Mapping the Impact of the 21st Century Innovation Research Initiative on Students, Teachers, and Systems

Local Innovation Research Projects in Ontario

Round 5

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Final Report

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Executive Summary

Under the auspices of the *Technology and Learning Fund (2015-2016)* the Ministry of Education and the Council of Directors of Education (CODE) continue to be invested for a second year, in furthering the research conducted in Rounds 1 (2011-2012), 2 (2012-2013), 3 (2013-2014), and 4 (2014-2015). This previous research documented influences on student success and changes in teaching practices that foster innovation in the development of 21st Century competencies.

The *21st Century Innovation Research Initiative (Round 5),* continues to advance Ontario's renewed vision and core priorities for education while gaining a more in-depth understanding of the impact of technology and resulting changes in Ontario education as a whole that have occurred during this entire initiative (2011-2016).

In the 2015-2016 school year, the Ministry of Education and CODE indicated their intention to work further in partnership to support innovation research projects on effective technology-enabled teaching and learning practices and system changes across Ontario. Curriculum Services Canada (CSC) continues to work with the innovation projects in documenting evidence of the impact technology-enabled instruction and learning has on student success, on teacher practice, and on the system, making strong and evident connections to student engagement, learning, and achievement, either where the impact can be evidenced now or how it is anticipated in future.

Curriculum Services Canada organized the same field team members as in the previous Rounds to liaise with project leads and to offer support as they gathered and reported data, identified within a common research framework. During ongoing dialogue and interaction, collaborative relationships developed between individuals involved in the innovation research and the research team, strengthening the processes and results of the study. In this year's study, CSC focuses on changes that have taken place at all levels of school systems, and examines the impact that has occurred during the five Rounds of study.

Over the past 4 Rounds of study, the research team utilized the metaphor of the landscape to establish a foundation for analysis and to identify project features that point to student engagement and achievement, sustainable pedagogical practices, and system capacity building. In doing so, we found that many landscape features have been traversed as projects increasingly focus on refining technology-enabled pedagogical practices that highlight 21st Century competencies. In this Round 5 study, the research team turns to the metaphor of mountain climbing as the skills necessary for a planned and deliberate ascent offer a parallel to many of the skills noted in the international literature as essential for learning and living in the 21st Century.

For the Round 5 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 qualitative analysis.

In this report the quantitative and qualitative data provide insights that align with the purposes of the study. All 72 school boards, 4 school authorities, and 1 provincial school participated in the Round 5 innovation research initiative. Based on the numbers reported by projects, over 265 000 students across the province were reported to be directly engaged in aspects of the Round 5 innovative research initiative. In comparison, approximately 170 000 students were involved in Round 4, and approximately 160 000 students were involved in Round 3.

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

All districts identified substantial involvement by classroom teachers in their research. Based on the numbers reported by projects, over 15 000 teachers across the province were directly engaged in aspects of the initiative with 60 teachers per project being the median level of involvement. Round 5 data shows a substantial increase in the level of teacher involvement from all previous Rounds. In Round 4, approximately 11 400 teachers were involved and the median level of involvement was 58 teachers per project. In Round 3, approximately 6000 teachers were involved and the median level of involvement was 24 teachers per project. In both Rounds 1 and 2, the median level of involvement was less than 20 teachers per project.

As well as classroom teachers, projects reported that in total 2285 school administrators (principals, vice-principals), 360 system administrators, and 850 support staff (e.g., information technology staff, program staff) had direct involvement in the project undertakings. The substantial increase in the direct involvement of school and system leaders in Round 5 supports observations of the field team of the increasing systemic support, alignment, leadership, and commitment given to technology-enabled teaching and learning by school districts across the province.

Overall, both the *quantity* and the *quality* of the submitted statistical data in Round 5 has substantially exceeded that of previous Rounds. Districts have been much clearer and purposeful in the establishment of baseline data to gauge changes to engagement and learning, and have demonstrated a stronger understanding of the needed evidence, either quantitative or qualitative, to show impact.

Much of the quantitative data submitted was from surveys which gave measures, based on student or teacher perspectives, of observed changes to student engagement, learning, and achievement. In Round 5, there was a significantly greater number of districts that also used non-perceptual data to measure and correlate achievement to project actions.

Students

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 increased, collaboration, communication, and feedback improved and overall interest and engagement was heightened as students worked with individual interests, talents, and learning styles. Teachers reported higher engagement, task completion and increased success through encouraging student inquiry.

A number of projects reported increased engagement through learning experiences that promoted student voice and choice. It was reported that student voice played a key role as teachers increasingly provided students with choice in how they demonstrated their learning and shared it with a wider audience. Projects reported that students indicated increased access to wireless digital tools in their classroom improved their ability to learn by providing opportunities for deeper exploration of materials. They could research information at any time and so had more choice in their learning.

Many more student-teacher and student-student partnerships were reported than in previous Rounds of study. It was reported that the use of technology is a catalyst for building collaboration and communication among students and teachers, e.g., in sharing a digital product, when providing and supporting one's own point of view in online discussions, or in commenting on another's post. In this way, students have gained a greater appreciation for the range of capabilities that others possess. Several projects described partnerships where students are taking a lead role to support technology-enabled learning. These students offer support to other students and teachers in their school and beyond.

A number of projects found that students were becoming more adept at leveraging digital tools to aid in collaboration, and developing their ability to work independently and synergistically in teams with strong interpersonal and team-related skills. Seamless collaboration on projects was identified, even if students were in other classes. As well, students reported that peer collaboration increased their motivation and the understanding of content.

Overall, it is clear that in this Round 5 study, a point has been reached where students are more engaged in learning how to learn and less on what to learn. Projects report a visible shift in students toward the process of learning and a growing eagerness to be involved in learning using multiple technologies is evident. Words like “connections,” “collaboration” and “communication” are repeatedly evident throughout the data, highlighting the continuing move to developing competencies that has been building over the last several Rounds of study. Projects reported that technology is now being used more as a learning tool rather than only as a teaching tool. Teachers are empowering students to inquire into their own driving questions, having them connect with their community and encouraging them to work independently.

Many projects, building on the four previous Rounds of study are documenting demonstrable achievement on the part of students. While some projects reported on achievement measures pertaining to skill development using technology and others reported on gains in the learning attributes central to digital learning, there was solid evidence of an increase in achievement due to the focus on competencies, utilization of technology, and student inquiry.

Teachers

Projects reported that teachers are engaging differently with technology than in earlier Rounds of study and that is impacting the way they consider student learning and their own thinking about planning, curriculum, instruction, and assessment. There is strong evidence that teachers are shifting their way of thinking about how they engage in their planning and teaching so that students are becoming much more a part of their own learning. Teachers demonstrate confidence for including student voice and choice, and in building collaborative partnerships among students and others.

Projects reported that technology allowed for the deepening of assessment practices, and 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 opportunities. In the Round 5 reports, there were a number of indications that teachers are thinking more critically and deeply about ways to confirm that student achievement can be measured on a scale commensurate with that being used to report student engagement and learning.

Projects found that teachers are open to using technology for professional development. The changes in delivery of professional learning are a clear indication that the technologies being employed within the classroom are having an effect outside the classroom. Teachers were more comfortable connecting with one another and learning together about changes in pedagogy and technology. This shift marks a change in innovation and capacity building among teachers. It is clear that the notion of partnering has expanded and strengthened.

Considering the previous Rounds of study, the evidence provided from project reports displays the impact on teachers, which is resulting in increasing comfort with technology, in a newfound impetus to build partnerships with students and colleagues, and in teachers participating in ongoing professional learning that can impact their pedagogy and hence, support student learning and achievement.

Systems

There was significant evidence that building capacity and a culture of growth within districts is continuing to expand. Systems are actively increasing coordination and collaboration among teachers, schools, and administrators. Projects reported that there is a growing understanding that leadership is the key to scaling innovative practice. In this Round 5 study, systems continue to report on changes to policy, planning, and shifts in vision that can mobilize new knowledge can impact achievement across districts. Districts report on developing a renewed plan, building on system vision for technology use to assure that all teachers and students have access to and training in the use of digital tools. The increase in technology use has motivated the development of new technology policies and continues to put pressure on improving overall infrastructure across systems as there is a developing culture of *"we're all in this together"*.

Streamlining communication between home and school using technology to increase parent engagement, enabling them to support learning at home is stressed in reports, as is the understanding that connecting with the parent community is a way of building a network for student success beyond the walls of the school. Having parents understand the direction that technology enabled-teaching is taking can only help foster understanding of the education process in the larger community.

One of the most noticeable features of the Round 5 projects is that there is positive acknowledgement at all levels of the education community that the competencies needed for life in the global community are those noted in the international literature: clear communication, collaboration among participants, creativity, critical thinking, and character development. Teachers are asking for ongoing professional learning at multiple levels to develop further their instructional practices in order to provide students with these competencies. Another important feature is that the descriptions of achievement in Round 5 provide evidence that teachers and system leaders are thinking more critically and deeply about ways to confirm that student achievement can be measured on a scale commensurate with that being used to report student engagement and learning.

There is now clear evidence that student success in the forms of engagement, learning, and achievement has been enabled by the planned and deliberate inclusion of technology in the learning process across the province. In Round 5, there is evidence that the three important member groups needed for sustaining success − students, teachers, and systems – are working together with a new clarity that provides guided optimism for the ascent ahead.

At the conclusion of Round 5, it is clear that districts are at an inflection point, where students, teachers, and systems for the most part are both experienced and equipped with the digital milieu to take technology-enabled teaching and learning to the next level.

Prologue

Mapping a New Metaphor for Round 5 of the 21st Century Innovation Research Initiative: Mountain Climbing

Over the past four Rounds of study (2011-2012; 2012-2013; 2013-2014; 2014-2015) the research team has utilized the metaphor of the landscape to establish a foundation for analysis and to identify project features that point to student engagement and achievement, sustainable pedagogical practices, and system capacity building. In doing so, we found that many landscape features have been traversed as projects increasingly focus on refining technology-enabled pedagogical practices that highlight 21st Century competencies.

In this Round 5 study, the research team turns to the metaphor of mountain climbing as the skills necessary for a planned and deliberate ascent offer a parallel to many of the skills noted in the international literature as essential for learning and living in the 21st Century.

An important comparison between this metaphor and technology-enabled teaching and learning begins with building and sustaining community. Just as successful climbers do not climb alone, we know from many years of educational research that teaching and learning in a community of learners (Lave & Wenger, 1991; 1998) increases successful outcomes. Further, in both the planning and execution stages of climbing, just as in teaching and learning, there is collaboration among and between the team members as they detail the route, address possible difficulties, and most importantly, as they support one another in undertaking tasks for success.

For a community to sustain and flourish, meaningful and ongoing communications are essential. Teaching and learning, just like climbing, require critical thinking and creativity when challenges are encountered. In a climbing community, much like in an educational community, the idea of becoming a fully participating citizen is inherent as individuals refine their skills over time and are able to transfer them beyond their community to the larger world.

In the Foreword to *Towards a New End: New Pedagogies for Deep Learning* (Fullan & Langworthy, 2013), Sir Michael Barber likened the search for new pedagogical approaches for the 21st Century to locating and then climbing a mountain. In Barber's terms, the research team can say with certainty that in the previous four Rounds of study, the mountain has been located and the foothills crossed. Much has been learned along the way as has been reported in the results of the previous studies.

In this Round 5 study, metaphorically the research team moves onto the mountain with all the tools and new understandings garnered during previous projects. The research team likens climbing with the certainty that previous experience provides to further advancing the impact of technology-enabled teaching and learning on students, teachers, and systems as a whole.

Chapter 1

The View from the Foothills: Background, Purpose, and Research Considerations for the Round 5 Projects

Under the auspices of the Technology and Learning Fund (2015-2016) the Ministry of Education and the Council of Directors of Education (CODE) continue to be invested for a second year in furthering the research conducted in Rounds 1 (2011-2012), 2 (2012-2013), 3 (2013-2014), and 4 (2014-2015). This previous research documented influences on student success and changes in teaching practices that foster innovation in the development of 21st Century competencies. Part of the Technology and Learning Fund (2015-2016) agenda is to conduct the *21st Century Innovation Research Initiative (Round 5)* in order to gain a more in-depth understanding of the impact and changes in Ontario education as a whole that have occurred during this initiative.

Purpose of the 21st Century Innovation Research Initiative (Round 5) Study

Building upon the foundations of the past four years of studies, the goals of this current study (Round 5) continue to:

- promote local innovation and leadership for 21st Century (next generation) teaching and learning
- support evidence-based 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 systems reform that integrates effective technology-enabled pedagogy, and emerging evidence on '21st Century effectiveness' in innovative 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 the 2015-2016 school year, the Ministry of Education and CODE indicated their intention to continue to work in partnership to support innovation research projects on effective technology-enabled teaching and learning practices and system changes across Ontario. Curriculum Services Canada (CSC) continues to work with the innovation projects in documenting evidence of impact on student engagement, learning, and achievement, identified within a common research framework. In this year's study, CSC focuses on changes that have taken place at all levels of school systems, and examines the impact that has occurred during the five Rounds of study.

The Ministry and CODE continue to be committed to mobilizing the growing knowledge and effective practices that are evident across the province. Lessons learned from previous Rounds are consistent with both international trends in 21st Century next generation learning and with Ontario's education strategy (April, 2014).

Research that Informs Technology-enabled Teaching and Learning

As in the previous Rounds of study, the research team continues to consider a broad range of international literature. The overall goals of the innovation research initiative continue to be supported by a wide variety of international perspectives, that is, to ensure that graduates are prepared for a competitive, globally connected, and technologically-engaged knowledge society and economy.

Dede (2013) describes shifts in education that will impact 21st Century learning such as moving toward higher quality electronic materials, innovative professional development, and digital tools and applications that can immerse students in subject matter.

Speaking about accelerating and deepening 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). In this regard, Fullan and Langworthy (2014) defined what they term 'new pedagogies' 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 pedagogical competencies in areas such as collaboration, communication, creativity, and community interactions on both a small and large scale to fully engage in technology-enabled learning.

Fullan and Quinn (2016) add to the ongoing research in digital learning by describing an action framework that is applicable to whole system reform that is comprised of four main components: 1) focusing direction; 2) cultivating collaborative cultures; 3) deepening learning, and 4) securing accountability.

Given the emerging nature of global perspectives on pedagogical practices driven by the technology-enabled environment, it seems clear that the Round 5 innovation research projects are of central importance for continuing to impact positively the teaching and learning environment in Ontario schools.

Knowledge Mobilization

As Ratković, Mogadime, and Spencer (2015) note, the term knowledge mobilization refers to: *"Knowledge dissemination, knowledge exchange, knowledge transfer, knowledge translation, knowledge utilization, [as well as] knowledge mobilization"* (Skinner, 2007).

By definition, to mobilize knowledge means to amass learning for action, based on a pre-determined grounding – the very opposite of a top-down model where new information is 'delivered' to school communities to be carried out without their input. 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). Fullan & Quinn (2016) add perspective to these points when they write that, *"Achieving coherence in a system takes a long time and requires continuous attention"* (p. 128).

Much like the attributes necessary to persist with the ascent 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).

Reflective Practice

Amulya (2012) defines reflective practice thus: *"Reflective practice is simply creating a habit, structure, or routine around examining experience"* (p. 1). Encouraging the capacity to be reflective both individually and collectively is highlighted by the goals of this Round 5 study. As teaching and learning becomes premised on the competencies needed for the 21st Century such as collaboration, communication and critical thinking, the ability to reflect on experiences takes a central role in building understanding and in taking next steps based on measured progress.

Rose (2013) raises the important issue of how to encourage slowing down for reflection to be a meaningful component of learning in our fast-paced technological society. She quotes Prensky (2001) who observes: *"One key area that appears to have been affected [by technology] is reflection … In our twitch-speed world, there is less time and opportunity for reflection … One of the most interesting challenges and opportunities in teaching Digital natives is to figure out and invent ways to include reflection and critical thinking in the learning but still do it in the Digital native language"* (p. 8).

It seems clear that reflection is necessary as it is associated with all of the attributes identified in the international literature as essential for technology-enabled teaching and learning. Reflection can add depth to inquiry as learning becomes premised on interactive communication in a community of learners who collaborate together in a creative manner, and think critically about next steps in their learning process. Reflection can support self-regulation, as learners think deeply about their own progress and direction forward.

Underlying Features that Support Technology-enabled Teaching and Learning

Much as in preparation for mountain climbing, there is groundwork that is essential for a successful transition to technology-enabled teaching and learning that can impact student success, instruction, and system practices.

Over the last number of years, the work of constructivist theorists such as Dewey (1938); Vygotsky, (1978); Bruner, (1987, 1990) and more recently Splitter (2009) and Shapiro (2011), have 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 and assessment 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.

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 … [T]he 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).

Digital technology has the potential to reform classrooms in ways that were seldom considered possible before the beginning of the 21st Century. The fundamental role of teachers in technology-enabled classrooms is transformed from that of gatekeepers of knowledge to resource managers and design consultants (Knobel & Wilbur, 2009).

Learning how to work in collaboration with others, to become effective communicators, to use creativity and imagination, to think critically, and to understand the concept of citizenship and its responsibilities are essential. Aspects of character development that highlight self-regulation, self-confidence, self-evaluation, and empathy are a necessary part of lifestyle learning.

In a foundation document for discussion, entitled *Towards Defining 21st Century Competencies for Ontario* (Winter 2016 Edition), the authors note that, *"What's new in the 21st Century is the call for education systems to emphasize and develop these competencies in explicit and intentional ways through deliberate changes in curriculum design and pedagogical practice. The goal of these changes is to prepare students to solve messy, complex problems – including problems we don't yet know about – associated with living in a competitive, globally connected, and technologically intensive world"* (p. 3).

Chapter 2

Tools for the Climb: Team Building, Methodology and Methods

Team Building

Like the ongoing preparations for 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, in this Round 5 study, Curriculum Services Canada has organized the same field team members as in previous Rounds to liaise with project leads to offer support as they gather and report data.

Since the field and research teams have been comprised of the same educators during the previous Rounds, a community of learners has been formed that displays many of the attributes of 21st Century competencies. Communication has been ongoing over time as the field researchers have interacted on a regular basis with project leads, and project leads have followed up on the invitation to contact the team as needed with questions or to dialogue about their project. Field researchers visited project sites and were invited to attend districts' events related to the project focus. During ongoing dialogue and interaction, collaborative relationships developed between individuals involved in the innovation research and the research team, strengthening the processes and results of the study.

It is clear to the research team that because of the collaborative efforts of the field team, project leads and participants have become more skilled in their reporting of findings and impact of the innovation research projects over the Rounds of this initiative. The research team has devoted much time and effort into planning for their interactions with the projects, and increasingly, results are shedding new light on the path to technology-enabled teaching and learning and ultimately, to student success. As the research team and project leads networked, they drew from classroom experiences, from whole district perspectives, from experts in the field, and from the cross-fertilization of ideas and perspectives gleaned from students, teachers, and administrators.

Methodology

Case Study

As the choice of equipment used by climber's impacts their climb, so to the choice of methodology in research projects is an important consideration for maximizing results.

In this Round 5 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 qualitative analysis.

As noted in the previous four Rounds, 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).

Based on the previous Rounds of study, multiple kinds of evidence were part of the data submitted by projects in their final results. Ultimately, the depth and breadth of data depended on information received from individual sites, so this array of data has continued 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 comprehensive self-reporting templates constructed by the research team. Our research team focused its interactions and reporting tools on gathering hard evidence of the impact technology-enabled instruction and learning has on student success, on teacher practice, and on the system, making strong and evident connections to student engagement, learning, and achievement, either where the impact can be evidenced now or how it is anticipated in future.

At the outset of Round 5, the research team asked the projects to submit a 'Project Profile' with a description of the innovation research, areas of focus, and anticipated participation numbers. Our 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 (June) and for the artefacts that visually portrayed the impact of the innovation research project in a context that gave meaning to their efforts. The accompanying artefact narrative provided a context for the concrete examples the projects included to demonstrate further the impact that the innovation research is making. As part of the narrative, projects were encouraged to include a brief history of their efforts over all Rounds of study to gauge a comprehensive look at the growth/change over the initiative to date as well as to include information about how the work connects to their continued efforts in technology-enabled teaching and learning.

As successful climbing teams understand, our field team maintained continuous interaction with the project leads through communications and site visits, using the following key questions as a basis for their conversations:

- What specific evidence is there that the project impacts student acquisition of 21st Century competencies, e.g., building the life skills necessary for living and learning in a digital world?
- What specific evidence is there that the project impacts changing pedagogy for deeper learning at the classroom level?
- What is your system's vision of technology-enabled teaching and learning?

The field team offered further support as innovation research projects collected and reported data through artefacts that visually portrayed the impact evidence in a context that gave meaning to their efforts. Innovation project leads have indicated that this interaction was a significant support in clarifying requirements for reporting on their initiatives.

Chapter 3

Project Designs and Innovative Practices: Describing Participants and their Projects

In March 2016, 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 the planned research. Districts were requested to update any of the data when submitting final impact reports in June 2016. The data presented here is based on the data provided by districts, and is intended to present an overall provincial perspective of the participants, settings, and guiding themes identified by the 2015–2016 innovative research initiatives.

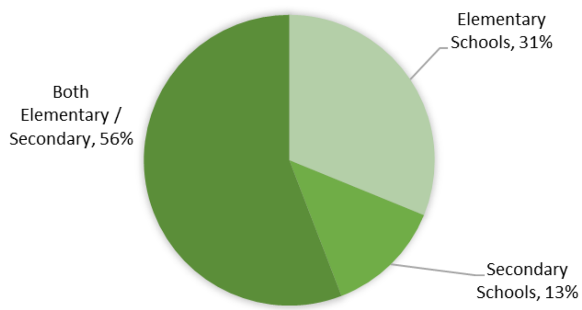
Several school boards described two or more distinct projects within their larger system report. For purposes of this report, the data from multiple projects within a system was amalgamated to present an overall perspective on the 77 district initiatives from each of the participating 72 school boards, 4 school authorities, and 1 provincial school. Though there was wide disparity in the nature and scope of activities across the projects, there were consistently strong efforts by districts to gather and submit data that has informed the research team's understanding of the project activites and the educational impacts these initiatives have had on students and educators across the province.

The following charts and graphs provide an overview of selected contextual data submitted by the 65 English-language districts and 12 French-language districts.

1. Projects by School Organization

	English (65 districts)	French (12 districts)
Elementary Schools only:	22	2
Secondary Schools only:	6	4
Both Elementary and Secondary Schools:	37	6

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 Rounds 2, 3 and 4.

Of the seventy-seven (77) district projects, forty-eight (48) projects are targeted at a specific range of grades or the specific content taught at identified grade levels. Twenty-nine (29) projects had a general system focus (JK-12) without restrictions to grades or divisions. The ratio of school projects across elementary and secondary schools has remained relatively consistent throughout all 5 Rounds of the research initiative.

