.
	The intended outcomes of this project include uniting learners beyond the walls of the classroom and creating engagement within a flexible framework and timeline. Ultimately we hope to support the development of students as deep, self-directed, meta-cognitive and passionate learners.
Context	*Number of students:* 1,785
	Number of teachers: 70
	Number of schools: 12
	Grades/Program: JK-12
Impact on Students	This year's Authentic Student-directed Learning (ASDL) project was built on the continued success from last year's Agents of Change project.
	Throughout the course of the project, students from 12 schools spanning grades from elementary and secondary classrooms, took on projects inspired by personal passions with the goal of making change in their society. They developed creative, collaborative problem-solving and communication skills. This program had a significant impact on both engagement, learning and achievement by the explicit promotion and inclusion of student voice and choice as demonstrated by the self-directed nature of the learning that occurred. By building on the Agents of Change Project, the ASDL project culminated in a showcase at Humber College for over 300 participants where students shared how they had taken action within their school or community.
	Throughout the project, students were supported by their teachers to learn how to effectively generate questions, gather relevant research, synthesize information and innovate in order to address an issue that they were passionate about. Ongoing feedback, monitoring and responsive instruction ensured that students were working towards their goals and effectively communicating their findings.
	Critical Thinking Skills
	• Students are engaged in real-world learning beyond traditional curriculum goals
	• Student are identifying personal learning goals with which they resonate.
	• Students are supported in the development of skills and competencies that are transferred to other learning contexts throughout the instructional day

	Learning to Learn • Students must outline and prioritize the tasks they need to accomplish • Students must monitor their own progress Collaboration • Students co-construct meaning of passion, purpose, action and impact • Students have the option to collaborate with a partner or a small group • Opportunities to support by connecting with a mentor within and beyond the school community Communication • Regular opportunities for students to conference with teacher and ask questions about progress and next steps • Regular opportunities to discuss and listen to mentor Global Citizenship • Technology is used to accelerate and enable established learning goals • Students have variety of technological tools from which to use when needed including: access to the internet/mobile devices/computers/AV equipment • Student projects may be connected to local and global causes, organizations, charities Through this project, students strengthened their learning skills including organization, collaboration, initiative and self-regulation. Through frequent conferences with teachers, and monthly self-assessment surveys, students reflected on the progress in their projects, their comfort level with technology in support of their learning and their overall growth in learning. Many of the student generated ASDL project initiatives involved authentic partnerships with community partners. For example, students at one school started their Kindness Project with residents of a senior citizen home to address the issue of loneliness among the aging population; students at another school partnered with local communities to find ways to support people living with cancer. The culture of supportive risk-taking was prevalent at the regional showcase where students openly and confidently shared about their successes, challenges, barriers and innovations with over 300 stakeholders.
Impact on Instruction	Through various professional learning opportunities, educators were supported in exploring student-directed learning. The schools were provided with a board-created resource: Agents of Change to support the facilitation of student driven projects. Educators also participated in a series of professional learning opportunities to address topics such as engagement, student voice, design thinking and the feedback loop. These learning opportunities were facilitated both through face-to-face sessions and with video-conferencing opportunities

	with educational partners. Throughout ASDL, educators explored how they might increase student engagement within a flexible framework and timeline. Teachers explored the value in shifting from teacher-driven lesson planning to student-driven learning experiences. Teachers reported change in the following instructional practices: • Differentiated approaches to instruction inherent through choice, voice • Teachers shifted from assigning report-style performance tasks to facilitating students' personalized action based projects. • Significant increase in the willingness to try new and unfamiliar technologies to support student learning and professional growth • Shift in the understanding of "educational" spaces as community partnerships allowed for student learning outside of the four walls of the classroom Due to the responsive instructional approach of ASDL, teachers began to explore ways to shift assessment practices. Teachers reported change in the following assessment practices: • Teachers learned how to document assessment in the form of observations and conversations through tech-enhanced methods. • Project structures allowed for embedded teacher-directed, peer and self-assessment • Emphasis was placed on the learning in the process rather than just the final product
Impact on System	The ASDL Project 2016-2017 is an iteration of the Agents of Change Project 2015-2016. This project has supported the system in investigating, communicating and providing access to divergent and emergent resources to support modern learning. Important partnerships were formed between curriculum partners through school visits in order to support connections with mentors in the business world. Educational partnerships were developed that will continue to impact professional learning in the 2017-2018 year. Experiential, social and formal professional learning opportunities and resources for teaching, learning, and assessment were provided through external partnerships. This supported student innovation and entrepreneurship. This partnership will continue in the 2017-2018 year with both face-to-face and video conference learning opportunities for schools throughout the system. After two years of developing strategies to support student-directed learning (Agents of Change 2015-2016; and Authentic Student-directed Learning 2016-2017), it is the intention that this learning will inform all 2017-2018 Modern Learning projects and become an integrated element of all project design.