2. Projects by Level of Student Involvement

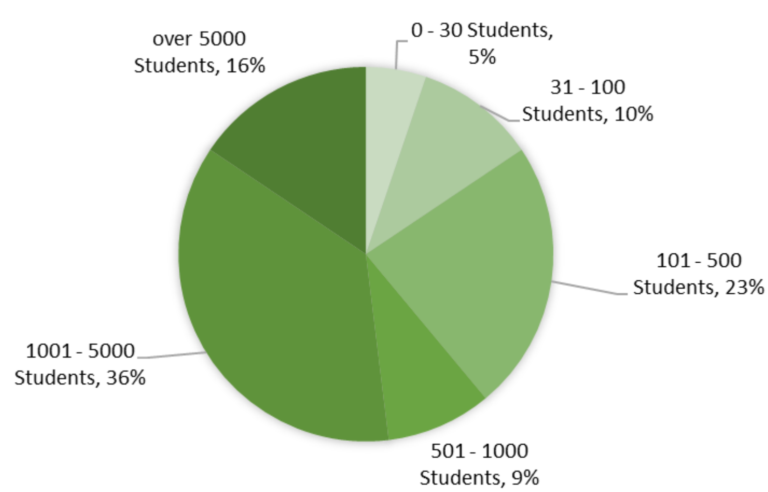
Based on the numbers reported by projects, over 265 000 students across the province were reported to be directly engaged in aspects of the Round 5 innovative research initiative. In comparison, approximately 170 000 students were involved in Round 4, and approximately 160 000 students were involved in Round 3.

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

There were four (4) projects in total that reported that there was no student involvement in their activities. These were projects that focused on teacher training, leadership development, or district processes. Twenty-seven (27) district projects (35% of total projects) identified that supporting students with special needs or examining the requisite assistive technologies was a significant aspect of their initiative. This is a substantial increase from Rounds 3 and 4 in which 14% and 18% of projects respectively identified support for students with special needs or explored assistive technologies. No comparable data was collected in Rounds 1 and 2.

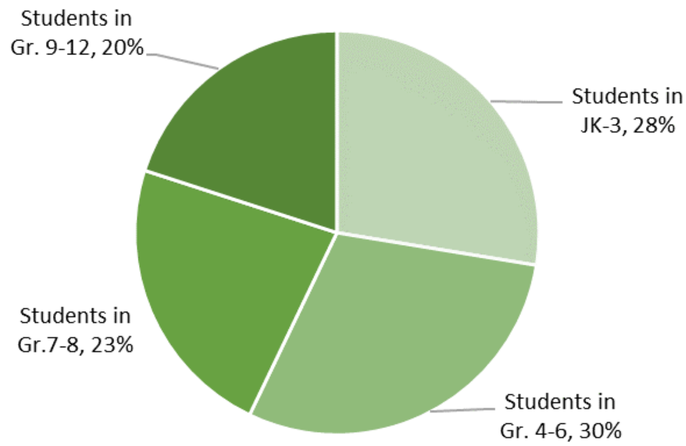
	English (65 districts)	French (12 districts)
Projects with 0 – 30 students involved	4	
Projects with 31 – 100 students involved	6	2
Projects with 101 – 500 students involved	12	6
Projects with 501 – 1000 students involved	7	
Projects with 1001 – 5000 students involved	24	4
Projects with over 5000 students involved	12	

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 100 students or more.

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



The graph indicates that there was a balanced distribution of student participation across the divisions.

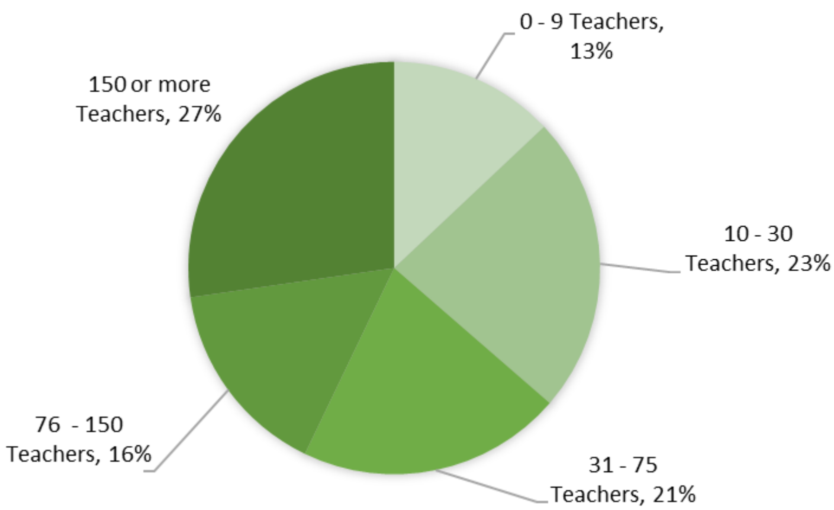
3. Projects by Level of Educator Involvement

All districts identified substantial involvement by classroom teachers in their research. Based on the numbers reported by projects, over 15 000 teachers across the province were directly engaged in aspects of the initiative with 60 teachers per project being the median level of involvement. Round 5 data shows a substantial increase in the level of teacher involvement from all previous Rounds. In Round 4, approximately 11 400 teachers were involved and the median level of involvement was 58 teachers per project. In Round 3, approximately 6000 teachers were involved and the median level of involvement was 24 teachers per project. In both Rounds 1 and 2, the median level of involvement was less than 20 teachers per project.

The teacher involvement data supports the comments from project leaders who reported the broadening and the scaling up of initiatives within their districts, and the field team identified that there was a sharp and dominant focus on pedagogy clearly evident across all projects. This data highlights that if pedagogy is to drive the use of technology, districts are increasingly involving and engaging teachers in the 21st Century innovation research initiatives.

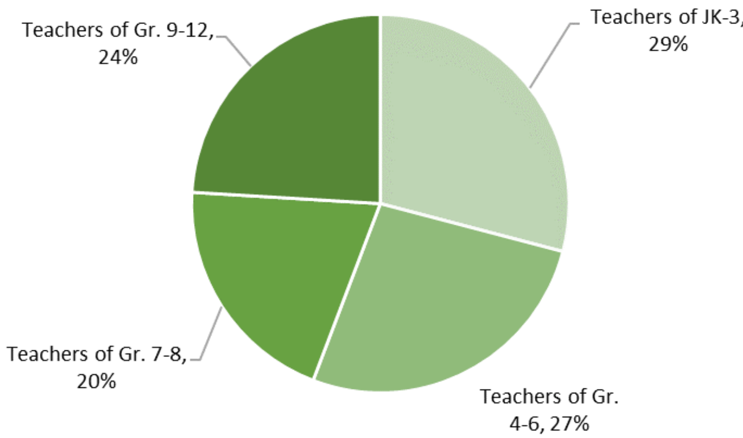
	English (65 districts)	French (12 districts)
Projects with 0 – 9 teachers involved..	7	3
Projects with 10 - 30 teachers involved	13	5
Projects with 31 – 75 teachers involved..	13	3
Projects with 76 – 150 teachers involved	11	1
Projects with 150 or more teachers involved	21	0

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 underscores the broad array of teacher engagement in innovation research activities conducted in Round 5.

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



The graph indicates that there was a balanced distribution of teacher involvement in district projects across the divisions.

As well as classroom teachers, projects reported that in total 2285 school administrators (principals, vice-principals), 360 system administrators, and 850 support staff (e.g., information technology staff, program staff) had direct involvement in the project undertakings. In Round 4, projects reported 1790 school administrators, 310 system administrators, and 870 support staff. In Round 3, projects reported a total of 1000 administrators (both school and system), and 800 support staff. No comparable data was collected in Rounds 1 and 2.

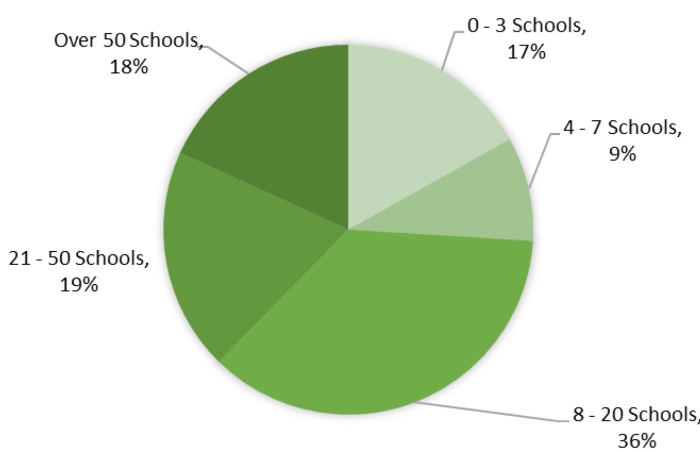
The substantial increase in the direct involvement of school and system leaders in Round 5 supports observations made by the field team of the increasing systemic support, alignment, leadership, and commitment given to technology-enabled teaching and learning by school districts across the province.

4. Projects by Level of School Involvement

All projects identified the number of schools involved or contributing to the initiative. Based on the numbers reported by projects, approximately 2300 schools across the province were directly engaged in aspects of the initiative, with 14 schools per project being the median level of involvement. In Round 4, 2100 schools were directly engaged, with 14 schools per project being the median level. In Round 3, 1450 schools were directly engaged, with 8 schools per project being the median level. This indicates a continuing trend of an increased level of involvement of schools over the past Rounds of the initiative.

	English (65 districts)	French (12 districts)
Projects with 0 – 3 schools involved	9	4
Projects with 4 - 7 schools involved	6	1
Projects with 8 – 20 schools involved	21	7
Projects with 21 – 50 schools involved	15	
Projects with 51 or more schools involved	14	

Projects: School Involvement (percentages across all English-language and French-language projects)



As shown on the graph, in Round 5, 73% of district projects involved 8 or more schools. In comparison, the percentage of projects that involved 8 or more schools was 65% (Round 4), 50% (Round 3), 54% (Round 2), and 55% (Round 1).

5. Project Elements

On the reporting template for the project profile, project leaders were asked to identify the components of their initiative that were significant and planned elements of their innovation research. The profile template provided a list of elements from which the project lead could select all that apply. The reporting of identified elements is intended to highlight trends across planned project actions, knowing that when compared project by project, there would be widely varying degrees of emphasis and actions connected to each of these elements.

Instructional Elements:

	English (65 districts)	French (12 districts)
Inquiry-based Learning	30	7
Experiential Learning	11	3
Focus On Numeracy / Mathematics	23	3
Focus On Literacy	16	5
Special Needs	13	
21st Century Competencies	57	12
Collaboration	52	10
Critical Thinking	48	10
Creative Thinking	40	7
Communication	49	11
Digital Citizenship	40	5
Other	11	1

Professional Learning:

	English (65 districts)	French (12 districts)
Teacher PD Sessions	49	11
Teacher Collaboration across Schools	40	6
Collaborative Inquiry Models	22	4
In-class Instructional Supports (e.g., tech coaches)	39	11
Program Development	19	1
Student Assessment	28	7
Models for Tech Implementation (e.g., SAMR)	28	8
Leadership Development	27	3

Key Areas of 21st Century Innovation:

	English (65 districts)	French (12 districts)
Teacher-Student Learning Partnerships	46	6
Student-Student Learning Partnerships	36	7
Teacher-Teacher Learning Partnerships	45	4
Assessment Practices supporting Pedagogy	35	5

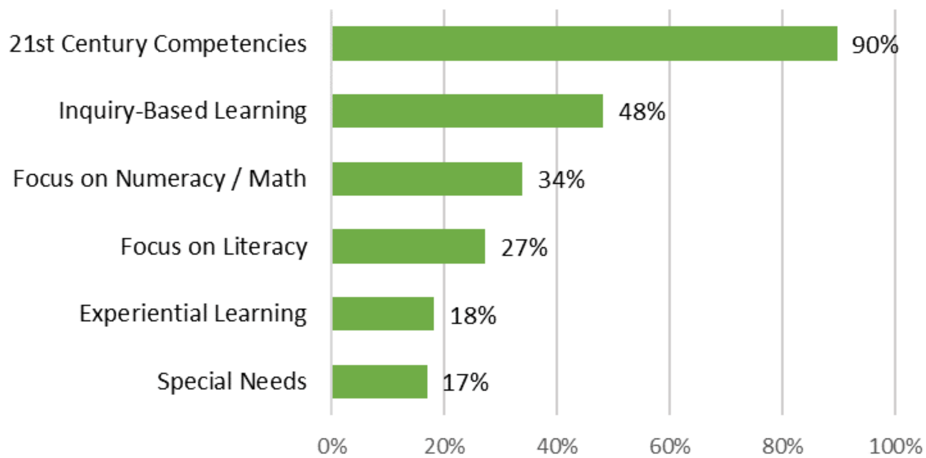
Tools of Technology-enabled Teaching and Learning:

	English (65 districts)	French (12 districts)
Cloud Technologies	55	11
Wireless Technologies	48	10
Blended Learning	32	
Learning Commons	14	3
Assistive Technologies	21	3
Home Access to Technology (students)	26	6
Mobile Technologies	45	6
Student Use of Tablets	45	6
Student Use of Netbooks/Laptops	38	9
In-class use of Personal Devices (students)	27	4
Productivity Applications (e.g., GAFE)	49	11
Collaborative Technologies (e.g., web 2.0)	41	8
Social Media	17	1

The following graphs display each of the previous tables by sorting the 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)

Instructional Elements:

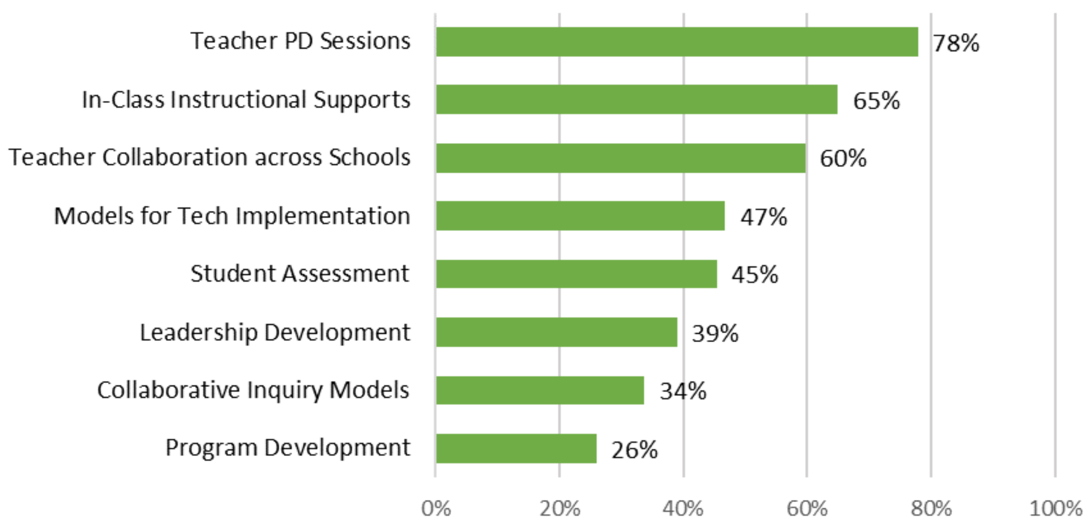


The graph emphasizes the focus by districts across the province on the development of 21st Century competencies. Sixty-one percent (61%) of the districts approached the competencies broadly by addressing all or most of the competencies as identified in the Ministry of Education's foundation document (Draft 2016). Twenty-nine percent (29%) of districts targeted a particular subset of competencies, with collaboration and communication being the most frequently cited in the project profile.

In both Rounds 4 and 5, actions related to inquiry-based learning were identified by many districts across the province. There were differing approaches and interpretations, but districts that focused on inquiry-based learning consistently identified supporting elements such as the development of 21st Century competencies and the promotion of learning partnerships, particularly student-teacher partnerships.

The percentage of projects that are addressing technology-enabled mathematics teaching and learning has increased substantially in Rounds 4 and 5, as compared to earlier Rounds. Districts are examining a range of math-specific computer applications and online software packages that can personalize learning, embed pedagogical support for teachers, and identify and track assessment data to inform instruction and learning. Many districts are looking at technologies that build conceptual understanding, provide tutorials and online help to guide students outside of the classroom, or deepen and enrich understanding by connecting and applying mathematics to engaging cross-curricular tasks. Consistently across these projects, the focus is on using technology to build learner understanding, enhance instructional approaches, and provide meaningful guided feedback. Districts did not focus on drill and practice algorithms and tools that were typical of earlier mathematics learning software.

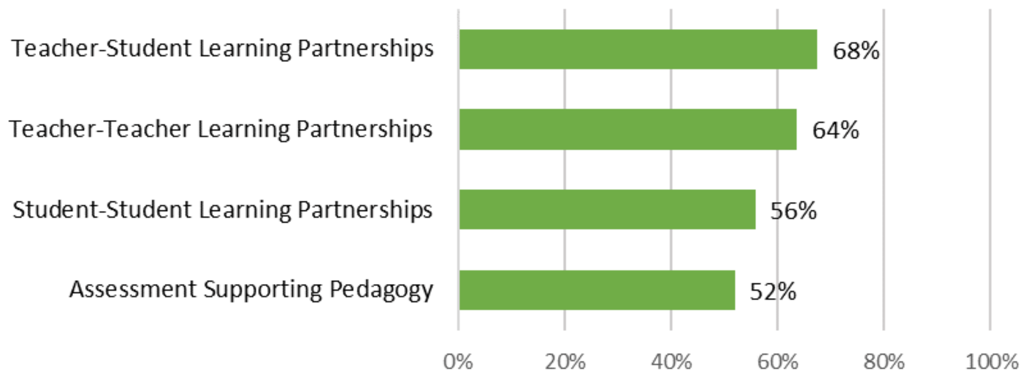
Professional Learning:



The graph highlights the emphasis that districts are placing on teacher professional learning.

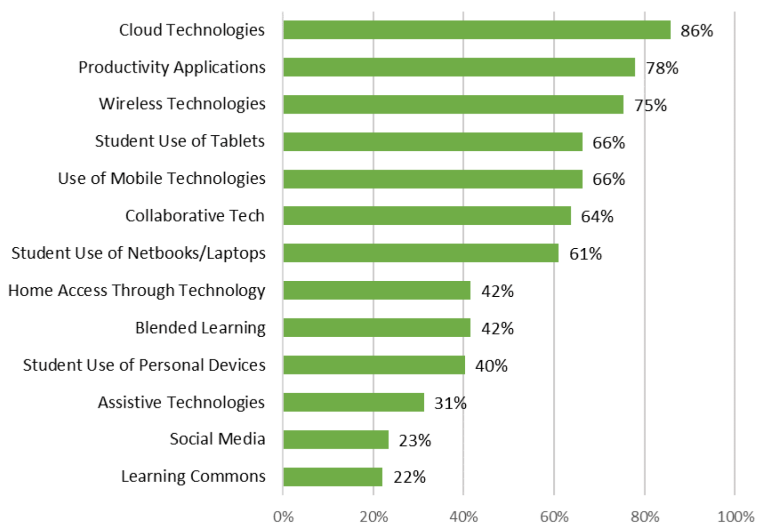
There is a continued and increasing emphasis on in-class instructional supports, most often in the form of school-assigned or system-assigned technology coaches who are an 'at-the-elbow' professional resource for teachers. As well, the promotion and expansion of technologies that allow for teacher collaboration across schools within and across systems, was cited in communications throughout Round 5.

Key Areas of 21st Century Innovation:



The graph shows a balanced approach to addressing the key areas of 21st Century Innovation, and the pattern is consistent with findings in Round 4.

Technologies:



The graph emphasizes the increased focus on utilizing technologies that impact teaching and learning at the point of instruction, or as several districts preferred to say, 'at the point of learning'.

Cloud technologies, wireless technologies, and productivity software all promote the omnipresent access to digital tools in the classroom that allow for the confident and timely use of technology-enabled teaching and learning.

6. Additional Project Elements and Perspectives

The above is a summary of the quantitative data that was provided by districts in their project profile. However, there is additional quantitative data that the districts have provided in the form of findings from their innovative research initiatives. These statistics and resulting analysis are highlighted in the project summaries and detailed in many of the artefacts submitted with the final report.

Overall, both the *quantity* and the *quality* of the submitted statistical data in Round 5 has substantially exceeded that of previous Rounds. Districts have been much clearer and purposeful in the establishment of baseline data to gauge changes to engagement and learning, and have demonstrated a stronger understanding of the needed evidence, either quantitative or qualitative, to show impact.

Much of the quantitative data submitted was from surveys which gave measures, based on student or teacher perspectives, of observed changes to student engagement, learning, and achievement. In Round 5, there was a significantly greater number of districts that also used non-perceptual data to measure and correlate achievement to project actions.

It is acknowledged that there are challenges in obtaining and using valid and reliable achievement data within the brief context of a project, and that current measurement tools do not always align well to the new skills and pedagogies being assessed, but districts are increasingly using and exploring strategies that will provide a confident measure of the impact of technology-enabled teaching on student learning and achievement. Several districts expressed the need to develop assessments and tools that provide measures that act as informed drivers for what is needed and valued in 21st Century learning environments.

Chapter 4:

Impact of the Climb on Students, Teachers and Systems

In this chapter, the research team presents qualitative data pertaining to the areas of investigation noted in Chapter 1 that forms the focus and intent of this study. Building upon the four previous Rounds, the research team continues to document changes in teaching and learning that foster innovation in the development of global competencies throughout the Ontario education system. Central to this Round 5 study is the focus on an in-depth analysis of the impact and changes that have occurred over time in these projects.

As noted in the Prologue, the research team has moved away from the landscape metaphor used in the four previous Rounds of study that provided an ongoing indicator of the impact of digital tools being utilized by projects. We have shifted to a new metaphor – mountain climbing – to more accurately represent the new place projects have moved to in understanding the skills and attributes necessary for continuing the climb to achieving student success in technology-enabled learning. This metaphor also supports our intention to specify gains in technology-enabled teaching and learning in greater depth in this chapter.

The impact of the four previous Rounds of study has brought us across the landscape to the mountain where we can now climb with more certainty and veracity to reach the heights needed for student success in amassing global competencies. Several recent international reports have used different metaphors as a way of situating their studies. While Barber (in Fullan & Langworthy, 2013) used a mountain metaphor, others such as Fullan & Donnelly (2013) used the swamp as they suggested new ways of navigating digital innovations in education, and Fullan & Langworthy (2014) used a geological metaphor to describe the rich seam that the attributes of deep learning can provide. The research team has chosen mountain climbing because many of the skills and attributes necessary for climbing teams are the same competencies that students are developing as they engage in technology-enabled learning, e.g., clear communication, collaboration among participants, creativity in the midst of action, critical thinking to complete tasks, and interpersonal and intrapersonal skills that enhance character development.

The research team believes that the learning from past projects has taken us beyond the pioneering or prospecting stage noted by Fullan & Langworthy (2014) in terms of envisioning the way forward in digital learning. Presently, we are on the mountain, climbing to the summit.

Connections to the International Literature

Climbing ropes are the important piece of equipment that connects climbers to one another to ensure a steady and sustainable climb. Similarly, in these innovation research projects, connections to local and distant participants are important for finding the way forward in theory and practice. International researchers provide the *theoretical* strand of the rope that can help reference the direction and sustain the climb undertaken by project participants.

Since Round 1 (2011-2012), the international literature has expanded and deepened in the understanding of what is actually involved in the move toward technology-enabled teaching and learning. Skills no longer stand alone, but like rope, are interwoven with the attributes necessary for participation in the global community. Some Ontario school boards are part of international studies noted by Fullan & Langworthy (2014) that also include countries such as Denmark, United States, Australia, and England and that are helping to inform a direction for education today. These researchers describe a commonality across countries in *"the radical change in the relationships between all key players in learning: students, teachers, technologies, school cultures, curricula, and assessments"* (p. 1).

Claxton & Lucas (2013) also describe changes in pedagogical practices in countries such as England, Australia, Singapore, and New Zealand that echo some of the competencies that Ontario (2016) has noted for present and future educational direction. They note goals such as producing: *"1) a confident person who is adaptable and resilient, knows himself, thinks independently and critically, and communicates effectively; 2) a self-directed learner who takes responsibility for his own learning, who questions, reflects and perseveres in the pursuit of learning; 3) an active contributor who is able to work effectively in teams, exercises initiative, takes calculated risks, is innovative and strives for excellence"* (p. 7).

Ritchhart (2015) writing about ways of enacting change notes that: *"culture is the hidden tool for transforming our schools and offering our students the best learning possible…In reality, curriculum is something that is enacted with students. It plays out within the dynamics of the school and classroom culture. Thus, culture is foundational. It will determine how any curriculum comes to life"* (p. 6).

Fullan & Quinn (2016) describe building capacity using a coherence framework that can guide action for change. Their model combines four elements: focusing direction; cultivating collaborative cultures; deepening learning; and securing accountability in a circle of simultaneous and continuous change activated and connected by leadership.

It is clear in the data reported by projects in this Round 5 study that the understanding of concepts for innovation and capacity building noted above in the international literature are being read, internalized, and enacted upon in Ontario school districts.

Connections to Local Research Projects

Of equal importance to the international literature is the growing understanding of local innovation initiatives that provide the *practical* strand of the rope for monitoring changes in teaching and learning that must be in place for a successful and sustainable climb.

In the following sections, the research team delineates the final data of the *Round 5 Research Innovation Initiative* using three major headings: 1) Impact on Students 2) Impact on Teachers and 3) Impact on Systems. It is clear that provincially, systems are mobilizing knowledge gained over the past Rounds of study to increase capacity and scale up technology-enabled teaching and learning to a greater degree. Projects appear to have gathered both the theoretical and practical strands of the rope into one and now have added strength and resolve that will impact the climb ahead.

Impact on Students

> *By creating new patterns of discourse, providing students with roles that structure learning, and asking good questions, we can do much to shape the interactions of our classrooms. These practices become even more powerful when they are situated within an atmosphere that seeks not to control students but to develop them as autonomous learners.*
>
> *Ritchhart, 2015*

In this section, the data on the impact on students is reported under the sub-headings *engagement, learning,* and *achievement*.

Engagement

Engagement refers to how learners approach and sustain interest in subject matter and skill development over time. Overall comments from project leads and student and teacher participants in this Round 5 study indicate technology-enabled pedagogy is more readily understood and evidence of student engagement is increasing.

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 increased, collaboration, communication, and feedback improved and overall interest and engagement was heightened as students worked with individual interests, talents, and learning styles. Teachers reported higher engagement, task completion and increased success through encouraging student inquiry. One teacher noted that: *"integrating tech and Office365, OneNote, and other tools has changed the way I teach, and the way students learn in my classroom. Good inquiry-based learning is now possible and easy to do with technology. Students have become self-driven learners, with me as a guide or facilitator. Students get more work done because it means more to them and they are in control of their own learning."*

In several schools in one project, teachers and administrators reported that it is the students who are now asking questions around their learning, what the expectations are and what opportunities they have to demonstrate their understanding. Multiple projects reported that students are able to create products that showcase their strengths, their interests, and are a truer reflection of their learning. A teacher found that, *"Students are beginning to take more ownership in their learning. The students are engaged in their learning and actively looking for ways to show their thinking."* One student said: *"By learning this way, we've taken on real world problems – I've never done that before…And, we had fun learning … instead of doing work that we'll never use, we actually put it into good use, and we made a difference."*

A number of projects reported increased engagement through learning experiences that promoted student voice and choice. It was reported that student voice played a key role as teachers increasingly provided students with choice in how they demonstrated their learning and shared it with a wider audience. A teacher noted: *"You can really see the value of students being given choice and voice regarding something that is important to them. Student engagement was at a greater level because of this. Due to an increased student interest level, the entire process of completing tasks was more enjoyable."*

Projects reported that students indicated increased access to wireless digital tools in their classroom improved their ability to learn by providing opportunities for deeper exploration of materials. They could research information at any time and so had more choice in their learning. A math teacher noted: *"[students] are excited about coming to class and are very open to discussions about the many ways to figure out problems. They were engaged in the activities. By learning to question better, I had a very student led/centered class that actively participated and freely have right and wrong ways to do problems … The project helped me become a better teacher and my classes, not just the ones in the project, will benefit. Conceptual understanding trumps memorizing steps."* As well, teachers observed a direct correlation between student voice and engagement. By leveraging student voice during planning and implementation, student engagement was significantly enhanced.

Along with the increase in student voice and choice, many more partnerships were reported than in previous Rounds of study that had an impact on engagement. For example, in one project the level of student engagement was echoed by parents, who indicate that they have to tell their children to stop doing math and go to bed. A teacher reported that students commented that they are increasingly proud of their work, feel more connected to their parents or guardians through their work, and are eager to learn more when technology helps them connect their learning to the world around them. A student speaking about math said: *"I get to explain my work - in my last class I couldn't explain my work because I was kind of shy. Now I get to record my voice and show people I can do the work. My Grandma says that I am doing great and she likes that she can see my work when I am at school."*

Partnerships described in the data reflect the impact of skills being learned that enhance inquiry. Student-teacher and student-student partnerships are clearly evident across projects. It was reported that the use of technology is a catalyst for building collaboration and communication among students and teachers, e.g., in sharing a digital product, when providing and supporting one's own point of view in online discussions or in commenting on another's post. In this way, students have gained a greater appreciation for the range of capabilities that others possess. Several projects described partnerships where students are taking a lead role to support technology-enabled learning. These students offer support to other students and teachers in their school and beyond.

It was noted that by providing a wider variety of ways to share their learning through technology, students could creatively demonstrate their learning in many ways and with many different people. Also, students are collaborating more as a result of technology, with students in their classes, with students in other schools, and with students throughout the world. In terms of expanding inquiry beyond the local area, a teacher noted that: *"Students are now realizing that the world outside the classroom is accessible and is part of their learning and seeing ways to explore and connect with others. They are becoming aware of sharing their own learning with parents, [other] students, and other people in education who are not a direct part of the classroom."*

It is clear that the impact evidence for increased student engagement noted by projects has added greater depth and breadth of understanding to technology-enabled learning. Having students recognize that they have choice and can add their voices to conversations with teachers, parents, and others as learning partners, using digital tools is a critically important knot in the rope of the continuing climb to inquiry-based learning. Since a willingness to engage in learning is a first step in elevating knowledge and skills, the increase in engagement reported by projects represents a heightened movement to including students in the planning and execution of their own learning.

Learning

In recent years, a number of experts in education have provided frameworks that promote technology-enabled teaching and learning, some of which are being implemented by districts to establish directions for impacting learning. In project reports, there is increased evidence that these frameworks are influencing changes in learning for students, e.g., example, New Pedagogies for Deeper Learning (NPDL); Substitution, Augmentation, Modification and Redefinition (SAMR); Science, Technology, Engineering, Mathematics (STEM). It is clear that while these frameworks have been referenced in past project reports, in this Round 5 study, evidence points to the fact that more teachers are ardently implementing these frameworks for instructional purposes in classrooms with students.

Most projects report that learning for all students, including those with special needs is now being greatly enhanced by technology use. It was reported that students felt their learning was being reshaped by available technologies and that they were able to be more creative and confident in their learning. A project noted: *"The widespread availability of technology in its many forms has allowed students to see themselves as learners and not as 'special needs' learners. … Technology has been pivotal in equalizing the playing field for our students. Rather than a playing field, perhaps we should refer to it as a 'learning field'."* There is a clear trend noted that students with learning difficulties now are able to engage in the same learning experiences as their peers, using appropriate digital supports while working at different levels of engagement, and that reluctant learners are more willing to share their ideas.

A number of projects found that students were becoming more adept at leveraging digital tools to aid in collaboration, and developing their ability to work interdependently and synergistically in teams with strong interpersonal and team-related skills. Seamless collaboration on projects was identified, even if students were in other classes. As well, students reported that peer collaboration increased their motivation and their understanding of content. A project reported that students participated in an inquiry that involved using skills from Math, Science and the Arts to design and build a structure to help someone living in a refugee camp. Students began this inquiry after conferencing digitally with a UN support worker. Their ability to use primary sources to collect information extended their learning in a way that text alone could not have done.

A number of projects reported that the use of mobile technology has increased student creativity in their thinking and assignments. In this vein, a teacher reported that: *"Students explored various 3-D objects in the classroom and identified the length, width, and height using non-standard units of measure. Students used mobile technology to document their learning (camera, voice, text). Communication, collaboration and critical thinking and problem solving were the competencies involved with this learning task."*

Several projects shared that students' self-regulation is impacted by technology use. A project stated that technology is providing students with opportunities to foster curiosity, engage in learning tasks, build independence, and promote innovation in ways that were not possible without it.

A teacher describing her classroom said: *"My students are beginning to realize that using technology is more than just opening up a document to type an essay. The students are blogging to share and reflect … watching videos to research and problem solve, interacting and connecting with others using [social media] ... Student impact has been immense – there has been more accountability …The walls are starting to come down and student awareness and competencies in 21st Century learning has started to increase."*

Overall, it is clear that in this Round 5 study a point has been reached where students are more engaged in learning how to learn and less on what to learn. Projects report a visible shift in students toward the process of learning, and a growing eagerness to be involved in learning using multiple technologies is evident. Words like "connections," "collaboration" and "communication" are repeatedly evident throughout the data, highlighting the continuing move to developing competencies that has been building over the last several Rounds of study.

Achievement

A main concern voiced in the international literature over the last several years has been how to measure student achievement within the context of technology-enabled learning. Fullan & Langworthy (2014) noted: "*Theoretically, at the end of learning experiences with new pedagogies, students should breeze through standardized tests that measure mastery of curricular content. Of more importance would be measuring the full range of students' deep learning competencies: 1) students' mastery of the learning process, including their ability to master new content; 2) students' key future skills, including their ability to create new knowledge using the collaboration and communication skills necessary for high-level value creation; 3) students' proactive dispositions and levels of perseverance in the face of challenges; 4) the effect of students' work products on intended audiences or problems. Technology can* *theoretically be harnessed to support all of these types of measures, but we have so far seen few clear examples of this happening"* (p. 40).

Many projects, building on the four previous Rounds of study are documenting demonstrable achievement on the part of students. This documentation provides evidence-based and research-informed decision making.

A project reported that, across the whole district, leveraging digital tools has had a positive impact on student outcomes such as increased collaboration, communication, and creativity. The research undertaken within the system has shown that the change by teachers to support new pedagogical practices has led to improved student achievement. In another project, the majority of teachers reported that student achievement had significantly increased with the use of cloud technologies in the classroom.

A number of projects focusing on literacy and mathematics reported gains in achievement over the course of the project. For example, in one literacy project, a teacher targeted five students with literacy gaps for data analysis, and noted significant academic impact on their ability to communicate their thinking and ideas. Another project found that over the past three years of working in these projects, student gains in reading have almost doubled. In terms of mathematical achievement, one project stated that students found that the use of tablets allowed them to experiment with math concepts and to learn, understand, and apply the concepts as opposed to memorizing them.

Overall, it is clear that while some projects reported on achievement measures pertaining to skill development using technology and others reported on gains in the learning attributes central to digital learning, there was solid evidence of an increase in achievement due to the focus on competencies, utilization of technology, and student inquiry. The descriptions of achievement in Round 5 provide evidence that projects are thinking more critically and deeply about ways to confirm that student achievement can be measured on a scale commensurate with that being reported in student engagement and learning.

Impact on Teachers

> *Achieving gains in deep learning is not easy. Professional teaching capacity must be built for the new pedagogies to be effective.*
>
> *Fullan & Langworthy, 2014*

In this section, data is reported on the impact on teachers engaged in these projects using the sub-headings: *instruction, assessment,* and *professional learning.*

Instruction

Projects reported that teachers are engaging differently with technology than in earlier Rounds of study and that this is impacting the way they consider student learning and approach their own thinking about curriculum and instruction, planning, and assessment. For example, a project reported widespread shift in teachers' attitude about using digital technology in learning tasks to where teachers now view digital technology as a means of engaging students in learning rather than as a sporadic means for sparking interest. Teachers also requested a digital tool for online collaboration with other teachers to share teaching strategies. Projects reported that teachers are decidedly integrating technology as they design learning experiences for students.

It was reported that teachers are recognizing that students are applying 21st Century competencies during the learning process. Competencies such as communication and creativity are clearly becoming part of the vocabulary of learning and instruction. One teacher noted, *"I see where some of my lessons were already touching on 21st Century learning, but I notice in my planning that I am thinking about those competencies now."*

Projects reported that technology is being used more as a learning tool rather than a teaching tool. Teachers are empowering students to inquire into their own driving questions, having them connect with their community and encouraging them to work independently. As a teacher noted: *"I have become a facilitator of learning. I guide, and I steer, but the students are searching, striving towards knowledge, collaborating, sharing."* It also was reported that in the past, teachers would have visually evaluated their students and given them oral or written feedback, but now, teachers place students in the position of responsibility for gathering examples of their progress, reflecting on their own skills, and presenting them in a way that demonstrates improvement over time … [this] would not be possible without the devices students were provided, and if teachers had not begun to differentiate the types of tasks and products required of students using technology-enabled strategies.

There is strong evidence that teachers are shifting their way of thinking about how they engage in their planning and teaching so that students are becoming much more a part of their own learning. Teachers demonstrate confidence for including student voice and choice, and in building collaborative partnerships among students and others. A teacher noted: *"I would say that my approach has changed* *in that now I approach lesson planning with tech in mind. I am always thinking about how I can shift the focus so that students are directing the learning. I look for ways to incorporate tech so that students are either more engaged, are sharing their learning with others, or are collaborating with each other."*

There is also a purpose and direction for changes in pedagogy among teachers who are more comfortable with technology than in earlier Rounds of this initiative. A teacher described a lesson: *"The other day my class needed to determine how far a kilometre was. We pulled up Google Maps, created our own map, found our school, made a landmark and then one by one placed a marker on the map to indicate where they thought 1 kilometre was. We then went for a walk and walked an actual kilometre. When we got back to class, we used the ruler tool to actually mark it on our map and see who was most accurate."* Another teacher stated: *"I have learned how technology can enhance the learning environment and make the curriculum more engaging. Moving toward a paperless classroom will help build electronic portfolios that can be easily transferred from one teacher to another as well as between home and school."*

In terms of engaging students differently, one teacher, reflecting on the innovation research project said: *"Moving forward, I plan on applying my learning from this project in future assignments and projects by focusing on the inquiry process rather than front loading students with information in order to provide students with genuine problem-solving opportunities."* Yet another teacher said: *"I found that [technology] helped me with seeing the overall process of students' work. [I could see] the times the students revised their work, [how I was allowing] opportunities for students to collaborate to solve problems as well as providing different ways for students to figure out which way of learning works best for them."*

A project lead describing the change in teacher practice said: *"Feedback that we got from our research was that teachers wanted to go deeper. … Working the way we are now is much more job-embedded and provides continuous support that is made available at the school."* This deeper understanding of technology-enabled teaching practice provides evidence of the impact that these projects have had over time on teachers.

The resulting change is critical for teachers to remain the activators or facilitators of learning in classrooms. They are the lead climber that holds the rope for those who climb alongside them.

Assessment

The Round 5 projects provide examples of the impact of teachers using technology to assess student learning. One project indicated that teachers were employing more diverse assessment practices because teachers had a better idea of both assessment and how to leverage technology to support assessment.

Teachers were reported to have a clearer understanding of how students are thinking and they were more focused on conversations with students and observations of student performance in assessing overall learning. Another project reported that technology has helped teachers refine their assessment practices and to share evidence of learning.

Projects reported that technology allowed for the deepening of assessment practices, and 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 opportunities. A teacher said: *"Being able to assess student work in different ways with multiple opportunities to check in to see where students are at and to determine next steps in their learning … is invaluable … technology has had an impact on the way we assess and make decisions about instruction."* Another found that: *"It's great to see the work in progress but also to see how that shaped their final project …The assessments are now focused less on content and more on thinking."*

In the Round 5 reports, there were a number of indications that teachers are thinking more critically and deeply about ways to confirm that student achievement can be measured on a scale commensurate with that being used to report student engagement and learning. A project reported that: *"Moving forward into the next iteration, we need to figure out how best to measure the less tangible skills as part of our scaling up so that educators are able to explicitly articulate between their work and inquiry, the 21st Century competencies, and board strategic vision."*

It is clear that monitoring and appraising achievement is becoming an important aspect of the learning process. The focus on the impact of engagement in previous Rounds of study has developed to the point where the impact of achievement is now being reported as more central by projects, and is being addressed thoughtfully. This development is consistent with that reported in the international literature. Much like climbing teams, in these projects all the small steps taken to measure achievement provide the ground work for moving to the next elevated stage of the climb.

Professional Learning

As reported in previous Rounds, professional learning is consistently embraced by teachers to extend their own learning and that of their students. Projects reported that as teachers recognized that technology-enabled instruction supported the development of global competencies, they constantly sought different strategies for guiding students' learning. Subsequently, this led to their planning lessons and activities that provided students with the opportunity to demonstrate these competencies. Following professional learning sessions, one teacher said: *"I now feel that when I am using technology in the classroom, it is more purposeful. I have a deeper focus and now know of more ways to connect the curriculum to the real world via technology."*

Projects found that teachers are open to using technology for professional development. The changes in delivery of professional learning are a clear indication that the technologies being employed within the classroom are having an effect outside the classroom. Much as Dede (2016) has described, they noted that this model of professional learning is both scalable and sustainable.

One project reported taking a multi-pronged approach to professional learning to meet the needs of teachers at differing levels of development that included on-site, embedded support for teachers provided by technology resource teachers and teacher-librarians; sustained learning opportunities through collaborative inquiry; school-based professional learning opportunities led by principals; support for self-directed learning; and opportunities to learn from expert teachers. Another project described that through needs assessment, differentiated types of professional development were offered based on knowledge level and subject area. This choice came about because teachers were not interested in generic sessions but wanted to learn more specifically how to use specialized apps with particular students to achieve specific goals. A teacher noting the benefits of professional learning said: *"Certainly I am much more confident using technology in the classroom. I've also expanded the scope of use. I began by simply using apps that complimented my program but now I am using web-based apps to build new resources for the classroom."*

Another aspect of the increase in professional learning that was evident in project data was partnerships with colleagues. Several projects reported that teacher-teacher partnerships were increasing as a culture of risk taking and shared learning was developing. It was reported that there is greater frequency and comfort with co-teaching, co-planning, and participation in coaching opportunities in both elementary and secondary. Teachers were more comfortable connecting with one another and learning together about changes in pedagogy and technology. This shift marks a change in innovation and capacity building among teachers. It is clear that the notion of partnering has expanded and strengthened.

Overall, the evidence provided from projects displays the impact of professional learning over the previous Rounds of study, which is now resulting in teachers' increasing comfort with technology, a newfound strength in building partnerships, and participation in ongoing professional development that assuredly impact their pedagogy and hence, support student learning and achievement.

Impact on Systems

> *Entertaining a directional vision for what is possible and where you want to go within the new realm of possibility is the first step on a successful path to change. Certain elements of school and system cultures can strongly support the spread of new pedagogies.*
>
> *Fullan & Langworthy, 2014*

In this section, data is reported on the impact on systems, using the sub-headings: *coordination and collaboration*, *leadership*, and *community*.

Coordination and Collaboration

There was significant evidence that building capacity and a culture of growth within districts is continuing to expand. Projects highlighted cultivating opportunities to develop further collaborative cultures at all levels through participation in cross-board and jurisdictional events, symposia, and shared learning experiences.

Systems are actively increasing coordination and collaboration among teachers, schools, and administrators. For example, in decision making about conditions required for deep learning to flourish in a school community, it was reported that system staff are also engaged alongside educators to identify the learning environments, learning partnerships, and digital tools that promote student engagement and success.

In this Round 5 study, systems continued to report on changes to policy, planning, and shifts in vision that can mobilize new knowledge and can impact achievement across districts. Districts reported on developing a renewed plan and on building on system vision for technology use to assure that all teachers and students have access to and training in the use of digital tools. The increase in technology use has motivated the development of new technology policies and continues to put pressure on improving overall technological infrastructure across systems as there is a developing culture of "*we're all in this together*."

Systems are focused on ways to increase the scope of technology-enabled teaching and learning. The physical layout of schools was recognized as an important facet to consider in terms of the impact on collaboration and communication. One participant noted: *"This school showed that taking technology and no longer centralizing it and distributing it through the school is the way to go … it's more difficult to keep control when equipment isn't organized into carts. It took quite a process. Our systems had to change to enable this [move]. This shows that we have to be able to respond to what the schools need to do with students."* One system noted that they have redesigned the learning space by redistributing technology in all elementary schools, which allows for opportunities for students to work collaboratively in small, flexible groups.

Another observed that a project was building on Round 4 by providing teachers with access to digital technology to support them 'at the elbow' in their daily work. A project reported that for the first time, secondary schools have been joined in a consistent platform to support a blended learning environment.

A district found that focusing on pedagogy and staying focused on a common goal was key for enhancing progress in 21st Century learning, as did another district that was implementing new technology in order to build upon their solid foundation for scaling up technology-enabled teaching and learning practices. There was also a clear indication that it is crucial to have sufficient resources to support the evolution and sustain changes in practice over time. It was noted by one project that they are able to ensure that all schools across their system are building capacity. Another project related an increase in the number of teachers who trained in the use of blended learning as way of using technology to meet pedagogical goals.

Many more teachers are reported to be using cloud technologies to support the scaling up of technology-enabled teaching and learning. For example, one project reported that teachers within the system have replaced experts from afar as the primary source of support for teachers and staff within the system. This is a testament to the growth in expertise and confidence with the technologies and evolving pedagogical practices.

Some districts stated that they were at a tipping point as far as growth across the system is concerned. They felt that in Round 5, teachers were asking for reassurance that technology-enabled teaching and learning will remain a priority.

Leadership

Projects reported that there is a growing understanding that leadership is the key to scaling innovative practice. A shift in mindsets within schools is occurring because there is strong leadership and support. For example, principals were reported to be playing a vital role as instructional coaches and that they are developing technical fluency with system tools. There is continued support for administrators and leaders as they recognize the advantages offered by the digital tools and networks.

It is clear that systems are now focusing more on the human impact of change such as support for teachers and building bridges between and among different system personnel in order to provide a more coordinated platform for technology use across schools and administrative departments in the district. For example, it was reported that the district established a Digital Learning Steering Committee to help set goals and provide direction on technology-enabled teaching and learning in schools. Another report noted that new technologies were impacting the administrative environment and creating changes among system leaders in terms of organizational processes, which have led to increased efficiencies and collaboration across departments. Yet another project highlighted that focused leadership is sustainable even as members come and go; they developed a board learning plan to provide this sustainability.