York Region District School Board – Project #2

Project Title	Assessment *As* Learning in a Modern Learning Context

Description	This project aims to build educator capacity to use effective assessment pedagogy in service of deep learning by:
	
	• Building shared understanding of AfL/AaL
	
	• Developing strategies to engage students as active agents in assessment
	
	• Appropriately integrating technology to support assessment for/as learning
	
	The fundamental student learning outcome is increased ability to be metacognitive, autonomous learners include the following:
	
	• This learning outcome will be supported by building student capacity to:
	    o use/dialogue through descriptive feedback
	    o use voice/choice to determine how/when to demonstrate learning
	
	• These student learning behaviours will be fostered by teachers by building teacher capacity in areas such as:
	    o constructing opportunities for self/peer assessment
	    o co-constructing / using criteria
	    o establishing clear goals
	
	• To support this development in teacher practice, project learning will build and deepen teacher understanding of:
	    o success criteria (rich descriptions of quality learning)
	    o descriptive feedback

Context	*Number of students:* 800 *Number of teachers:* 40 *Number of schools:* 8 *Grades/Program:* K-8
Impact on Students	One of the key goals of this project was to support students in developing capacity in self-assessment in a manner that was enhanced by technology. This impacted student engagement, learning and achievement on two levels. On one hand, students were engaged by the inclusion of technology in support of assessment. For example, students were able to easily engage in peer assessment using the Comments feature in Google apps for education. This required co-creation of criteria for effective feedback, so that the assessment provided by peers, and to one's self via self-assessment, was constructive, specific, relevant and respectful. Though students have traditionally had the opportunity to provide feedback to one another, the medium of Comments appears to have increased the quantity and quality of peer and self-assessment. Students were further engaged by the access provided to assessment data

	collected by teachers and shared with students. By doing so, assessment data became transparent and a significant component of the learning cycle, rather than checkpoints along the way. Teachers collected assessment data via Google Forms and shared this data with student using the docAppender add-on. This provided students with the opportunity to access, comment upon, challenge and respond to teacher-generated assessment data. In an effort to engage students in ongoing dialogue around descriptive feedback, many project participants explored digital portfolios. In doing so, project participants reported an increase in students' ability to be metacognitive.
Impact on Instruction	In this project, teachers explored a variety of technology tools to enhance both assessment for and assessment as learning practices. For example, teachers used Google Forms to capture spontaneous and authentic examples of student thinking and achievement. These forms were used to support the triangulation of assessment by allowing teachers to record the observations made and the conversations heard or participated in, in addition to any products that were collected. Furthermore, we identified the Comments feature in Google Docs as an ideal tool for providing descriptive feedback and engaging students in dialogue based on their learning and achievement. In pursuit of making our formative assessment part of students' learning cycle, teachers used docAppender to create an efficient workflow to share assessment data with students. Though there were a handful of teachers overwhelmed by this learning, most staff were very receptive to our shared learning. Many recognized these tools for their potential to enhance their assessment practice. As well, exploring how these tools impact achievement and assessment when put in the hands of the students helped all of us understand the concept of assessment as learning.
Impact on System	This project was intentionally designed so that project participants engaged in the same assessment strategies that were the focus of the learning. The rationale for that is that all stakeholders in our system are perpetual learners, and best assessment practice for monitoring learning and impact in the classroom is best practice for monitoring learning and impact at the system level. Participants set out to identify and explore the connections between three interconnected components of the YRDSB Modern Learning Frame: growth mindset, assessment as learning and metacognitive skill. Specifically, participants were encouraged to identify and engage in tech-enabled strategies that would demonstrate and leverage the connections between these components. Moving forward as a system, we will explore ways to incorporate learning from this project into the design of future projects and learning opportunities. Assessment as learning can be an integral part of any project rather than just the content in focus of a single project.