Community

Projects reported that technology and the system implementation of platforms that provided for home access opened learning beyond the school and afforded opportunities to involve parents as part of their children's learning and success. Streamlining communication between home and school using technology to increase parent engagement, enabling them to support learning at home is stressed in reports. Having parents understand the direction that technology-enabled teaching and learning is on student learning and success, fosters support and strengthens connections to the larger community.

In one instance, parents were invited into a classroom to observe students researching online as a way of demonstrating how students were using digital technology. One project participant said: *"Parents are both working and it's more difficult to engage parents in their student's learning. Technology has started to change the way we are engaging parents in their kids learning. Some digital tools provide an online portfolio … and the parents can instantly look at the work their child has done and they can comment on it or provide feedback to the teacher, student or both. We have comments and participation from* *parents I have never met in person … We're pushing student work out to parents as opposed to saying you have to come into this building to see what's going on."*

Systems are cultivating community relationships through interactions with members of multiple stakeholder groups. For example, there is an increase in connections being formed through partnerships with universities, private sector businesses, the technology sector, and parent groups. As well, it was reported that districts are affording opportunities at all levels to further develop collaborative cultures through participation in cross-board and jurisdictional events, symposia, and shared learning experiences.

The evidence provided in this chapter confirms that the goals of the study noted in Chapter 1 have been addressed and that further, the impact on students, teachers, and systems has shown that growth in learning continues to flourish in increasingly positive and measurable ways.

As in mountain climbing, it takes the coordinated effort of the whole team to reach the summit. Districts clearly understand that to promote sector-wide engagement, common understanding must be fostered if capacity is to be increased to scale up technology-enabled pedagogical practices for optimizing learning.

Chapter 5

Learning and Growth on the Ascent: Viewpoints and New Perspectives

> *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.*
>
> *Fullan & Langworthy, 2014*

In this chapter, the research team provides an overview of changes viewed across the history of the projects and insights into the impact projects have had on growth and change in technology-enabled teaching and learning during previous Rounds and that are apparent in this Round 5 study. We also situate innovation efforts within the wider context of international research that points to features of strong system growth in integrating effective technology-enabled pedagogy.

Foundational to the success of the whole initiative over the five Rounds is the change from viewing technology separately from pedagogy, to one where teachers and systems understand that pedagogically driven and technology-enabled teaching and learning is a key factor for student success in the knowledge economy where competition is now played out on a global scale.

Growth and Change Across the Rounds of the Research Projects

As described in the Prologue, the research team has shifted to a new metaphor, mountain climbing, to highlight competencies noted in the international literature that are now considered seminal for continuing the successful transition to the global and innovation-based economy.

Looking back over the history of the innovation research projects, it is clear that the language of digital learning utilized by project participants has expanded from the early Rounds of study as familiarity with the tools of digital learning have increased and become part of daily classroom and school life. The increasingly rapid pace and forward direction of technology-enabled teaching and learning displayed in the most recent Rounds of projects is focused on how to continue scaling up and sustaining the momentum in developing the competencies that place students, teachers, and systems at a higher juncture in the climb.

Researchers such as Dede (2011, 2013, 2016), Fullan & Langworthy (2014), Fullan & Scott (2014), Robinson (2015), Fullan & Quinn (2016) have highlighted essential competencies such as learning collaboratively, becoming effective communicators, bringing creativity and critical thinking to learning, and building character that can hold learners in good stead as citizens in the competitive world of the 21st Century.

Now, at the conclusion of Round 5, it is clear that we are at an inflection point on the ascent, where teachers are for the most part experienced and equipped with the digital milieu to take technology-enabled teaching and learning to the next level on the climb.

The forward direction across Ontario is paralleled in the international literature, where Fullan (2012) noted that we were at the beginning stages of an improvement cycle in education where pedagogy, technology, and change needed to be addressed together to connect the "natural affinity" that students bring with them to their studies in schools from their 24/7 world of information and learning. This connection has been readily embraced and, as projects reported, technology has influenced changes in pedagogical practice and impacted students' development of global competencies.

Fullan & Langworthy (2014) described what they termed the "*new pedagogies*" of 21st Century teaching and learning, drawing on data from many countries and from the province of Ontario. These new pedagogies focus teaching and learning on inquiry rather than on answering prepared and limiting questions, and the skills needed for the inquiry process have highlighted a new direction in 21st Century learning.

Over the last three Rounds, projects across Ontario have reported embracing practices such as student-student and student-teacher collaboration and shared communication, and a deeper engagement in learning on the part of students through critical and creative thinking. Teachers are gaining a more sophisticated understanding of the potential of technology-enabled instructional practices, and the power of networking locally and more broadly to share ideas and perspectives.

Just as mountain climbers know that preparation for achieving a successful climb to the peak can take many years of practice, the accumulation of learning from the five Rounds of study ensure that the sharing of new knowledge from prior efforts becomes central to the path forward for the next stage of the ascent.

The evidence from the Round 5 projects clearly indicates that districts are now capitalizing on their successful efforts from the previous four Rounds of study (2011-2015). This prior learning has impacted student engagement, achievement, and pedagogical practice system-wide across Ontario.

Evidence of Visible Learning

The degree to which the impact of the innovation research projects has shifted over the five Rounds of study is visible in a number of concrete ways that are also present in the international literature. In both the innovation projects and the literature, it is clear that research-based knowledge about 21st Century competencies is becoming more evident in practice. Many publications that provide information on the growth and change in teaching and learning are now available and refer to educational shifts that hold promise for technology-enabled learning in many countries and in the province of Ontario (Fullan & Langworthy, 2014; Dede, 2014; Kirtman & Fullan, 2016).

A number of studies and reports have described many of the areas of change reported on in previous Rounds of study such as: mobilizing knowledge through networking; innovative pedagogical practices; professional learning; and overall shifts in system vision (Luckin, Bligh, Manches, Ainsworth, Crook and Noss, 2012; Fullan & Langworthy, 2013, 2014; Fullan & Scott, 2014; Dede, 2013; Claxton & Lucas, 2013). Each of these topics provides information on capacity building that can further collaborative, creative, communication among the education community and beyond. They each provide important markers that reflect the magnitude of change and its impact on the journey to the summit of technology-enabled teaching and learning practices.

Mobilizing Knowledge & Networking

As the research team noted in Chapter 1, projects are increasingly demonstrating the importance of mobilizing the knowledge they are accruing through sharing experiences more widely. For example, in the last three Rounds of study, projects reported that teachers are sharing their new knowledge with one another across grades, schools, and districts. Teachers are learning from and with students, and students are collaborating with one another to seek solutions to problems and inquire into diverse and rich topics of interest.

Projects have also reported the power of networking and the breadth of information available from different sectors that can inform their technology-enabled classroom practice. There is an increase in connections being formed through partnerships with universities, private sector businesses, the technology sector, and parent groups. Networking is also occurring between and among school boards across Ontario through planned events, seminars, district and major conferences where opportunities are offered for sharing current technology-enabled teaching and learning practices.

This broader sharing of information and successful practices through partnerships provides evidence of the impact of collaboration and ongoing communication undertaken across the province. The realization of the breadth of technology-enabled teaching and learning complete with the positive connections possible around the world has made a significant impact on students, teachers, and systems.

Innovative Practices

On strong climbing teams, members know that innovation is a necessary skill and everyone has a voice and choice in decision making from the team leader to the newest climber. In similar fashion, through the projects' reporting, the research team continues to see visible evidence of innovative practices among students, teachers, and system leaders.

Couros (2015) writes that innovation is a way of thinking – thus the impact of innovation rests on the shoulders of everyone involved in changing the course of teaching and learning as new concepts and processes are implemented that will change outcomes over time. Over the Rounds of the innovation research projects, engagement in digital learning has changed from simply working to understand the mechanics of technology, to purposefully utilizing the tools that advance technology-enabled teaching and learning in classrooms across the province.

Student voice and choice, and a move toward more independence and self-regulation in learners, teacher as facilitator and activator (Fullan & Donnelly, 2013), and whole systems being involved in professional learning (Fullan & Quinn, 2016) are energizing practices that impact every aspect of learning.

In Round 5, there is evidence that individuals and groups are using their experience in past projects to continue the move away from a traditional teaching base. There is an expression of growing confidence in embracing technology-enabled teaching and learning and an assumption that the move to inquiry is foundational for 21st Century learners. To that end, there is evidence that changes in instruction have had a perceived and measurable impact on student achievement and on ways to assess their progress to a degree not reported in previous projects.

System-Wide Measures

In Round 5, access to ongoing professional growth through planned system-wide sessions and through continuous school-based 'at-the-elbow' support by coaches, colleagues, and students has provided deeper knowledge of technology's role in teaching and learning and further built the capacity among teachers to continue the climb.

In terms of capacity building, there is evidence that professional learning is more extensive and more varied than reported in previous Rounds, based on teacher requests for more specific support. Professional learning has broadened in scope to include school and district administrators. These changing practices have impacted teacher awareness of and willingness to embrace new strategies for teaching and learning to a greater extent than in previous Rounds of study. Teachers are enlarging their focus in their professional learning beyond how to engage students to include ways and means of measuring student achievement within a context that models and promotes global competencies.

Systems have shifted from a prominent infrastructure and hardware focus reported in the previous Rounds of study to the important realization that the human aspect of building capacity is key for the full implementation of technology-enabled teaching and learning.

There is also increased evidence across systems that frameworks identified in the international literature are being utilized for supporting student success – engagement, learning, and achievement. As noted in Chapter 4, there are now many references to ‘deep learning,’ to the SAMR model, and to subject-specific ways of infusing technology into teaching. The literature is being read, discussed, and put into practice. Evidence-based and research-informed decision making is focused on the instructional core and on creating momentum for supports and tools at the ‘point of learning.’

In reviewing project capacity building over time, it is clear that much like a climbing team, the coming together of all members of the group with one aim in mind is a necessary step in scaling up for a successful outcome for everyone. In Round 5, there is evidence that the three important member groups needed for sustaining success − students, teachers, and systems – are working together with a new clarity that provides guided optimism for the ascent ahead.

Epilogue

Locating a New Place on the Mountain and Next Steps for Continuing the Climb

Achieving coherence in a system takes a long time and requires continuous attention.

Fullan & Quinn, 2016

In concluding this Round 5 study, the research team returns to the title of the research project and the project metaphor to offer final remarks. To 'sharpen the focus' of a direction being undertaken is to bring a more solid vision of the way forward into view. It then becomes possible to 'hone in' on the goal with more accuracy. Mountain climbers engage in this two-step process as they refine their techniques and strengthen their skills with each climb they undertake. The knowledge that practice can only improve the next climb supports every effort to continue sharpening the abilities of climbers whose ultimate aim is to scale the mountain.

This same pattern is visible at the conclusion of the Round 5 innovation research projects where participants continue to refine and add to their knowledge of how technology-enabled teaching and learning contributes to student success. Looking back upon the four previous Rounds of study, it is clear that with each Round, continuous progress has been made in the climb toward broadened implementation of technology-enabled teaching and learning across the province. With each project iteration, capacity continued to be built, sustained, and scaled up.

There is clear evidence that participation in the innovation research projects has resulted in teachers gaining an increasing comfort with technology, in a newfound impetus for them to build partnerships with students and colleagues, and in their participation in ongoing professional learning that can impact their pedagogy and hence, support student learning and achievement.

One of the most noticeable features of the Round 5 projects is that there is positive acknowledgement at all levels of the education community that the competencies needed for life in the global community are those noted in the international literature: clear communication, collaboration among participants, creativity, critical thinking, and character development. Teachers are asking for ongoing professional learning at multiple levels to develop further their instructional practices in order to provide students with these competencies.

Another important feature is that the descriptions of achievement in Round 5 provide evidence that teachers and system leaders are thinking more critically and deeply about ways to confirm that student achievement can be measured on a scale commensurate with that being used to report student engagement and learning. As well, there are growing indications that districts are focusing efforts in order to judge and measure the impact of technology-rich environments on student achievement.

Systems are focusing more on the human impact of change such as support for teachers and on building bridges between and among different board personnel in order to provide a more coordinated platform for technology use across the district.

Further, projects identified that there is a need to foster teachers' confidence as facilitators of student success by identifying technology's role in provincial policies for curriculum, competencies, and assessment and by making relevant connections among these areas.

In conclusion, there is clear evidence that student success in the forms of engagement, learning, and achievement has been enabled by the planned and deliberate inclusion of technology in the learning process across the province.

Recommendations

Given all that has been learned to this point in time from these five Rounds of study about the importance of these projects for technology-enabled teaching and learning and the continuing development of global competencies, the research team presents two broad recommendations for continuing the climb:

1. Establish a level of funding that would enable districts to continue advancing technology-enabled teaching and learning, specifically in the following domains:
    a) ***Professional Growth*** – to address many facets of continuous learning and training at all levels of the system, (e.g., teaching practices, leadership, partnerships)
    b) ***Infrastructure and Hardware*** – to maintain and build on the essential requirements and needs that support technology-rich learning environments (e.g., accessibility, replacement)
    c) ***Innovation*** – to proactively explore and give ongoing consideration to the impact of the evolving nature of digital tools and resources that promotes data-driven decision making

2. Communicate the enabling role of technology in teaching and learning by making well-defined connections among and between provincial policies, (e.g., competencies, curriculum, assessment) as guidance for embracing effective instructional practices that promote student success

We believe that with these recommendations in place, districts, like climbing teams, will continue to build on previous learning and use it going forward as they add to and refine their skills and planning for the next stage of the climb.

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Appendix

Project Report Summaries

Artefacts submitted by the projects provide additional context and content for the Round 5 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. In 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: collaboration, creativity, character education, citizenship, communication and critical thinking. In 2015-2016 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.
Context	*Number of students:* 3,850 *Number of teachers:* 290 *Number of schools:* 46 *Grades/Program:* K-12
Impact on Students	In analyzing our data, the Educational Technology Leads, Teachers and Administrators indicated that the use of technology is an integral part of student learning. Technology is providing students with opportunities to foster curiosity, 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. Having a variety of technology devices (laptops, tablets, chrome books, and desktops) has improved access and engaged students in problem solving dialogue on the most appropriate device to use for a given task. The use of technology has been a catalyst for building collaboration and

	communication among students and teachers, whether sharing a digital product, providing and supporting one's own point of view in an online discussion, or commenting on another's post. Students have gained a greater appreciation for the range of capabilities that others possess. Overall, the data indicates that the use of technology represents a significant power shift in classrooms towards a student centered approach. The 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. Survey results include: • Student work shows greater depth of understanding (Yes / Definitely = **82%**) • Students have greater opportunities for sharing knowledge more broadly with expanded audiences (Yes / Definitely = **86%**) • Improved student task completion (Yes / Definitely = **76%**) • Students demonstrating new leadership capacities (Yes / Definitely = **66%**) In many instances, the Educational Technology Leads encourage a student-to-student and student-to-teacher learning partnership at their schools. The term "technology ambassador" has been adopted to describe this partnership where students are taking a lead role to support technology enabled learning. These student "technology ambassadors" offer support for other students and teachers in their schools fostering learning partnerships.
Impact on Instruction	The target group for the Round 5 project continued to be the Educational Technology Leads. We have at least one teacher from every school who enthusiastically stepped forward to fulfill the role. 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. The ADSB Standards for Digital Learning K-12 was 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 also indicates that a majority of the student digital learning experiences fell within the categories of collaboration, digital presentations and productivity. 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 comments by the Educational

	Technology Leads show that the teacher-to-teacher learning partnerships are improving and resulting in a culture of risk taking and sharing. Through collaboration and planning for authentic learning enabled by technology, there is a shift occurring in teacher practice and learning opportunities for students. The data shows that teachers are feeling a greater comfort level with the following areas: • Engaging students in exploring real-world issues and solving authentic problems using digital tools and resources • 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 • Promoting and modelling digital etiquette and responsible social interactions related to the use of technology and information
Impact on System	The Educational Technology Lead initiative is contributing to our system scaling and sustaining of pedagogically-driven, technology-enabled practices through building capacity at each site by having one key individual at each school. 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. 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. The Educational Technology Lead role aligns with our Board's strategic goals and is aligned and integrated with other innovative work being conducted with the eLearning and Instructional Lead professional learning communities. 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. This year, a leadership team participated in the New Pedagogies for Deep Learning (NPDL) Symposium with Michael Fullan. Information from this experience helped to shape our vision for system scaling and sustaining pedagogically-driven, technology-enabled practices. A Microsoft Innovative Expert hosted a day that enabled the Educational Technology Lead to explore various aspects of Microsoft Office, Office 365 and Skype. With a focus on Mathematics, we also hosted a session for our Grade 9 Applied Mathematics teachers. An Apple Distinguished Educator worked with our teachers on instructional practices and the integration of technology.

Algonquin and Lakeshore Catholic District School Board

Project Title	Secondary Technology Infrastructure and Access Improvement Plan
Description	The purpose of this project is to remove these barriers so that our teachers and students can have seamless access to technology. This will reduce stress and engage our teachers in deeper conversations about teaching and learning. The main focus of this project is the creation of a staff and student landing page, where with a single sign on users are directed to a place where digital resources are located. This includes things like IEP's, Maplewood Student Management System and Report Cards, our Virtual Commons etc. The greatest outcome of this work will be that as the barriers are removed, teacher comfort with and use of technology will improve. We will have a community hub that will support easy and dependable access and ultimately raise the level of digital competencies of our teachers and students. Support collaboration between the Learning Technology Services (LTS) and curriculum departments building ownership and clarity with respect to the organizational structures in support of the Technology Embedded Learning Plan, including: • Alignment of technology investments with educational priorities in support of 21st Century learning environments • Strengthening system-wide confidence in the board's information technology infrastructure and service support model • Integration of the reframed Technology Enabled Learning Special Assignment Teacher (SAT) role Through all of this work, that just keeps building and supporting our core work, we have learned that teacher engagement is key. In both our 4-8 laptop project and the K-3 iPad rollout we have focused first on building confidence in our plans and our teams. Next we focused on building capacity with our teachers by honouring wherever they are in this journey and by providing the support required to move them forward.
Context	*Number of students:* 2,500 *Number of teachers:* 200 *Number of schools:* 8 *Grades/Program:* Gr.9-12
Impact on Students	The greatest impact that this project has had is in building awareness and access to online resources. This has created consistency across subject areas and has supported students engaging with technology in many cross curricular opportunities. The increase in the use of blended learning opportunities through D2L course pages has accommodated and supported the different learning styles

	of students. It has removed barriers and allowed for pre-learning, re-learning, independence and differentiation. This project has also opened so many doors to collaboration with teachers and peers. It has created a safe and accessible space and a commons set of tools for students and teachers to use in creative and engaging ways.
Impact on Instruction	This initiative has increased the willingness of our teachers to embed technology into their practice for the simple reason that it is easier to access and reliable. This kinds of seamless access to technology is creating community based inquiry teams. We are building capacity with technology coaching by nourishing and feeding the grass roots, local level which is allowing spread to happen. There is a paradigm shift occurring from the teacher-led model of curriculum delivery to student-centred choice and voice options that are moving ownership to the students. The way that teachers provide feedback is really changing and this is having direct and timely impact on their teaching practices and the learning opportunities of their students.
Impact on System	This project has provided the opportunity to place “core” learning tools and opportunities in an easily accessible space. This is the first time our Board has joined all five secondary schools in a consistent platform to support a blended learning environment. This has placed consistency of practice at the centre of our work while still allowing and supporting choice and voice at the teacher/classroom level. Our technology coach has also had the opportunity to move from school to school working in small groups encouraging and supporting the collegial use and application of the tools this funding has provided. We look forward to building on the learning as we venture into 2016/17.

Avon Maitland District School Board

Project Title	Next Generation Learning
Description	Our TLF funding has primarily been used to support our Next Generation Learning initiative, which has put mobile technology – specifically iPads – into the hands of all teachers and all Intermediate students across our District, and more importantly has created the catalyst that is transforming teaching and learning for both our teachers and for our students. Our Next Generation Learning initiative affords students the opportunity to personalize their learning experiences, and collaborate both inside and outside of the school day. Students are developing a digital skill-set required to support this type of learning, which includes independent file management skills, understanding of how to create and maintain an appropriate online presence, and advanced digital communications skills. Students are redefining learning in this personalized environment, by creating systems for organization, management, and collaboration that are individualized and work to support their learning style. In Avon Maitland, we have invested in Teacher Technology coaches, elementary (itinerant) and secondary (job-embedded) teachers, assigned to schools to support tech-enabled teaching and learning. Professional development days have been dedicated to both ETFO and OSSTF members, annually, with a specific focus on technology and changing pedagogical practice. Furthermore, teachers have been afforded opportunities for networked learning both during and outside of instructional time, and during the summer, where they have had opportunities to dig into topics such as blogging, challenge/problem based learning, and foundational skills training.
Context	*Number of students:* 4,000 *Number of teachers:* 280 *Number of schools:* 29 *Grades/Program:* Gr.7-10
Impact on Students	By providing Intermediate students with their own personal, take home iPad, we have been able to ascertain a number of key areas of impact. The method for collecting much of the measure of impact was through several phases of a research project, undertaken by Dr. Michelle Searle, and her team, based out of Western University. The most recent phase of the research in the study was aimed at developing a more thorough understanding of the impact of the project, specifically with regards to the areas of inclusion, and assessment. The result of these deeper conversations within the research project resulted in evidence that students are taking more ownership of their learning which has

	directly impacted students' engagement. Qualitative evidence was gathered from the study to indicate that students are developing their higher order thinking skills as a result of the influence of the iPads, as evidenced in changes in the student outcomes and products. Students reported regular communication with other students in their classes and school, as well as their teachers who provided supports and feedback both during and outside of regular class time through apps and other electronic forums, made possible by the iPad. The ability to connect with others outside of the regular school day has been a particularly impactful change for students, and has allowed them to continue to learn in ways that were not previously available to them prior to the provision of mobile technologies. Parent surveys corroborated this observation as more than 70% of respondents indicated that they have observed learning happening with their children, on the devices, after school hours. Student creativity was supported by the devices, and changes in the ways that students have been able to share their learning. By providing a wider variety of ways for students to share their learning, and moving away from traditional paper and pencil tasks, students can creatively share learning in many ways – visually, orally, or in an engaging multi-media format – all of which were much more difficult prior to students having access to the technology. Students are able to create products that reflect their strengths, their interests, and a truer reflection of their learning, especially in cases where they may have other difficulties sharing these, such as a learning disability, or the like. Differentiation is much easier through the technology, and the work can be shared more readily with both the teachers, and other audiences through social media, blogs, and other communication outlets, providing a much broader and richer audience for students. Student are collaborating more as a result of the technology, and not only with students in their classes, but with other across the district, and the rest of the world. With the introduction of challenge and problem based learning in some classrooms, technology is a vital link to others who are working together to learn more about, and ultimately develop solutions for local or regional problems or concerns. Student collaboration is important, but so too is collaboration between students and their teachers. Students are reaching out to their teachers outside of the traditional structures of school, and extending the learning beyond the regular school day.
Impact on Instruction	While we have identified areas of considerable impact on students, it is possible that there has been greater impact over the past year on teacher practice. Teachers voluntarily participated in several areas of research, and were deeply engaged in sharing their stories, and the evidence of change in their own and

	their colleagues' practice. One important change that was articulated by a number of participants indicated greater frequency and comfort with co-teaching, co-planning, and participation in coaching opportunities in elementary and secondary. Teachers were more comfortable connecting with one another and learning about the changes in pedagogy and technology together. As a result of the collaboration between teachers, there were many strategies that were shared, and reports that many more teachers were using differentiated instructional strategies to meet the needs of their learners in their classrooms. In the past, teachers would have visually evaluated their students and given oral or written feedback, but in this new task, students were responsible for gather examples of their progress, reflect on their own skills and present them in a way that demonstrated improvement and learning over time. This task would not be possible without the devices students were provided, and especially not possible if the teacher had not begun to differentiate the types of tasks and products required of students, using technology enabled learning strategies. Teachers reported a change in their perceptions and practices around assessment. With more frequent collection of data, teachers reported a greater ability to impact instruction. They gathered more documentation using their technology, and recognized an increase in quality and quantity of the materials that they were collecting. By providing a central hub for sharing work and feedback, the communication between both groups became much more timely. Teachers also indicated that there were more diverse assessment practices being employed in classrooms, because they had a better idea of both assessment, and how to leverage the technology to support assessment. Teachers indicated that they appreciated the increased visibility of learning that the devices were able to provide for students and for themselves. When tracking growth over time, teachers and students could use a variety of tasks to measure movement. Where teachers have embraced the devices, the learning in their classrooms is more student-centered, often employing concepts such as project or challenge based learning. Another area where there has been significant impact on teachers is the change in the number of our staff who have been sharing their work both within and outside of our district. Things have grown and developed as a result of having teacher technology coaches released in both elementary and secondary panels to support teacher learning with regards to leveraging digital technologies in their classrooms. [W]e also have a number of staff who are presenting the work that is being undertaken in our system at provincial and national conferences, impacting the learning and thinking of others outside of our system.

Impact on System	In Avon Maitland, we have identified a strategic direction that states: “If we transform teaching and learning in AMDSB, through the consolidation of effective pedagogy, which leverages the use of technology and learning opportunities that explore the Student Outcomes of creativity, communication, critical thinking, collaboration and problem solving then our students will demonstrate improved achievement in literacy and numeracy”. The work that has been undertaken and supported by the Technology Enabled Learning Fund has directly impacted the success of the strategic plan in our system. The purchase of common devices for all students in grades 7 to 9 in our system has provided the platform for students, teachers and administrators to leverage digital technologies in their teaching and learning. Several sites in our system have been working for several years on using technology to capture, organize, and share rich descriptive feedback with students in a digital environment. Student learning and understanding has grown significantly in these sites, as evidenced by qualitative and quantitative measures, and these successes are now being shared more widely across our system. In addition to central staff, there has been a huge increase in the number of regular classroom teachers who are willing to share their expertise and experiences with others by supporting professional learning opportunities. In the past, system professional development days with a focus on technology enabled teaching and learning were supported primarily by experts from outside of our district. Over the course of the past two years, teachers within our system have replaced experts from afar as the primary source of support for teachers and other staff within our system. The breadth and depth of offerings would not have been possible even two years earlier, and is a testament to the growth in expertise and confidence with the technologies and the pedagogical practices found within staff in our district. Senior leadership in Avon Maitland have, by explicitly referencing leveraging technology in the strategic plan, made the support of teachers and students through digital tools a priority. Professional learning opportunities, such as system wide PA days, have been established to share the learning with all staff. Additionally, funds have been provided to support four full time elementary technology enabled learning coaches, and ten secondary coaches who are released for some of their teaching day to support the work that is being done in classrooms. Requests for coaching supports have been steady in all schools, but there has been an increase in the number of requests for support from elementary teachers whose students are not directly impacted by the Next Generation Learning personalized iPad deployment. This is a very positive sign that despite not having individual devices, teachers with younger students are recognizing the potential of a variety of technology enabled learning strategies

	and structures to support and positively impact the learning of their students. Beyond the direct instructional supports that are offered to staff and students, informed by local and international research findings, senior administration has provided opportunities for members of multiple stakeholder groups to convene sessions, providing release to allow groups of teachers, consultants, administrators, school support staff, and a variety of others for a Technology Advisory Committee, to investigate issues and concerns that may exist within the system. For example, the need for a comprehensive digital citizenship program was raised by the group, and since that time, system level staff, in consultation with students, teachers and community stakeholders, have developed a program that will be implemented in schools in the fall, across all grade levels, with supports for both teachers and students. As a result of an earlier phase of research, stable internet access through wireless access points was identified as a barrier to expanding the project within schools, as teachers and students reported inconsistent connectivity, which limited the effectiveness of the tools provided to them. Immediately after receiving the recommendation to expand the capacity of the wireless connections in schools, Avon Maitland technicians installed several hundred access points in schools. The feedback since has been positive, and connectivity is no longer a barrier to scaling the project within the system.

Bluewater District School Board

Project Title	Scaling Up the Potential of Technology Through Strong Pedagogy
Description	One key area of our project has been ensuring that all students can send and receive work electronically. This is essential for students with special needs to access the learning and achieve at a high level. Students and teachers use the Office 365 interface 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. This allows for timely and effective feedback (since it is electronic), and supports student reflection on their own learning (increasing metacognitive skills). The use of a variety of devices has provided students and teachers opportunities for "just in time" learning as they are able to quickly and easily find answers to rich questions through the Internet. The balance of the classroom time can then be spent on deeper cognitive learning and discussion, and not on recall of facts. The choice of device has become less relevant as students are able to use Office 365 tools on all devices. It is more about the learning platform, not the device. This also honours student choice to pick the right device and tool for the specific task. To support this learning, we have struck a Bring Your Own Device committee to ensure that we have the infrastructure, policies, and procedures in place. Some staff are beginning to seek ways to bring real-world experts into the classroom through Skype in the Classroom, and the Digital Human Library allowing for digital experiential opportunities. This is occurring in JK-12+ classrooms. Ongoing school-based inquiries 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. This is promoting a growth mindset within our schools around the understanding that ALL students can achieve at a high level. Explicitly teaching self-advocacy skills to students with special needs is increasing their confidence, and empowering them with their own understanding of who they are as a learner.
Context	*Number of students:* 2,515 *Number of teachers:* 191 *Number of schools:* 51 *Grades/Program:* K-12, specifically students with special needs
Impact on Students	**Office 365 and Outlook:** As students have been using Office 365 as an interface to communicate and collaborate with their peers and teachers, they have been able

	to move toward a more paperless environment. One teacher reports that students who previously would allow others to complete group work are far more conscientious knowing that the teacher can see who is responsible for specific work. "The kids are far more motived when they know that there are others also working on their project." As Office 365 is a device agnostic platform, students have been free to pick the right device and/or tool that best meets their learning needs. Students have commented that OneNote Class has allowed them to easily keep track of all their work in one location. The use of the OneNote Class Notebook tool has allowed teachers to monitor all stages of the learning process, and to provide timely and effective feedback. This tool has been particularly beneficial for students with learning disabilities as they use accessibility features such as a PDF reader and voice-to-text. **Equipment Refresh:** Students have identified that the arrival of additional updated technology in the classroom (iPad and laptops) has allowed for greater equity. This has greatly impacted student engagement at all grades. Teachers report increased achievement and engagement by all students, but particularly for those with learning disabilities. **Ongoing iPad Use:** Children as young as Junior Kindergarten conduct research on their own using Siri. It has taught them to be succinct in their queries. They are building their independent learning skills utilizing this method as they research, record the information using the Explain Everything app, and make inferences to support their findings. The children are independently using the iPads to capture their learning (photos and writing/typing) and then share their learning with the rest of the class. **Parent/Guardian Engagement and Home Connections:** Use of the Office 365 suite has provided teachers with a means of communication with parents/guardians. Some classes have also created Blogs or Sways as a vehicle to share their learning with each other and their families. This has helped the students realize that there is a wider audience beyond their classroom. Further, they are seeking feedback and assistance from their peers (assessment as learning). **Evidence of growth** was reported through school-based inquiry projects. One study that included 7 students with learning disabilities found that 60% of students went up two levels in reading and writing (level 2-4) and 40% went up one level in reading and writing (level 2-3) when they were given the opportunity to complete work electronically on iPads and Lenovo Yoga laptops. A second project demonstrated significant improvements over the school year in reading, writing, and mathematics. Teacher surveys of students and parents demonstrated 80% of students having an improved attitude toward writing, and 70% attributed improved attitudes toward school due to technology.

Impact on Instruction	The position of Specialized Technology and Learning Teacher was created to support teachers in providing and receiving electronic student work, and how to incorporate technology as a learning tool into the classroom setting. The Specialized Technology and Learning Teacher (STLT) and Technology Enabled Learning and Teaching Contact (TELT) have supported teachers across the district to enhance technology-enabled instruction. The STLT had a targeted approach of supporting the teachers of students with special needs to assist them in developing responsive supports for their students through the use of technology. The TELT worked with teachers of all students to upscale the use of Office 365 tools and the vLE learning system. Teachers report increased collaboration with their students. As a result of the system wide implementation of Office 365 and Outlook as a communication tool, teachers have begun exploring best practices for the variety of tools available. Communication with students is available through Sharing of Files, email via Outlook, and using OneNote Class Notebooks. Three different high school co-op departments have implemented OneNote Class Notebooks as a means of monitoring student achievement and streamlining communication with students at their placements. Other teachers use OneNote for pedagogical documentation of student learning. Survey results indicated that after 3 months of system wide implementation of Outlook, over 80% of teachers are confident using Outlook as a communication tool. Further to this, 67% of respondents indicate that Office 365 online apps, such as Word Online have had a positive impact on student literacy. Additional capacity building will be required. **Digital Citizenship and Global Competencies** An independent presentation of My Life Online was provided to all schools being refreshed with new technology this year. This presentation was given to students in Grades 4-8 to encourage them to approach the internet, "positively, productively, and powerfully." All teachers indicated that they could easily integrate the learning into future class lessons, and 60% reported that even 3 weeks afterwards students still wished to discuss Digital Citizenship.
Impact on System	**Office 365 and Outlook District Wide**: As of May 4, 2016 all BWDSB staff are communicating via the Office 365 environment. All schools with students in Grades 4-12 received some form of direct instruction provided by the Specialized Technology and Learning Teacher (STLT) or the Technology Enabled Learning and Teaching (TELT), although not all classes were individually visited. BWDSB has also begun to use the Office 365 tool- Skype for Business. As a long term strategy, it is anticipated that the board can reduce funding for travel expenses as staff can attend meetings remotely.

	New Specialized Equipment Board Process: System Staff (e.g., Speech and Language Pathologists, Psychologists,) work with school staff to build capacity specific to their students' needs. A new process utilized Office 365 Group OneNote Notebooks for ongoing tracking of visits to schools. All support staff connected to the students have access to these notebooks, which has helped streamline targeted instruction from teachers to students and monitor ongoing visits and regular classroom assessments. One school reported that 100% of students with learning disabilities used technology to write Ontario Secondary School Literacy Test. **Open Access** The Open Access committee (Bring Your Own Device) has met throughout this year to investigate the impact of Open Access on the Board. This team has analyzed the current board policies, and is developing suggestions for revision. The Information Communication Technology department has been working to improve firewall.

Brant Haldimand Norfolk Catholic District School Board

<table>
<tr><td>Project Title</td><td>The Transforming Learning Project 2016: Shifting the Focus from Teaching to Learning</td></tr>
<tr><td>Description</td><td>The round 5 21st Century Innovation Research Initiative focusses on assessment “for” learning through the math lens and how technology can be leveraged to empower educators in this work. The purpose of this project is to engage educators in a deep study of effective assessment “for” practices that are built upon a thorough understanding of content areas in mathematics and an awareness of digital tools that will enhance the assessment process. The criteria for success in this round of our project include:
Educators are collecting evidence of current student understanding in mathematics through observations, conversations, and products
Educators are analyzing this evidence to understand the student mathematics learning need
The educator’s response results in furthering student learning and understanding in mathematics (this response might be, but is not limited to, feedback and teacher self-reflection to reteach or redesign the task)
Through a math lens, educators engaged in this work will be collecting and analyzing evidence, using tools, consulting resources, dialoguing with peers and students, identifying strengths and needs and engineering opportunities based on student data. Technology will play a role in the process as educators, administrators and system level support use devices and online tools to monitor the learning and work (e.g. recording student voice, capturing student thinking, gathering and giving feedback through online tools, self-assessment and reflection using online tools, archiving student learning through forms of electronic portfolios).

Professional development focusses on the pedagogy (around assessment “for” and math content) and technology (around the new educator device being provided to staff, Windows 10, Office 365 and other productivity and collaborative technologies that will enable richer assessment “for” strategies) associated with our project. Continuing the work from our round 4 project, our school based ‘champions’ will come together for 3 days of collaboration and professional development. These educators will be a voice at the school level professional learning table to support the ongoing scaling of this project focus and to enable system level decision makers to ensure the voice of the educators is accurately and authentically represented. Every educator from kindergarten to grade 8 will receive one full day of release for collaboration and professional development in like grade groupings. Next year, this project will continue to scale at the school level as system student achievement teachers (assigned to networks of schools) further the conversations and learning around math based assessment “for” strategies.</td></tr>
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Context	*Number of students:* 6,345 *Number of teachers:* 372 *Number of schools:* 29 *Grades/Program:* K-8 Mathematics

Impact on Students	As a result of the work we have completed through rounds 1 to 4, we are seeing:
	• A growing range of engaging learning activities enhanced by technology at the point of instruction. These activities are evolving from substitution-type activities to more modification and some reimagined (SAMR model).
	• New collaborative opportunities occurring in both our D2L and Office 365 environments. Examples include:
	  o Students engaging in online forums
	  o Students accessing calendars and each other to keep organized
	  o Students working synchronously and asynchronously to collaborate
	  o Students collaborating with teachers to further their learning
	Due to various challenges, we are in the early stages of training and device deployment for the current year's project. At the writing of this report, only our school-based champions have their devices.
	In the classrooms of our champion group, students are impacted in positive ways because their teachers are:
	• Capturing learning in richer ways
	• Beginning to focus more on assessment *for* learning
	• Sharing evidence with students during the learning to drive their next steps as learners (e.g. showing the student a photo or video of themselves in action and then engaging in a conversation to identify next steps)
	• Sharing evidence of progress over time (e.g. share audio recordings of them reading from different weeks to hear the change)

Impact on Instruction	The current year project is focused on teacher practice. We have continued to build the capacity of our school-based champions and to rely on their feedback to monitor and improve our implementation so we can maximize the conditions we create to promote success for all staff and students. They are using the device, software, infrastructure, and new learning to collect evidence of learning in a variety of formats, including text, audio, picture, and video. They report that these conditions have enabled them to: • Capture learning in richer ways providing more context and greater insight • Collaborate more easily and more effectively with their colleagues • Provide richer and more timely feedback to students • Use evidence to more accurately identify where individual students are and what

	is needed to push their learning forward • Communicate more effectively with parents • See progress over time for individual students (e.g. audio recordings of students reading from different weeks to hear the change)
Impact on System	The projects funded by the TLF support the Board's strategic goals and improvement plans. System scaling includes: • Engagement with our IBM partners to revisit our strategic priorities and how technology is being leveraged to support achievement of them across the entire district • Development of a plan to imbed the use of the new staff mobile device and related collaboration tools in all system professional learning activities • Development of a PD model to facilitate the necessary learning across the district during the 2016-2017 school year • The migration to Windows 10 across all devices to improve device management • The development of a Board Store within the Windows Store to provide access to "approved" learning apps • The introduction of a BYOD network for students, teachers, and guests (phasing in over 3 years, completed Phase 1) • Consultation to review the existing wireless infrastructure and develop a new plan to support the growing demand on this resource. • Increases in the amount of Internet bandwidth to all schools. Changes to administrative procedures and policies related to responsibilities, security (both of the device and the data collected/stored/accessed via it), intended use, and support of devices The purpose this spring was to lay the foundation. A considerable amount of learning (e.g. local sessions, attendance as a team at assessment conference) has taken place at the system level to understand assessment for learning and to identify a set of standard software applications and processes that staff and students can use to support the assessment for learning processes while promoting the privacy of student information. The system-wide focus will be on using assessment for learning to drive improved outcomes for students in mathematics. All teachers will be participating in small scale collaborative inquiry learning projects and professional learning communities to support the success of the focus. All teachers will be participating in small scale collaborative inquiry learning projects and professional learning communities to support the success of the focus. Participants in these learning activities will use the device, processes, and tools introduced over the last 2 years to support the work. The focus will be on ***assessment for learning in the area of mathematics***. The software, processes, and device will be ***the tools*** that staff and students use to carry out the work.

Bruce-Grey Catholic District School Board

Project Title	Scaling Forward with Modern Learning at Bruce Grey Catholic District School Board
Description	Our project centered around hubs and concentrated on our Board Math Goal. “Students are able to communicate their math thinking creatively and confidently through the processes.” Teachers met in at least 3 hub sessions, in the course of the year with in-between sessions in their school with either an Instructional Coach or the Math Consultant. Teachers collected evidence of student learning through observations, conversations and products from their students as they worked through technology-enabled math learning and also interdisciplinary learning through technology and the 21st Century Competencies. Teachers also completed a continuums of learning, where they reflected upon what professional learning happened in the sessions and their intended next steps. This initiative has provided us with the opportunity to focus on student thinking and their ability to communicate their thinking. Certain apps such as Educreations and Explain Everything have given students a means of communicating their thinking and the teacher is able to follow the student’s thought process as their explanations.
Context	*Number of students:* 330 *Number of teachers:* 15 *Number of schools:* 7 *Grades/Program:* JK/SK, Gr.2/3, Gr.4/5, Gr.7/8, Gr.9-12
Impact on Students	This year our project centered around hubs and concentrated on our Board Math Goal. “Students are able to communicate their math thinking creatively and confidently through the processes.” Teachers collected observations, conversations and products from their students as they worked through technology-enabled math learning and also interdisciplinary learning through technology and through the 21st Century Competencies. This initiative has provided us with the opportunity to focus on student thinking and their ability to communicate their thinking. With students having the tools to help them explain their thinking, the level of engagement has increased and as students have become more engaged, we are starting to see achievement rise as well. Through collaboration with peers in the classroom, students are using math manipulatives (both digital and not) to help them explain their thinking and they are recording this evidence using iPads and apps on the iPad too. Certain apps such as Educreations and Explain Everything have given students a means of communicating their thinking without having to stress on writing in their math book or standing in front of the class, plus the teacher is able to follow the student’s thought process as their explanations are recorded as they explain orally.

	Students participated in skype lessons, which greatly increased the level of engagement in math classes, as they were excited to talk to students in other buildings through skype and also to ask questions of other learners. The exciting part of the skype lessons was seeing the students explaining their thinking to others confidently and creatively (which directly links to our board math goal). The communication between students and with student to teacher has increased and self-directed learning that is evident in these spaces is certainly having us re-think teaching and learning as we move forward. Students are becoming the leaders in their own learning and deciding the direction they need to take in terms of their own learning. We conducted a math survey at the beginning of the year for students and we asked them if they used manipulatives to help them solve problems and also if they could explain their thinking in math. For our primary students, in the fall 37% said that they could explain their thinking in math and this has now gone up to 39% who feel they can explain their thinking.
Impact on Instruction	Professional learning this year has been divided into hub sessions and each hub has focused on the board math goal. Here, teachers met in at least 3 hub sessions, with in-between sessions in their school with either an Instructional Coach or the Math Consultant in between the hub sessions. Teachers learned how to triangulate the collection of their evidence on student learning according to the Growing Success policy. They also used student work to guide their next steps and moderated student work at each session. Through the use of technology tools, teachers were able to collect video evidence and pictures to come back to the hub sessions. Using the video and picture evidence, teachers participated in the process walking through a protocol for pedagogical documentation, which supported their professional learning as to determine next steps for students and be able to look at the student learning through an asset model lens. Teachers have also taken responsibility for their own professional learning, and some have started blogging on their learnings around innovation. This is considered a great success for innovation and our project centered around modern learning, as teachers and leaders are beginning to rethink teaching and learning. Over the past couple of years with the CODE project, we have been focused on getting tools in the hands of students. Now we are seeing the benefits of focusing on pedagogy and staying focused on a common goal through our learning sessions. Now teachers are ready to take some of the tools and use them to rethink teaching and learning in their classrooms. Teachers are also rethinking assessment as they move forward in using the COPS template to collect evidence on student learning.

Impact on System	This year, our organizational structure focused around professional learning in hub sessions in order to set a focus of working towards the board math goal. We also focused on IT through our Strategic Plan and will continue to address at the system level for both sustainability and moving forward with 21st Century competencies. [W]e have people who sit on many committees and work in different capacities, who are able to see links and embed our plan of scaling forward with modern learning within their learning hubs. A collaborative approach allows us to all work toward the common goal of improving students' ability to communicate their math thinking through the processes.

Catholic District School Board of Eastern Ontario

<table>
<tr><td>Project Title</td><td>Technology Enabled Learning & Teaching “Infrastructure to Scale Technology Enabled Learning & Teaching System-Wide”</td></tr>
<tr><td>Description</td><td>Purpose: CDSBEO continues to build capacity for educators with the technological tools available for pedagogical documentation to support assessment practices and monitor student learning through blended learning and the combination of Office 365 and BrightSpace. Educators have the ability to assess, report on and improve student performance with built-in analytics tools that use data to help educators make more proactive decisions. The blended learning model provides teachers with the opportunity to leverage technology and increase student engagement and collaboration by promoting authentic learning opportunities for all students.
Scaling Our Vision - Areas of Focus:
1. Elementary Redistribution Plan: Creating a point of instruction, as well as a blended learning centre of five laptops in every classroom allowing for differentiation, self-directed learning and real world problem solving.
2. Secondary Educators: Selected by their Principals, Technology Enabled Learning & Teaching Co-Learners (TeLCTC) will be trained via face-to-face and over Skype to provide technology enabled learning and teaching supports for teachers in their respective schools and will help build an infrastructure to scale our ICT vision over the next two years Board-wide.
3. CDSBEO Technology Enabled Learning EdCamp 2016 “Student Series”: We will be building capacity of student leaders around the integration of Office 365 to help students learn how to integrate Office 365 into daily practice.
4. Administrators: We have added 21st Century learning and capacity building around the integration of BrightSpace and Office 365 as a standing item for our Regional School Leaders’ Meetings. 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.
5. Curriculum Consultants: We are using the Collaborative Learning Network framework to promote the Office 365 cloud technology and to ensure a cohesive learning environment, while enabling our educators access to the latest collaboration tools.
6. Professional Development “Any Time, Any Place, Any Pace”: Our PD in 20 sessions led by our TELTC, is an innovative approach to reaching a larger number of teachers on a consistent basis, which helps us overcome some challenges that our board geography presents. Best Practices and PD sessions are being shared via a website which allows for greater flexibility for the learners. It also provides teachers independence around building capacity.</td></tr>
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Context	*Number of students:* 400 *Number of teachers:* 60 *Number of schools:* 41 *Grades/Program:*
Impact on Students	Our Technology Enabled Learning and Teaching Capacity Building Initiative with our secondary schools has allowed students from grades 7-12 to learn using Office 365 and BrightSpace. Students were engaged in learning tasks that addressed key 21st Century competencies such as critical thinking, communication, collaboration and creativity and innovation. Through the use of our two online platforms, students collaborated seamlessly when working in their OneNote Class Notebook and private Yammer classroom. Our leveraging of Office 365 has helped students with collaborative tasks and has had a positive impact on student learning and engagement. Students have expressed a more positive outlook on the value and importance of collaboration and teamwork when using Office 365 and BrightSpace. Furthermore, they have demonstrated an ability to create richer learning tasks more seamlessly with a higher degree of effectiveness. The OneNote Class Notebook has allowed for students to access course content, collaborate with their peers and communicate knowledge in variety of ways using safe and secure online tools from Office 365. Furthermore, students are receiving rich and descriptive feedback in formative and summative tasks from their teachers with use of the insert audio tool. Students have also submitted final tasks to the class Dropbox in BrightSpace. The Turnitin feature that is attached to the Dropbox has allowed for students to ensure that they are properly citing their sources and that their work is original. Moving in this direction with assessment and evaluation has allowed our students work to be saved in one location for their reference and to have continuous access to the feedback. Increasing opportunities for students to work collaboratively with technology has created new learning partnerships by removing barriers so that ALL students of different abilities and talents learn together. Students are taking on greater leadership roles in the classroom to support Teachers who are integrating technology.
Impact on Instruction	The Blended Learning Model being explored in classrooms provided teachers with the opportunity to leverage technology and increase student engagement by promoting authentic learning opportunities for all students. Office 365 is allowing our teachers and students to collaborate seamlessly when working in our Board cloud. Using BrightSpace, educators have the ability to assess, report on and improve student performance with built-in analytics tools that use data to help our

	teachers make more proactive decisions in regard to student learning. Through the combination of Office 365 and BrightSpace we are leveraging our Board assessment and evaluation process. The tools allow for a mark book that meets our Board and Ministry policy of evaluating most consistent and recent student work. What we have learned: Using technology, teachers are able to automate common tasks allowing more time doing what we do best—working with students to support their individual needs. Teachers are using the annotation feature in addition to with the assessment and evaluation tools within BrightSpace and Microsoft OneNote (Office 365) to provide ongoing and innovative formative and summative tasks and feedback on student learning.
Impact on System	As part of our Technology Enabled Learning and Teaching plan this year, we have redesigned the learning space by redistributing technology in all of our elementary schools. This will allow teachers to implement the Blended Learning Model Board-wide next year. Each classroom has been equipped with a point of instruction computer, an LCD projector as well as a Blended Learning center of five laptops. The redistribution of technology has created and enhanced opportunities for students to work collaboratively in small flexible groups. We have added 21st Century learning and capacity building around the integration of BrightSpace and Office 365 as a standing item for our Regional Principals meetings. 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. Principals are now modelling and promoting the use of Office 365 with their staff in staff meetings, CPLC sessions etc. Our “PD in Twenty” sessions led by our TELTC is an innovative approach to reaching a larger number of teachers on a consistent basis, which helps us overcome some of the challenges that our Board geography presents.

Conseil des écoles catholiques du Centre-Est

Project Title	The Impact of Using Technology, A Virtual Learning Environment, and Pedagogy Centered on Critical Thinking on the Development of Student IT Skills
Description	This is a research project to determine the impact of using technology, a virtual learning environment, and critical-thinking-centered pedagogy on the development of student IT skills. To accomplish this, we chose Grades 7 and 8 in a secondary school. The CODE funding was used to provide students with Chromebooks in a ratio of 1 to 1. The goal was to provide the students with access to technology so that they could use it to develop their IT skills. Several means were used to provide teaching staff with the professional development they needed for technology integration, in particular, the creation of a virtual learning environment. Training is offered across the system by the 21st Century team in order to develop critical thinking, blended learning, and digital citizenship. This team also provides support to the student exit profile leads in this school. The IT applications team provides targeted training on the various tools in the Google Apps for Education suite, including specific training on Classroom. The school created a 21st Century committee to coordinate the work of the project stakeholders. The goal of this committee is to ensure effective integration of technology; development of 21st Century skills for students in the entire school; and support for the CODE project initiatives for Grades 7 and 8.
Context	*Number of students:* 342 *Number of teachers:* 30 *Number of schools:* 1 *Grades/Program:* 7 and 8
Impact on Learning	The goal of this research was to determine the impact of using technology, a virtual learning environment, and critical-thinking-centered pedagogy on the development of student IT skills. The results were validated by means of two surveys of the students and teachers. The findings of the survey in January enabled us to make a number of observations about our research question. Student feedback on the January survey and the May survey was very similar. The students reported that the use of a virtual learning environment really helped them to get organized and to understand the subject material. They also said that the technology helped them to be better organized, complete their assignments, and manage their time. The technology also made it easier for them to work in teams and complete their projects. Several said that they still liked working with

	paper and pen on some learning tasks. Some reported that they liked doing their summative assessments on paper, rather than online; others said that student supervision had to be modified to ensure that all of the students were working on the task when they used technology in the classroom. Several appreciated the possibilities that a Chromebook offered for doing research and accessing information. The students reported that the video clips on IT skills would really help them to do better research.
Impact on Instruction	With the advent of Chromebooks in the classroom, our teachers have adopted new pedagogical practices. To enable them to fully understand the IT skills and be able to incorporate instruction in these skills into their practices, we created a partnership with the library team. The teacher-librarian created 7 video clips on various IT skills and offered them in the classroom, instead of in the library. In this way, the teachers learned with the students. These IT skills had also been presented at a staff meeting by the teacher on special assignment from the Board. At this meeting, teachers familiarized themselves with the IT skills and with the definition of student engagement. In co-operation with Mr. Thierry Karsenti, an IT skills continuum was developed. Following the SAM'met event, the teaching staff adapted its approach to summative assessment. For example, one of the teachers replaced her pen-and-paper, end-of-unit assessment with a task that consisted of creating a country and its various institutions including a constitution, a currency, and a government. Twelve members of the teaching staff completed the May survey; 100% responded that adding Chromebooks in the classroom had had an impact on their pedagogical practices. Examples they gave of changes in their practices included pedagogical differentiation, the use of a virtual learning environment, assessment for learning and assessment by learning, as well as the use of digital IT skills. Opinions on the impact that adding Chromebooks in the classroom had had on assessment strategies were more divided. 58% reported that their assessment strategies had changed; 42% reported that there had been no impact on their assessment strategies.
Impact on System	In order to equip the teaching staff to transform the students' learning experience and to focus on the integration of technology for learning, a collaborative session was organized to validate the definition of transformation of the learning experience. In its definition of this transformation, the Board developed 5 spheres of action, based on the research. The Board brought together 100 experts, from inside and outside the Board, in Ottawa for a half-day of dialogue on the transformation of the learning experience. This collaborative validation session was led by Michael Fullan. With the goal of actualizing its student exit profile and transforming the learning

	experience of every student, the Board has provided each school with a lead teacher for the past two years, so that it could achieve its prioritized strategic objectives. Each of these student exit profile leads submits a report for his/her respective school at the end of each year, documenting the initiatives taken for the transformation of the learning experience. These reports are shared in the virtual Google + community of the student exit profile leads in order to build the professional capacity of all staff. This community has over 365 members, including superintendents, school principals, the student exit profile leads, teachers on special assignment, and the teaching staff. This professional sharing makes everyone quickly aware of best practices in the schools. These virtual exchanges also promote reflective practice, with the goal of improving pedagogical practices and teaching strategies. One of the best practices that Collège catholique Samuel-Genest (CCSG) has re-implemented is the SAM'met event. This is an event at the school, organized by the school's 21st Century committee, to equip students and teachers for the integration of technology for learning. Teachers offer the students a number of workshops. Other schools held similar events during the year. We noted that one of the concerns of the secondary school principals was ensuring continuity between the experiences of students from feeder schools and their experience when they start secondary school. The students will also exert some healthy pressure, ensuring that new emerging pedagogies are applied and transform the learning experience of students and adults. In order to support the sharing of best pedagogical practices, time is set aside for formal and informal exchanges between the student exit profile leads at lead coaching meetings that are also attended by the school principals. In this way, the professional autonomy and engagement of these key stakeholders is supported and encouraged. This time is well spent, and these exchanges are productive; they are having an impact on pedagogical practices in the schools. Through the cross-pollination of ideas, these sessions equip participants to support and mobilize other staff members in their respective schools.

Conseil scolaire de district catholique Centre-Sud

Project Title	Technopedagogical Shift at CSDCCS
Description	The primary goal of this project can be summed up in the theory of action that the Board developed for it: *If we integrate inquiry-based learning into our instruction, supported by the integration of technology, our students will develop a 21st skill or skills that will enhance their learning and achievement.* Eight schools in the Board are taking part in this project in 2015-2016. In order to increase opportunities for networking and sharing, the schools are paired up based on location and technopedagogical characteristics. The teachers have opportunities to share resources and products they create (e.g., a prototype for a digital portfolio) and to co-analyze a technology-pedagogy activity using the technology integration matrix (TIM) and the surveys found in the document entitled *Pédagogie numérique en action* [Digital Pedagogy in Action], in connection with the 21st skills that the school is targeting. The technology tools recommended by the Board (Virtual Learning Environment, Google Apps for Education, Chromebook) enable the students to collaborate on a single inquiry; communicate their findings efficiently; and learn from their peers. In addition, students have an opportunity to develop their critical thinking skills when they analyze the inquiry questions that are asked and the information in support of their inquiries and when they target evidence of learning that demonstrates their progress in the inquiry process. School principals participating in the project also receive support on an as-needed basis from the pedagogical leader from the TacTIC Team, Southern Region, to target specific objectives using the principals' technology integration matrix and the foundational document, *Pédagogie numérique en action* in connection with the technology-pedagogy transformation in their school. With the support of the regional Board leaders and the pedagogy coaches, the Board's digital age work cell supports the pedagogy coaches when they want to integrate technology tools that support pedagogy in the schools where they are providing coaching. The digital age work cell advocates the use of social media and technology tools to share project activities with the entire system, in order to encourage Board staff to network and create sustainable inter-school partnerships (Twitter account #edu4lite, G+ community, and VLE course).
Context	*Number of students:* 420 *Number of teachers:* 17 *Number of schools:* 8 *Grades/Program:* K-8
Impact on Learning	After analyzing all of the data in connection with the project, the team saw a distinct improvement in participation in students who were using technology in the classroom. Several teachers noted that the work that students did using technology tools in the

	classroom was superior to their pre-technology work, due to the fact that the suite of Google apps enables the teacher to provide feedback on a more timely basis. This enables students to improve their work and better identify the next steps. <u>Impact on student participation and learning:</u> • When a teacher gives feedback in a Google document using the *Comment* tool, the students are much more motivated because they know that their work will be read. The inquiry has an impact on their critical thinking, which in turn enriches their work. Students who are struggling no longer hesitate to use their technology tools because these tools are becoming the norm in the classroom. • Students are now scheduling mini-meetings so that they can work together online. • Often, boys don't like writing but, with technology, they spend hours on their text. They add colour. They are much more motivated to write. • We have noticed an impact on student motivation to complete activities into which technology tools have been integrated. Our parents have noticed that students with needs are much more motivated and likely to produce high-quality work. • Students do even better work when they know that it will be published using technology, like on Twitter or in a Google presentation. We can use technology to publish for an entire classroom or an entire school. With technology, students can organize their work in Google Drive and parents can access shared documents. <u>Impact on student learning and engagement:</u> • The Google tools allow the students to be creative. They allow teachers to support students remotely. Teachers' management styles are changing; there is a lot less paper because the students create folders and sub-folders in Google Drive. They can show their work to their parents and it's like having a student portfolio. With the Virtual Learning Environment (VLE), teachers can communicate with their students using the *News* tool and they can do flipped classes before introducing a new subject in the classroom. • Technology enables students to give each other better feedback more often; students are more accountable for their learning. • The technology tools help the students to make better choices from a range of formats for presenting their inquiry, based on their needs. The technology integration matrix is also useful when they need to ask themselves questions about the use of a specific technology tool. • The *Comments* tool in the Google document enables students to produce higher quality work because the teacher can provide feedback more frequently, from anywhere and at any time.
Impact on Instruction	<u>Impact on teachers' teaching and learning practices:</u> We observed a high rate of responses demonstrating that technology tools have a

	significant impact on teachers' teaching and learning practices because they allow for more effective and timely sharing between colleagues and between teacher and student. Technology tools enable teachers to guide students more effectively, using evidence of learning that is more readily accessible via technology. Here are a few findings: • 43% of teachers/principals involved in the project reported that technology enabled them to share more fully with their colleagues in order to more fully understand how the technology tools (VLE, Google apps, Chromebook, Padlet) can support pedagogy, specifically, the inquiry process. • 100% of teachers who took part in the workshop on the development of critical thinking skills, focusing on the use of technology tools to measure student progress on these skills, are going to try to change their teaching practices with respect to the inquiry process in order to enable their students to ask questions that will help them in this process and enable them to perform more in-depth analyses during their research, in order to find answers to the inquiry questions that they are asking themselves. • 62% of teachers appreciated co-planning and co-teaching in the classroom as a means of observing and more fully understanding how technology tools can support pedagogy for the inquiry process in Social Studies and also as a means of understanding how to manage a classroom more effectively when students are using technology tools in the process of learning. We noted that many teachers were using the space in their classroom differently after tools to support their pedagogy were integrated. There was a huge impact on the teachers' assessment practices and the creation of partnerships as a result of using technology tools in their daily practice. Lastly, the 21st skills that developed the most during the project were communication and creativity/innovation. <u>Teachers' teaching and learning practices:</u> • 80% of teachers who answered the survey reported that, following the integration of technology into their teaching, they were using the classroom space differently (classroom reconfigured to support collaboration; students given the opportunity to work anywhere in the classroom where they felt comfortable; the creation of technology stations with portable computers and Chromebooks). • 80% of teachers reported using technology tools to support their students in the development of the spatial skills targeted at their grade level (e.g., the use of Google My Maps and Google Earth to create and analyze the paths taken by explorers and to make connections more easily). <u>Assessment practices:</u> • 100% of teachers reported that technology tools supported formative and summative assessment and had an impact on the assessment practices they had been using

	before the project began. • 70% of teachers indicated that technology tools enabled them to provide feedback more frequently, in real time, either orally or in writing, and that this had a great impact on student motivation and the quality of student work. • 80% of teachers reported that technology tools enabled them (and their students) to gather evidence of learning, using triangulation. <u>Creation of partnerships (student-student, student-teacher, teacher-teacher):</u> 100% agreed that technology tools allowed for better collaboration: • Between students: students shared documents more frequently to obtain feedback from their classmates; they collaborated more frequently using Google Hangouts or Google Chat to complete group assignments). • Between students and teachers: particularly in terms of more frequent feedback, the fact that students ask more questions to guide them in their learning, the fact that students share their knowledge more often; the teacher can track the student's line of reasoning and progress more frequently. • Between teachers: sharing ideas, lesson plans and event plans, resources and student progress, particularly with other teachers teaching the same group. This is much easier now with Google tools. <u>Development of 21st Century skills:</u> • 80% of teachers reported that students were able to more fully develop their creativity/innovation skills. • 70% of teachers reported that students were able to more fully develop their communication skills. • 60% of teachers reported that students were able to more fully develop their collaboration and critical thinking skills.
Impact on System	<u>Impact on development of the system, directives, and activities:</u> Several actions were completed in order to ensure that support was provided on an as-needed basis. The Board team focused on training and coaching the system leaders in technology-pedagogy so that they could integrate their new learning into their coaching and share technology that had the potential to support pedagogy. The principals of all of the schools in the system took part in a Google summit that had been personalized for their role. The teacher-coaches received 2 training sessions (elementary level) and 1 training session (secondary level); this was followed by ad hoc support as needed. The pedagogy coaches (Programming Services and Student Services) received 3 training sessions with ad hoc support as needed (e.g., co-planning, the integration of technology tools in support of pedagogy when providing numeracy coaching in a school, support to create video clips for schools on a variety of topics for a pedagogy day).

	We noted that, in providing support to these system leaders, technology-pedagogy practices also spread to schools that had not been able to participate in the project this year. The Board team hosted monthly webinars on the use of VLE tools for all Board staff. Anyone who was interested could take part, become a learner, and hone their digital skills. All of the webinars were recorded so that staff who had seen them could watch them again and staff who had not been able to participate in real time could watch them as well.

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

Project Title	Transforming the Learning Environment for In-Depth Learning
Description	During the initial phases of our project, we realized that, in order to be more innovative in our pedagogical practices, we needed to re-think and create physical and virtual learning environments that were conducive to learner engagement and the development of 21st Century skills. During Spring 2015, the Board focused on the ground work, identifying locations and resources for the creation of "pilot classrooms" or "3 C classrooms", referring to three 21st Century skills: Collaboration, Creativity, and Communication. The primary objective of our project is to examine the impact of a physical and virtual transformation of the classroom on teachers' pedagogical practices and to examine the impact of this new environment on student engagement, student 21st Century skills (in particular, collaboration, creativity, and communication), and student performance. To achieve this, the Board set itself the goal of creating two 3C classrooms during the 2015-2016 school year. Learning environments in 3C classrooms meet the following criteria: the availability of technology – Chromebooks; openness to the world – Wi-Fi and social networks; mobile, flexible learner spaces; mobile, flexible teacher spaces; vertical, erasable writing surfaces to develop their creative thinking processes; opportunities for collaboration, creativity, and communication; and support for the development of responsible digital citizenship. Technology plays a major role in 3C classrooms. It supports pedagogical practices and is a tool for student exploration, learning, innovation, and production.
Context	*Number of students:* 60 *Number of teachers:* 2 *Number of schools:* 1 *Grades/Program:* Gr.7-8
Impact on Learning	Once again, 3C classrooms are designed to foster intellectual engagement and the development of 21st Century skills, in particular, Communication, Collaboration, and Creativity. There are seven key criteria for a 3C learning environment: • The availability of technology – Chromebooks; • Openness to the world – Wi-Fi and social networks; • Mobile, flexible learner spaces; • Mobile, flexible teacher spaces; • Vertical, erasable writing surfaces to develop their creative thinking processes; • Opportunities for collaboration, creativity, and communication; and

	• Support for the development of responsible digital citizenship. Several elements that students identify as being key to an ideal classroom are echoed in the design of a 3C classroom. Good work surfaces, chairs on wheels, and erasable vertical surfaces foster collaboration, creativity, and communication, as do a positive atmosphere and a sense of independence and well-being. Certain practices, such as evening emails and “chat” created by students to help each other with homework improve communication and collaboration between teacher and student and between students. Students report that computers make it easier for them to do their homework and write their compositions. The Google apps are conducive to collaboration and team work. Spell check functions assist with written communication. The students also use a variety of technology tools, such as smart phones and computers, to create videos related to their learning. The teachers agree that the students are more engaged; more likely to take risks; more likely to ask questions and to ask each other questions; have more opportunities to develop their written and oral communication skills; are more creative; and work more collaboratively.
Impact on Instruction	Different strategies were implemented to engage the students. Lessons forced the students to be curious and active and to take charge of their own learning. Assessments were authentic. These strategies facilitated a connection between the pedagogical tasks and the students’ lived experience. The teachers reported that, compared to last year, they used pedagogical differentiation more frequently; created opportunities for initiative-taking more frequently; encouraged interaction with the content and questioning more frequently; made more extensive use of technology resources to communicate, collaborate, and offer feedback to students; offered students a broader range of technology tools for accomplishing their work; and more fully integrated a variety of technology tools into their lessons. They also reported that when students submitted their assignments via Google Doc/Classroom or a D2L Dropbox, it was easier to provide them with feedback. Access to technology was also conducive to flexibility in lessons. To sum up, the physical environment in the classroom enabled the students to work collaboratively, be creative, and develop their communication skills on a daily basis. This environment will be further developed next year, so that learning centres can be incorporated.
Impact on System	The results show that the only 3C classroom criterion that was fully achieved was the opportunity to collaborate, create, and communicate. All of the other criteria were almost achieved. The configuration of the learning spaces is flexible. Vertical writing surfaces are

	available. When school starts, and throughout the school year, students need to be made aware of the appropriate use of devices in the classroom (e.g., cell phones), as well as why and how to use these devices. The creation of 3C classrooms requires a lot of planning and a multidisciplinary team. The factors that facilitated implementation of the 3C classrooms were: • Support from the stakeholders; • The requisite financial resources; • Pre-planning of purchases of furniture and equipment (e.g., work surfaces, student furniture, teacher furniture, tech equipment). The factors that posed a challenge to implementation of the 3C classrooms were: • The need for close, ongoing communication between the members of the various departments: school principals, teachers, pedagogy coaches, service managers (IT, education, technical); • The time involved in coordinating all of the elements that involved all of the different stakeholders; • The differences between the schools in terms of the needs and resources required to set up the 3C classrooms. 3C classrooms enable teachers to offer students more opportunities for collaboration, innovation, and communication. This change in the physical and virtual environment encourages teachers to step out of their comfort zone and be more open to change and risk-taking in their pedagogical practices. The results indicate that students clearly see the benefits of this physical learning environment and its positive impact on the atmosphere in the classroom. The results of the project this year show that students in 3C classes take more initiative and are more entrepreneurial. As a result of this observation, the Board is moving to the next stage: creating entrepreneurship cells in its schools, in order to innovate and maintain the development of 21st Century skills. The Board is building on the 3C classroom project, with plans to implement this entrepreneurship project in seven schools during the 2016-2017 school year. Just like for the 3C classrooms, creativity, collaboration, and communication will be the focus of the entrepreneurship cells. To sum up, the project to transform learning environments into 3C classrooms this year is evolving and will now be applied system-wide through entrepreneurship cells.

Conseil scolaire catholique Providence

Project Title	Pedagogical Transformation for In-Depth Learning
Description	The technology integration project focusses on pedagogical transformation for in-depth learning. In order to facilitate this transformation, the Board created a conducive environment, with system-wide support, clear statements, ongoing IT support for staff, and the development of professional resources and system-wide tools for implementation and monitoring. Equipped with a team of "technology-pedagogy coaches", the Board is pursuing its entry into the digital age by embarking on a sustainable, permanent transformation of its pedagogical practices using programming and robotics. This project enables the Board to differentiate instruction and learning in core content subjects such as Mathematics, French, Social Studies, etc. What's different about this project for the 12 schools is the fact that there is technology-pedagogy support (coaching) that is targeted, ongoing, and adapted to the clientele at each school. Although the coaching project is a means of bringing the programming to life in pedagogical teaching activities, it is just one mechanism for transforming pedagogical practices. The first step is a planning session, with the school principal and the coach, in which the school's priorities and needs are identified. Members of the staff who are invited to join the coaching projects are also identified. Based on the intentions of the coaching project in the teacher's classroom, the coach and the teacher work together to plan, co-model the transformed instruction, co-teach, and co-objectify the learning activities. Coaching may include PLC work in the schools. Once again, this depends on the schools' initiatives and priorities. Put as simply as possible, the task of the technology-pedagogy coach is to "enhance the use of technology in the school's pedagogical activities" and, based on the project's preliminary results, the Board's approach is working. The coaches support the teachers in the targeted schools with the integration of programming and robotics in the various disciplines. Integration is based on challenges and problems. For example, in the elementary schools, students are asked to draw geometric shapes in their Mathematics course using Scratch and even using a robot. This brings an entirely new level of thinking and depth, because students are required to think about the characteristics of the shapes and to use "code" in order to reproduce them. Students are often required to work in pairs or small teams and often find the solution through iteration and exploration.

Context	*Number of students:* 1,759 *Number of teachers:* 56 *Number of schools:* 12 *Grades/Program:* K-12
Impact on Learning	The Board is pursuing its entry into the digital age through a sustainable, permanent transformation of its pedagogical practices, using programming and robotics. The coaches support the teachers in the targeted schools with the integration of programming and robotics in the various disciplines. Integration is based on challenges and problems and has the support of the Board's "Technological Continuum" and a few other pedagogical models / frameworks. The Board's Continuum tool guides the planning of pedagogical activities that will be supported by technology in order to include the development of skills for the digital age. 93% of respondents to a teacher survey reported a big to very big increase in student engagement. Students are more engaged in activities that incorporate technology. They ask more questions; participate more actively; and are more curious. They are more efficient and work more independently to complete tasks and deliver assignments with the help of blended learning tools. They correct their work using the integrated tools (checker). They go back to assignments they have delivered and read the feedback. According to the survey, 96% of respondents reported a big improvement in student motivation. They noted that their students were more self-critical, which further develops their judgment and, therefore, their self-regulation (habits and skills) in delivering assignments. In this same context, respondents observed this phenomenon when the students used their personal devices to document themselves and document a project, which encouraged them to reflect and led to further refinements of their work. This happened both individually and with peers.
Impact on Instruction	Collaborative work seems to come naturally to the students and, after a brief explanation of an activity, they get right down to work. It was quickly clear to teachers that classroom management was much easier because of the major increase in student engagement and student collaboration. Several teachers reported that integrating technology made it easier for them to reach students who were shy or uncomfortable with oral presentations or with situations involving failure. Technology made it easier for students to organize their work and find resources; it gave them a "voice" during collaborative activities; and it enabled them to demonstrate what they had learned in a variety of ways.

	Similarly, monitoring students as they work and monitoring their progress is easier and faster, and teachers even reported that some aspects of FSL are easier to implement (descriptive feedback, differentiation, etc.). They reported that their assessments were more accurate and fair, with pedagogical documentation. The use of video and photographs emerged as a very powerful and important element in teacher-student exchanges. In these situations, students were better able to express what they had learned and to see what the next steps were. The teachers also noted that activities with technology brought a depth to learning that didn't necessarily exist in traditional lessons. The teachers saw a greater difference between "knowledge" and "know-how" in pedagogical interventions that were supported by technology. In addition, the development of skills for the digital age became more intentional.
Impact on System	Thanks to the CODE funding, the Board was able to make great strides in its digital transformation. In light of the success it had experienced and the increased interest in technology-pedagogy initiatives, the Board wanted to build on elements of this success and formalize its intentions around instruction in the digital age, with the implementation of a sector dedicated to technology-pedagogy. This made it possible for the Board to maintain and even increase the speed at which it entered the digital age. With preparations to launch the new strategic plan, it is now understood that technology permeates the new orientations. Certain impacts of the CODE initiatives are very clear at the Board. This trend can even be seen in the framework documents coming out of the strategic plan, such as the Board improvement plan (BIP), the school improvement plans (SIPs), the service plans, and so forth. This year, the Board developed and launched a "technology road map" (TRM) to guide the planning and implementation of its technology initiatives and its technology-pedagogy initiatives. The TRM facilitates and ensures alignment of activities in the framework documents; coordinates and maximizes the resources that are available; and creates a climate conducive to progress that is healthy, manageable, and do-able. To conclude and talk specifically about the 2015-2016 initiative and its impact on the system, we need to talk about the pedagogical transformation and in-depth learning. The 2015-2016 initiative to provide technology-pedagogy coaching is grounded in IT programming and has a natural link to robotics. It is an excellent way to integrate the development of skills for the digital age, in particular critical thinking, communication and collaboration in a "traditional" pedagogical context. This gives us an opportunity to: • Align and integrate the various pedagogical models; • Support the implementation of FSL (e.g., differentiation, assessment,

	descriptive feedback, etc.); • Co-plan, co-teach, and co-objectify in a context of coaching; • Model innovative pedagogy, which is based on the research and on winning strategies; • Present related skills and technology tools for pedagogical transformation; • Create sustainable, lasting transformations in our pedagogical practices. For 2016-2017, we see an evolution in our IT labs and further work on the transformation of our pedagogical practices, in addition to a review of the facilities we need to support learning in the digital age. This will require an analysis and adaptation of our IT labs and classrooms to transform them into "exploration and innovation hubs" and "modern and innovative learning spaces".

Conseil scolaire catholique de district des Grandes Rivières

Project Title	Transforming Pedagogical Practice in Order to Increase Student Engagement in Learning and Develop Their 21st Century Skills
Description	The primary goal of this project is to use a variety of technology tools to change our teachers' pedagogical practices and transform student learning, while developing their 21st Century skills (communication, collaboration and critical thinking).
Context	*Number of students:* 442 *Number of teachers:* 23 *Number of schools:* 3 *Grades/Program:* K-8
Impact on Learning	The survey conducted at the beginning of the project revealed student perceptions of technology in the classroom. Initially, 72% of students agreed or completely agreed that technology would be useful to them in their future career. At the end of the project, this percentage was 78%. The final survey completed by the students revealed that coaching had had a major impact on the contribution of technology for learning. After coaching, the data revealed a distinct increase in the use of technology in reading (+34%), writing (+21%), numeracy (+26%), and self-regulation (+30%). <u>Impact on participation</u>: It is now apparent that the coaching contributed not only to the use of a broader range of tools in the classroom, but also to an increase in the students' active participation in their learning. The use of technology led to an increase in collaborative participation and engagement in assignments. Using an interactive white board to make lessons interactive led to an increase in student participation and engagement in their learning. Collaborative work, exchanges, and sharing information using applications in the Cloud are three examples of tools that had an impact on participation. We noted that technology is used primarily for oral and written communication and is used much less frequently for reading and numeracy. <u>Impact on learning</u>: Tools such as Padlet, ePublishing, and the Cloud applications make it possible to document what students are actually learning on a continuous basis. Through play, technology such as robotics provides students with opportunities to solve problems and discover mathematical and scientific concepts. With the use of coding, this technology also enables them to develop their spatial thinking. Other tools, such as ePublishing and video, help students to improve their oral communication, which enables them to assess their own work and improve their

	final product. In addition, technology fosters the development of their 21st skills. There was an impact on communication, collaboration, and problem-solving throughout the project. Offering a variety of activities and tools made it possible to meet a wide range of student needs. For example, we were able to meet the needs of our male students who like learning through play. <u>Impact on student achievement</u>: The use of technology enabled students with special needs to increase their independence and achievement. Technology made support resources available to these students and to various key people around them, including their parents. Using the Cloud, students were able to share their work and, in return, they received timely descriptive feedback from their teacher or peers. In addition, tools for self-assessment (e.g., video, images, forms) provided another opportunity for self-improvement.
Impact on Instruction	<u>Impact on teaching practices</u>: At the beginning of the project, 60% of teachers believed that technology had an impact on their teaching practices; at the end, 72% reported that this was the case. Technology had the greatest impact on teaching strategies. <u>Tracking tool for measuring technology integration (TIM)</u>: The technology integration matrix (TIM) is a task-checking tool to help teachers transform their pedagogical practices by providing them with options for making progress in the digital age. We chose the 21st skills of communication, collaboration, and critical thinking/problem-solving. <u>Transformation of teaching practices</u>: We noted occasional integration, with no clearly-defined pedagogical intention for technology for learning. In March, we noted that 24% of activities were transformative. The Padlet site opened up possibilities for collaboration, and ePublishing (epub) made it possible to develop creativity and communication. Activities such as sharing tasks in the Cloud and various apps available on iPads made it possible to create videos that required creativity. These activities required targeted skills such as communication, collaboration, and critical thinking. In May, the percentage of activities that were transformative had risen to 63%. <u>General observations about the TIM, exchanges, and observations</u>: Our primary data indicate that, with technology coaching, pedagogical practices are gradually growing in number; we see a progression from “general” practices (e.g., less use of the interactive whiteboard as an overhead projector) toward more targeted interactive practices that have a clearly-defined pedagogical intention.

	Another component of the project that people really like is the time set aside for support and exploration of various tools and applications in the classroom. The TIM enables stakeholders to evaluate themselves and regulate themselves so that they can determine where they need to go next in their interventions. The coaching provided by the technology-pedagogy coaches provided them with opportunities and tools to make significant changes in their teaching practices and have a greater impact on student learning.
Impact on System	Consultants have been involved in planning and implementing organizational processes and structures for coaching us as we transition smoothly to a Cloud environment. The project supported the development of policies and procedures for secure use of 21st Century technology (preparation of policies on responsible use). A technology committee (IT manager, supervisory officer, pedagogical services and student services heads, the technology-pedagogy coach, the eLearning contact) was created to develop a plan for implementing the transitions and training needs around the Cloud initiatives. This committee also developed a long-term plan for our technology needs so that we could make the transition to the digital age. At a system-wide level, the project helped with the migration to a Cloud environment (Office 365). This change enabled the education stakeholders to collaborate and communicate more effectively. This initiative also made it possible to implement a system-wide practice for *Creating Pathways to Success* for the entire Board. This project helped us to realize that the Board is ready for the transition to the digital age; we have the desire, the motivation, and the commitment to achieve our objectives. We will need to address the challenges posed by the infrastructure to ensure and support the growing demand for new technology. In addition, we will need to develop a plan to make the technology directly accessible for students.

Conseil scolaire catholique Franco-Nord

Project Title	Implementation of the New Pedagogical Vision for 21st Century Learning
Description	This year, our objective is to pursue our transition to the 21st Century by focusing on the implementation of our new pedagogical vision (development of the six key skills, best pedagogical practices, learning partnerships, and technology integration) in all 14 schools. Intensification and systematization of the implementation of the new vision for pedagogy and technology will require a major, ongoing effort in terms of professional development. At the present time, professional development comes in the form of leadership provided by the school principals, the pedagogy coaches on the school success support team, and support from the CFORP TacTIC team. Every Board school is assigned a pedagogy coach who supports the school's teaching staff in a variety of ways (coaching, modelling, co-planning, co-teaching, etc.). The school principals monitor implementation and support their staff to transform their pedagogical practices, in line with the Board's new pedagogical vision. The teaching staff are also given support by the IT team for problems around the use of the technology. As part of our innovation project, we will be exploring various ways to maximize the impact of the resources that are currently available to us. We will be supporting the professional development of these technology-pedagogy coaches more intensively, so that they can become accessible models and resources in their school and throughout the Board. We will use the SAMR (Substitution Augmentation Modification Redefinition) model to show our staff the potential of technology to enrich student learning, based on an in-depth learning model.
Context	*Number of students:* 1,200 *Number of teachers:* 125 *Number of schools:* 9 *Grades/Program:* K-12
Impact on Learning	Over the past two years, implementation of the Board's new vision for pedagogy and technology has been the focus of our innovation research project, and we can see the impact that it is having. <u>Student engagement and motivation:</u> The development of learning partnerships appears to have had an impact on the engagement of our students; they now have a voice and can offer input on the decisions that need to be made throughout their learning. In addition, they are more motivated and engaged because learning is more authentic and relevant to their reality, especially when they see a connection to their future. Because there is more collaboration, more sharing, and more co-operation during

	learning situations, there appear to be fewer challenges in terms of student behaviour and discipline. In many cases, we are seeing an increase in self-esteem. We have seen students increase their ability to work independently, their organizational skills, and their self-regulation. Our students are developing more resilience. We also note that learning supported by the use of technology appears to be having a positive impact on the achievement of our male students. Several teachers report that they want to go further, get more information, and work harder on their assignments. <u>Student success:</u> According to our analyses, increasingly, technology is enriching student learning. With the implementation of the new pedagogical vision supported by digital technology, our students generally appear to be submitting work of higher quality. In our opinion, increased student engagement and motivation, in and of themselves, appear to be contributing to higher student achievement. The students are trying to do good work because they know that their peers will be evaluating them on predetermined criteria. They appear to be taking more responsibility for their learning. They are generally working more independently. Generally, the students appear to be submitting work of higher quality and demonstrating greater comprehension. In a survey of intermediate division students, 72% reported that their assignments were better when they used an iPad and could choose from a variety of applications, depending on the task. In the junior division, 86% reported that this was so. <u>Oral and written communication:</u> In 2014-2015, our SWST (Student Work Study) Teacher chose to work on oral communication, expression of mathematical thinking, communication of language (ALF) and written communication in three small schools, using technology for learning (interactive whiteboard and iPads). It was observed that student communication improved in all of the strands and that students also developed better work habits and learning habits. <u>ALF – Writing: 2015-2016 – SWST (Student Work Study) Teacher:</u> The iPad, speech synthesis, and word prediction all increased the quality of written communication of students in Grades 3 and 5. • Speech synthesis combined with word prediction encourages students to ask themselves more questions about how to spell a word (trial and error), and this leads to an increase in the rate of self-correction. • Speech synthesis correctly pronounces phonemes, which facilitates phoneme/grapheme correspondence. As a result, grapheme/phoneme

correspondence improved. Combined with word prediction, speech synthesis encourages students to ask themselves more questions about how to spell a word (trial and error), and this leads to an increase in the rate of self-correction.

The correlation between independent work and efficient use of speech synthesis and word prediction was less obvious. However, the data did reveal that:

- There is a direct link between the quality of written production and independent work;
- The ability to work independently decreased when students wrote on paper;
- Efficient use of speech synthesis and word prediction is not a factor that increases the ability to work independently.

<u>Developmental Reading Assessment (DRA) of Students in Grades 6, 7, and 8:</u>

Reciprocal teaching, enhanced with the use of iPads, contributed to an improvement in the achievement of students in Grades 6, 7, and 8 in reading, as assessed with the DRA tool. According to our observations and an analysis of the students' work, they experienced improvements in reading, writing, mathematics problem-solving and, in the case of our students who are learning the language (ALF), language acquisition.

In Grade 6, out of 23 students, only 5 (21%) had achieved or exceeded the DRA60 target in November 2015. By April, one student had advanced by 1 level; 8 students had advanced by 2 levels; and 3 students had advanced by 3 levels. In all, 15 students (65%) had reached or exceeded the DRA60 target, resulting in an increase in student success in reading of 44%.

In Grade 7, out of 32 students, 13 (40%) had achieved or exceeded the DRA70 target in November 2015. By April, 4 students had advanced by 1 level; 12 students had advanced by 2 levels; and 2 students had advanced by 3 levels. In all, 28 students (87%) had reached or exceeded the DRA70 target, resulting in an increase in student success in reading of 47%.

In Grade 8, out of 43 students, 22 (51%) had achieved or exceeded the DRA80 target in November 2015. By April, 8 students had advanced by 2 levels and 8 students had advanced by 1 level. In all, 36 students (83%) had reached or exceeded the DRA80 target, resulting in an increase in student success in reading of 32%.

<u>*Students with special needs:*</u>

The stigma attached to using a digital device such as an assistive device is eliminated because the other students are using the same technology. It goes without saying that the students are now using assistive technologies more regularly and are experiencing more success with reading, writing, organization, and oral communication. Using technology gives these students an opportunity to

	experience a level of success that they would not otherwise experience. We often see students with special needs shine when they help their peers with the technology and this has a major impact on their self-esteem. In some classes, during team projects, the students organize themselves without teacher intervention, divvying up tasks and responsibilities.
Impact on Instruction	The transformation of our teachers' teaching practices and assessment practices is the result of a system-wide effort to align ourselves with our new pedagogical and technological vision for 21st Century learning. This new vision has five components: the development of 21st Century skills, best pedagogical practices, the development of partnerships for learning, learning environments, and the integration of technology for learning. Since implementation of our new pedagogical and technological vision first began, we have seen the impact of our teachers' efforts to gradually transform their practices. In fact, 95% of teachers surveyed reported that, with the 21st Century transformation this year, they had made changes in their pedagogical approach. The impact of implementation of the Board's new pedagogical and technological vision on the development of skills can be seen in the following areas: communication, creativity, critical thinking, collaboration, character development, citizenship, best pedagogical practices, assessment and data collection, pedagogical differentiation, partnerships for learning, learning partnerships between students and teachers, learning partnerships between students, learning partnerships between teachers, learning environments, and technology integration for learning. In several of our teachers, we have seen efforts to develop students' 21st Century skill set. We have also seen efforts to develop learning partnerships in the classroom and, by extension, in an entire school. We have also observed a genuine effort on the part of our teachers to integrate digital technology for learning and to transform the students' learning environment. A few teachers have begun developing STEM (Science Technology Engineering Mathematics) education in their schools; others have begun using robotics in their learning strategies. Several teachers report that technology makes pedagogical differentiation easier. Access to digital technology has also enabled our teachers to triangulate assessment more effectively, because it is now easier to document evidence of learning, using video and audio. Several teachers are using a virtual learning environment to enable students to collaborate and offer each other feedback. They are encouraging their students to be more creative by giving them a lot of latitude in how they demonstrate that

	they have achieved the learning objectives. They have adopted a spiral approach for the acquisition of the strands of mathematics in authentic, real-life contexts, with the support of technology. Increasingly, our teachers are allowing students to choose their learning tools, topics, learning processes, and forms of expression. Several teachers report that they have a different role in the classroom—that of a catalyst for learning. Several teachers are sharing with their colleagues to accelerate their progress on the implementation of new pedagogical practices and technology integration in the classroom.
Impact on System	Our transformation for the 21st Century has given us an opportunity to think about our vision of pedagogy and the role that technology is going to play in student learning. With the development of our new pedagogical and technological vision, we want to define our expectations for what will inevitably be a transformation of our pedagogical practices in the classroom. By adopting a system-wide approach to pedagogical transformation in the classroom, we will ensure that these practices are sustainable. The development of our new pedagogical and technological vision led to the development of several work, support, and assessment tools that are aligned with best pedagogical practices. We adopted a 21st Century skills development continuum that is slightly different from the original document produced by the New Pedagogies for Deep Learning project led by Michael Fullan. Having a team of pedagogy coaches who have embraced the new pedagogical and technological vision for 21st Century learning is critical to our successful transformation. Intensifying and systematizing the implementation of this new vision also requires a major, sustained effort in the area of professional development. Each Board school is assigned a pedagogy coach who supports the school's teaching staff in a variety of ways (coaching, modelling, co-planning, co-teaching, etc.). School principals monitor this implementation and support their staff to transform their pedagogical practices, in line with the Board's new pedagogical vision. The teaching staff receive support from the IT team for problems around the use of the technology. In April, we launched our new technology-pedagogy program. The idea is to increase our ability to support our teaching staff to make this pedagogical and technological transformation in their classrooms. We also created an enterprise social network using Yammer. This web tool enables teachers to share best practices, relevant links, and relevant resources; ask their colleagues questions; celebrate their wins; and create a forum for collaboration. We acknowledge that there is a need to measure the impact of the transformation on student achievement more precisely. We need to define very specific indicators of success in our Board's student improvement plan and school improvement plans and we need to develop tools for measuring this impact.

Conseil scolaire catholique du Nouvel-Ontario

Project Title	Littera-tic
Description	The goal of the Littera-tic project is to enable two teachers to monitor the transition to the digital age, i.e., the development of 21st Century skills, in "an authentic context". The primary objective is to promote teaching and assessment strategies that embrace the new pedagogy, i.e., with the students as co-learners engaged in their learning and with the teachers as partners in that learning. The three strands of French will be addressed: oral communication, reading, and writing. Technology will play an important role; however, it will not be the primary focus of the project. The key will be to develop skills in our students: collaboration, self-regulation, the ability to work independently, critical thinking, innovation, and the use of French (for communication). Each student has access to an iPad with a wide range of applications. With the new classroom configuration, drastic changes in the learning spaces are possible. These spaces become areas where the students can collaborate, communicate, and work in teams more easily and more effectively. Tables, on which students can write, enable the teachers to quickly monitor their learning. What a great example of assessment for learning. During oral communication activities, the students have opportunities to develop and refine their language skills. These activities provide all students, not just ALF students, with a variety of models of oral communication. The new assessment practices enable teachers to collect different types of evidence of learning, in order to comply with *Growing Success*, which talks about the importance of triangulation, i.e., observation, conversation, and production.
Context	*Number of students:* 43 *Number of teachers:* 2 *Number of schools:* 2 *Grades/Program:* K-3
Impact on Learning	We used teacher observations, evidence of projects (artefacts), and student survey responses to determine the impact, on the students, of pedagogical practices that incorporate technology and a learning space that has been reconfigured for the use of technology in Grades 2 and 3. 42 Grade 2 and Grade 3 students answered a survey. • 95% liked working with an iPad; • 92% preferred the new design of the learning space in the classroom; and • 86% preferred an iPad to paper and pencil for writing a story. In examining student work, the impact of the pedagogical practice, and student engagement, we noted a redefinition or a change in the following areas, in the

	students who participated in the research project: 1. Communication: our students communicate more with each other and record themselves using their iPads. For example, they used FaceTime for a literacy project following book reviews they had read in the virtual learning environment. 2. Collaboration: our students spontaneously help each other. They communicate more often using either email or AirDrop. They send each other messages, share images, and send emails to the teacher or the principal. 3. Creativity and Innovation: Our students do projects that reflect their interests or they choose a task and use their imagination, spontaneity, and ingenuity, choosing the right technology and using it appropriately. 4. Development of critical thinking and problem-solving: several students found very interesting solutions to technical problems with their iPad functionality, for example, how to send a book to the teacher using OneNote. 5. Orientation of student learning: when students are working on a project, they often need to use more than one application. During math centres or literacy centres, they correct themselves and assess themselves. They ask, "Is the problem done? Is it successful?" And then they re-do the problem on their own. 6. Experiencing authentic learning situations and creating authentic projects: the students add apps to their digital device at home, e.g., Bitsboard or Money Pieces, so that they can practice their dictation. The students' projects become authentic products that can be used by other students. For example, Grade 2 students create books on animals and then share them with Kindergarten students. 7. Franco-Ontarian identity construction: Students ask to listen to songs by Franco-Ontarian artists whom we have presented. They do a search for the biography of the artist and listen to the artist on YouTube. 8. Digital citizenship: Throughout the year, we have discussions with our students in order to develop their sense of themselves as responsible digital citizens: inappropriate images, copyright, certain websites. Students demonstrate critical thinking and responsibility when they consult their teacher over a website and learn what is appropriate. 9. Learning environment: We noted the impact that reconfiguring the classroom to facilitate technology integration had on the development of the students' skills, in particular, a huge increase in students helping each other. Students demonstrated openness, pleasure, and flexibility in working with other students throughout the day.

	10. Dynamic learning: we noted how the students developed expertise in doing searches. They incorporated a variety of digital sources into their work. They became more resourceful and skilled at using applications. 11. Literacy and numeracy skills: The students are independent and creative; they are leaders and better speakers and communicators. They are enthusiastic and spontaneous and volunteer to present their research projects to the class. They are very proud of their work and really like presenting it to the class. In Mathematics, the students successfully use several applications at the same time. They are able to solve a problem independently and they do 3 to 5 steps before loading their work into OneNote.

Impact on Instruction	This section first describes the impact on teaching practices developed using a list of indicators of participatory pedagogy from the CFORP TacTIC team completed by the teachers in the project is remarkable. [*sic*] It then discusses what the teachers learned about the technology, e.g., the successes and challenges they encountered over the initial project proposal.
	Impact on teaching practices:
	The teachers:
	• Use assessment for learning and as learning, with the help of technology tools and software (e.g., OneNote), in order to more effectively coach and guide students in the acquisition of knowledge;
	• Introduce the redefined participatory pedagogy and note any observable behaviour in order to measure progress and adapt their teaching and in order to ensure the academic success of all students;
	• Learn to use the technology with the students and enable them to become the key users, with responsibility for technology in the classroom (the students become the experts);
	• Spend less time providing verbal explanations, in order to allow the students to search for and find answers and solutions to issues that create challenges in society;
	• Treat the students as learning partners by:
	    ○ Acting as supporters and coaches;
	    ○ Setting learning objectives with them and guiding them to ask the right questions;
	• Expose students to the world and to cultural diversity, using technology tools and social networks;
	• Act as architects of knowledge, guiding students to locate, organize, and manage new knowledge.

	In both the Grade 2 and Grade 3 classes, we noted a 32% improvement in the integration of the redefined participatory pedagogy, as presented in the survey of the literature and virtual interviews conducted between November 2015 and June 2016. <u>Progress and Learning by the ICT Teachers:</u> In terms of technology, these teachers learned: • To use the various applications of the iPad; • To use all of the settings, storage space, etc.; • To manage student work in OneNote; • To achieve the general expectations and the specific expectations in the curriculum documents, using the technology, with the centres they created, projects, assignments, etc.; • To integrate the technology into their teaching (e.g., questionnaire using Kahoot!); • That virtual communication needs to be even more meaningful for students; • To familiarize themselves with digital citizenship. Support was a very important element in the implementation of this project. Right from the start, the teachers were supported by the TacTIC team and by the Board team.
Impact on System	The Board developed a Shared Vision of digital age learning and shared it with all staff at a professional learning day. For the past two years, we have been participating in the CFORP TacTIC project. Approximately 12 schools participated in order to raise teacher awareness of the transformation in teaching and assessment practices. The teachers had the support of a pedagogy coach; the principals had the support of a pedagogical leader who gave them options for implementing the vision for 21st Century learning. It was important to create model classrooms (laboratories). Other teachers could visit these classrooms to observe, ask questions, and reflect on the steps that needed to be taken in order to transform their own practices. We developed or revised several “administrative directives” relating to 21st Century learning. We will continue this work next year. It goes without saying that we want to develop digital citizenship in our students. The teachers had an opportunity to explore the Ministry website on identity and digital citizenship. The pedagogical team created a table matching the expectations and the learning contents in the curriculum documents for Grades 4 to 10. We will continue our efforts at implementation, ensuring that we support our school principals and teachers as they make this transition.

Conseil scolaire de district catholique des Aurores boréales

Project Title	From Invisible to Visible: Collecting Evidence of Learning
Description	In this next round of the project, we want to continue using technology to improve our students' language skills. Using technology, our teachers are better able to assess student progress and our students are able to assume more responsibility for their learning. It is easier for them to assess themselves and to see their progress in oral communication using video and audio recordings. Technology enables our teachers to really use assessment for learning to plan the next steps for their students, with far greater use of differentiation. Technology makes it easier to collect evidence of learning that more clearly documents student progress. This makes it easier for teachers to use technology to talk to students about their progress and, subsequently, to increase their sense of responsibility for their own learning. With feedback from the teacher, self-assessment, and peer assessments, students are better able to improve their work.
Context	*Number of students:* 275 *Number of teachers:* 19 *Number of schools:* 9 *Grades/Program:* K-2
Impact on Learning	This project is for all students in Kindergarten to Grade 2 in all of our elementary schools. It involved more closely monitoring the progress of students who had been assessed at Level 3 and lower (using the French language acquisition toolkit, TACLEF), as well as students who spoke little or no French in JK or SK. We focused on teaching vocabulary using Marzano's six steps to improve oral communication in our ALF students, because this skill is necessary for developing three of the 21st Century skills: communication, critical thinking, and collaboration. The impact of oral communication of student achievement in reading became apparent when we reviewed the data at the end of the second project year. We analyzed the report card marks in reading of Grade 1 students in the project who had participated the previous year. We compared these data to the report card marks for Grade 1 students who had never participated in the project. We also compared the marks in reading for Grade 2 students participating in the project for the first time to their marks in reading the previous year, before their participation. We saw an improvement in the students' marks in reading following the use of technology to gather evidence of learning. We also noted the impact of our project on the students' work skills and work habits, specifically their ability to work independently and their motivation. We noted that the students persevered more and wanted to rework and improve

	their work, beyond what was expected of them, because they liked seeing themselves in videos, assessing themselves, and figuring out what they wanted to improve. This step also developed their critical thinking. Thanks to the technology, it was easier for them to see their progress. Some students who didn't normally like to talk now wanted to talk because they were being filmed and wanted to "perform" well. Thanks to the technology, oral communication situations were more authentic for the students. The teachers reported more than once that the students applied what they had learned to other subjects and other learning situations.
Impact on Instruction	The educators who took part in this initiative saw a transformation in the practices they used to assess in-depth learning of language skills in students from Kindergarten to Grade 2. The first change was in how they planned their teaching. They used a theory of action and took into account the methods and tools they would need to measure student progress. Using Skype and Office 365 Cloud, they planned learning situations in collaboration with their colleagues. In using these collaborative tools with their colleagues, they then became more comfortable planning situations involving collaboration with their students. Thanks to the iPad, all of the teachers were able to gather a wider variety of evidence of learning so that they could more accurately assess their students' progress in oral communication. The technology enabled the teachers to see their students in action, during authentic learning tasks with their peers. If necessary, they could intervene to provide support. All of the teachers worked in collaboration with their colleagues in a PLC for co-planning, sharing resources and ideas, and objectifying learning. Using tools like Skype, they were able to talk and work with colleagues in other schools. They were able to share resources using Web 2.0 and the Office 365 tools. With digital student profiles, primary division teachers now have access to evidence of learning at the beginning of the school year. This makes it easier for them to determine where their students are. It enables them to start with the needs of each student, planning differentiated instruction and supporting each student in his or her learning.
Impact on System	This project meets some of the priorities identified by our Board. The first priority is technological innovation for strategic planning, one of the objectives of which is more effective communication between students and teachers. Second is the need, identified in our Board improvement plan, to improve student achievement in reading through oral communication. We created to a committee to coordinate, plan, and monitor our progress and to ensure that implementation of 21st Century learning projects got the resources it

	needed. For example, tools such as the virtual learning environment and the Microsoft Office 365 environment were deployed across the Board to increase the sharing of resources and information and facilitate collaboration. For this project, we created a course on pedagogical differentiation. To ensure that the number of educators and school and system leaders involved in our innovation projects continues to grow, we started with a small number of participants, supporting them and coaching them in their learning. They then became ambassadors for the technology and for their role in 21st Century learning. Because our strategic planning includes overall student success using pedagogical differentiation and technological innovation to coordinate the needs of 21st Century learners and because the infrastructure must support all of this, we will ensure that the transformation continues with coaching and a strategic, targeted cycle of monitoring.

Conseil scolaire de district catholique de l'Est ontarien

Project Title	Coaching in the Digital Age to Integrate Technology and Develop Critical Thinking and Digital Citizenship in our Students
Description	This year, we are focusing on implementation of four components of the Board's digital citizenship plan: 1. Development of the students' digital citizenship skills 2. Access to networks and electronic tools 3. Personal electronic devices 4. Electronic communication First, with coaching, we will help one cohort of teachers to use technology tools to facilitate or enrich learning, by introducing pedagogical strategies that use a variety of learning environments and that develop 21st Century skills. We will help a second cohort of teachers to explore concepts of critical thinking; transform their tasks and learning strategies; and use the technology integration matrix (TIM) to plan critical challenges and pedagogical interventions. Last, using coaching once again, we will help a third cohort of teachers to understand the elements of digital citizenship, as stated in our digital citizenship plan (DCP), and to plan and integrate the teaching of the elements of digital citizenship into their courses so that their students become responsible 21st Century learners who espouse our values for the digital age. As in the past, our pedagogical services are working in collaboration with school principals to enable teachers to participate in one of the system-wide cohorts: coaching for the digital age; coaching for critical thinking in the digital age; and digital citizenship coaching.
Context	*Number of students:* 1,600 *Number of teachers:* 59 *Number of schools:* 15 *Grades/Program:* K-12
Impact on Learning	Based on the measures we used in the previous rounds, and based on our data collection and analysis, the teachers and students reported an increase in their engagement in their learning task and their classes and courses. The intention of our coaching was to support teachers in the integration of technology tools to facilitate or enrich learning; in the development of pedagogical strategies that use a variety of learning environments; and in the acquisition of knowledge and strategies that support the development of critical thinking and digital citizenship. The integration of best strategies supports student learning, engagement, and overall success. The students reported that they had learned a lot about software tools and Cloud

	environments for collaboration. They also reported that they were making increasing use of technology in the classroom. One-third of students surveyed reported using technology every day. 82% reported that technology helped them to learn. Two of the things they liked about technology were search engines and collaboration. They reported that, thanks to technology, they were more engaged in their learning. We note that students like using technology in the classroom. They understand that they need digital skills in order to acquire 21st skills and find work. Hence, the importance of carrying out this transformation in our classrooms.
Impact on Instruction	More in-depth learning implies advantageous use of technology. The challenge is to help teachers to move from simple substitution to use that adds value and transforms pedagogy. This was the primary objective of the three cohorts we coached this year. With the data that we collected with the help of objectification and observation, we noted that all of the participants made progress in the SAMR (Substitution Augmentation Modification Redefinition) model. The teachers reported feeling more effective and more aware of the impact of technology on their pedagogical practices, in particular assessment (assessment for learning and assessment as learning) and on the development of 21st Century skills. The pedagogy coaches reported that, thanks to the coaching, over 79% of teachers felt more effective and had progressed along the technology integration continuum. 84% of the teachers surveyed reported that they had been able to make progress on technology integration in the classroom. They more fully understood the triangulation process, thanks to the technology and tools that made it easier for them to note their observations of, and conversations with, students. What our data revealed was that, regardless of the point of entry, coaching enables teachers to transform their practices.
Impact on System	Progress in the final phases led, this year, to the creation of a digital citizenship plan and a code of conduct and regulations governing education in the digital age. This plan informs all of our interventions. This year, the coaching focused on four components of the Board's digital citizenship plan: development of the students' digital citizenship skills; access to networks and electronic tools; management of personal electronic devices; and electronic communication. In implementing these components, the coaching enabled us to build the capacity of the school teams through shared leadership. One of the cohorts (critical thinking in the digital age) focused on training leaders in each of the schools. While being coached by their pedagogy coaches, they went through professional learning cycles with their peers. This is a model that will guarantee lasting change.

	We noted major systemic changes in the schools that received coaching. 50% of schools in the intermediate division reported an increase in their perception of the use of best pedagogical strategies in the classroom. Where the secondary schools were concerned, 29% of schools reported an increase. Keeping in mind the objectives of our digital citizenship plan, this initiative enabled us to train the leaders in our schools: our principals. Leadership days for our school principals enabled them to become aware of and understand the challenges associated with digital citizenship and to begin thinking about implementation of the school action plan. To sum up, this initiative is essential to the transformation of our pedagogy and the assessment practices that are associated with it. Our data confirm that, within a shared vision, more individualized support makes it possible to transform our practices.

Conseil scolaire public du Grand Nord de l'Ontario

Project Title	The Impact of Coaching on Pedagogical Transformation in the Digital Age
Description	Drawing on our success and what we learned in Round 4, we are expanding our project. As in the previous round, our initiative focusses on coaching teachers to transform their pedagogical practices for the digital age. This year: • Our Grade 7 and 8 teachers continue to be coached; • Our Grade 9-12 French and Mathematics teachers will be coached; • All of our junior division classrooms have carts of Chromebooks. All of these teachers will be coached, too. With coaching, teachers will be better equipped to move their pedagogical practices in the direction of greater participation and differentiation, using a process of inquiry. Students will be able to more fully develop certain 21st Century skills (e.g., communication, collaboration, critical thinking, creativity, and innovation). Here is a general outline of the project: • All of the students and teachers involved in the project will have access to a technology tool (portable computers, Chromebooks, BYODD [Bring Your Own Digital Device]); • All of the teachers completed a survey that provided a benchmark and a general profile. A mid-year survey will be administered in April; an end-of-project survey will be administered in June; • All of the coaching is documented in a journal (Google form) to measure progress against goals and document frequency of individual coaching.
Context	*Number of students:* 1,414 *Number of teachers:* 59 *Number of schools:* 11 *Grades/Program:* Gr.4-12
Impact on Learning	Because the pedagogy is more differentiated, all of the students have an opportunity to participate. "A student who doesn't like to talk can still participate using technology (Padlet, Hangouts, Google Slides). The technology will enable this student to communicate more and to provide more details." The students are more motivated and enthusiastic about learning. They communicate and collaborate with each other and with their teachers more, during class and outside of class time, using the collaborative tools available to them (e.g., Google Drive, Classroom, etc.). The students analyze and evaluate increasing amounts of information from a variety of sources, generally using a tool that has been suggested to them. The students have access to a wide variety of tools. They are in an open environment

	where they can use a tool of their choosing to demonstrate what they have learned (e.g., they can choose to use the graphing calculator, GeoGebra, or a pencil and paper to explore rotations in their Math course).
Impact on Instruction	Based on the surveys and observations of the coaching team, we see an impact on teaching strategies. Teachers: • Have better communication with parents; • Are transforming their pedagogical practices and innovating in their teaching practices using various tools and approaches. “Technology makes it possible for me to diversify my lessons; spark my students’ interest; and plan lessons that get them actively involved.” • Have more confidence in the use of technology tools in the classroom after they have received coaching and they find it easier and more natural to use technology; • Teach paperless courses. “I don’t use paper with my language courses. It’s easier to mark the students. They have access to assistive technology. Fewer students make excuses about losing their work. There are fewer problems with absenteeism, etc.” <u>Impact on assessment strategies:</u> Teachers report that: • The tools make it possible to provide timely feedback; • It’s easier to collect evidence of learning and they do it more often. As a result, they have a better grasp of what their students have learned and remedial work is more effective; • The students have a wider range of tools for demonstrating their learning and paper-and-pencil tasks are less common; • They are engaging in assessment for learning. <u>Impact of coaching:</u> In terms of the impact that coaching is having, the teachers’ feedback is very positive. They report feeling better equipped to try new strategies and new applications, and they feel more secure in the knowledge that support is available if they need it.
Impact on System	This initiative supports the Board’s vision of building the capacity and confidence of its teachers to integrate technology tools into their pedagogy. This initiative is part of a system-wide winning strategy involving coaching in literacy and numeracy. The coaches are already in place; they are using more technology during coaching and are able to lead the change to 21st Century learning. Due to its success, this model will be introduced in the junior division next year so that we can continue to build the capacity of our staff, across the Board. The key to the success of this initiative is collaboration between the Board’s pedagogy-technology team and the provincial TacTIC team.

Conseil scolaire public du Nord-Est de l'Ontario

Project Title	Transforming Teaching and Inquiry-based Learning (Through the Integration of Technology)
Description	Our project has two key goals: improving the teaching practices of our teachers and developing three 21st Century skills in our students: critical thinking, communication, and collaboration. Where our teachers are concerned: • We are increasing the use of technology in our classrooms; • We are training our people on inquiry-based learning (CFORP); • We are co-planning units of learning with our teachers; • We are co-teaching; • We are doing presentations on various digital resources (apps, programs, sites, etc.); • Knowledge and experience are shared within the school by means of presentations; inquiries come to life during professional activity days dedicated to pedagogy; • Our technology-pedagogy coaches participate in professional learning communities in the schools; • Assessment for learning is advocated (evidence of learning is gathered through observation, conversation, and production; learning results are shared with the students; criteria are developed, etc.); • Pedagogical differentiation is advocated, using the Read and Write program. Where our students are concerned: • We show them different ways to collaborate using technology; • They collaborate using shared documents; • The units that are developed foster an openness to the world; • Self-regulation and independent work are developed through the teaching of research skills; • The students take risks; • There is an improvement in communication (sharing circle); • We develop their critical thinking… research (evaluate resources, sources of information); • There has been a great improvement in student engagement and motivation because they feel that they have some control over their learning.
Context	*Number of students:* 130 *Number of teachers:* 8 *Number of schools:* 5 *Grades/Program:* Gr.7-8

Impact of Learning	Through the inquiry-based learning process, we have noted the development of three 21st Century skills: communication, collaboration, and critical thinking. Using collaborative tools (Padlet, Lino, VLE, 0ffice 365) and questions, the students' prior knowledge is shared and becomes available to everyone. The inquiry process enabled us to ensure that there was pedagogical differentiation in all of the classrooms being coached. The students could choose their approach, their subject of inquiry, and the way in which they demonstrated their learning; however, because they chose a format based their strengths (video, narrative), their particular needs were less obvious. Encouraged to collaborate, the students were more motivated and engaged, which meant that there were fewer disruptions during the day. Accountability was high because the students were part of a team. They did research on a topic of inquiry and then presented their findings to the whole group. This developed their accountability, self-regulation, and ability to work independently. The technology tools also made it possible for them to pursue their inquiry at home and even to collaborate with their partners.
Impact on Instruction	There were PLC meetings throughout the school year. These meetings facilitated co-planning of co-teaching and co-objectification. During coaching, the technology-pedagogy coaches saw a transformation in the classroom. The use of lecture-format teaching declined and students were seen as active learners. The teachers asked questions instead of transmitting information. Through the PLCs and through participation in a webinar entitled *Le processus d'enquête : des élèves actifs et engagés* [The process of inquiry: active and engaged students], the teachers had an opportunity to ask questions and develop their knowledge and skills in order to improve their teaching practices. By observing and coaching, we noted several changes in assessment in the classroom. Making use of the technology, assessment by triangulation became commonplace. While the students were engaged in their process of inquiry, we were able to use audio and video to record our observations and gather evidence of learning. OneNote is often the tool recommended by teachers, because authentic traces of learning can be used to assess student learning objectively. This program can also be used to provide instant, personalized feedback. This initiative is encouraging teachers to collaborate on planning and on teaching strategies. This gives them an opportunity to learn how to more fully integrate technology into their practices; transform their planning; share their knowledge; and ask questions in order to help each other evolve and become increasingly effective at implementing the process of inquiry. The teachers are noticing that their role is changing from that of transmitter of knowledge to that of coach and facilitator.

Impact on System	The Board provides a continuous learning environment for all stakeholders: students, teachers, and technology-pedagogy coaches. This atmosphere of trust allows for frank discussion, co-learning by adults, and co-learning by adults and students. Thanks to the success and support of this initiative, it has spread to other classrooms in the schools being coached, and to schools in other communities. Curiosity about inquiry-based learning has contributed to the creation of similar projects in other divisions, e.g., Grades 5 and 6 and Grade 10 Science.

Conseil scolaire Viamonde

Project Title	The Viamonde 21 Program
Description	The Viamonde 21 program provides multi-service (pedagogy/IT) support to help schools develop 21st Century skills and IT skills. Classrooms in participating schools agree to create an online presence that students can access; work on the development of 21st Century skills; and encourage students to proactively demonstrate and document what they have learned. The intention of the program is to produce lasting changes in pedagogical practices and ways of learning; to demonstrate learning; and to document learning. Each school sets goals at the beginning of the year, identifying obstacles (technical and otherwise) that stand in the way of achieving these goals. These obstacles are addressed in coaching sessions during the year and each teacher is guided to increase his/her ability to integrate technology into his/her practices. The program starts this year with four schools, in addition to six teachers in other schools who are participating on an individual basis. The goal of this program over the next three or four years is to reach every school in the Board. Components of the program: • 4 meetings at the central office during the year for training (led primarily by the participants) and for sharing best practices; • 1 half-day of coaching per teacher per month with a pedagogy coach for training based on needs (5 pedagogy coaches); • 1 half-day of coaching per teacher per month with an IT technician to address technical questions and needs (4 technicians); • 1 presentation per school at a technology fair called *Rassemblement Viamonde 21*, where teachers share their experience. Participation is open to all Board staff; Ministry of Education staff; and the CFORP TacTIC team.
Context	*Number of students:* 430 *Number of teachers:* 23 *Number of schools:* 8 *Grades/Program:* K-12
Impact on Learning	Based on the results of teacher surveys, the students made progress on all levels of the technology integration matrix (TIM) and therefore in their 21st Century skills. The teachers reported major improvement in collaboration (88% based on the Learning Skills & Work Habits (LSWH) and 21st Century skills, increasing from 20% in September to 81% in May, according to the TIM) and in independent work (100% across all 6 LSWH), and they reported that the students were more proactive in demonstrating their learning (100%). In addition, they all reported

	increased levels of student perseverance (90%). Because the objective of the program was to work on the LSWH, as well as 21st Century skills, the survey data targeted these skills. The students more fully grasped concepts and, as a consequence, there was an overall improvement in student achievement (100%). According to the teaching staff, students have access to instruction via video 24/7; this enables them to watch it again when they want to, in their preferred environment. They also have the ability to self-regulate; they can return to activities where they under-achieved. Looking at their classmates' achievements, they are motivated to improve their own work. According to the student survey, 86% felt more motivated to improve their work using technology. They found that technology helped them to more fully express their ideas (76%) and their creativity (73%).
Impact on Instruction	According to the survey results, overall, the teachers are satisfied with the Viamonde 21 program. Most reported that they had improved their planning practices (they were better organized) and their assessment practices. The teachers benefitted from being coached by a pedagogy coach and an IT coach. Most were very satisfied. 70% changed the physical environment in their classroom to make it more conducive to collaboration. 100% appreciated being able to share with their colleagues at the meetings. All of the teachers in the program presented training video clips at the Board's teaching and learning fair, and some of them also presented at CONNECT 2016, an international conference on learning and technology, in Niagara Falls. 100% of school principals reported an improvement in assessment for learning and pedagogical documentation.
Impact on System	In terms of the system as a whole, the program has evolved dynamically and exponentially. We have worked from the needs identified by the schools, in order to offer customized coaching, while ensuring that we maintain benchmarks on assessment and differentiation and communicate important messages around the foundations for 21st Century skills. The Board is working to minimize obstacles to technology integration and encouraging collaboration and risk-taking. There were three meetings during which teaching staff led sessions on the sharing of best practices for their colleagues and explained the technology that they were using. 25% of teachers led sessions at the first meeting, compared to 92% at the final meeting. These three events (May 2015, October 2015, and April 2016) drew more than 600 teachers, in addition to school principals, IT technicians, and guests from outside the Board. In terms of the system as a whole, the roles of the stakeholders are continually evolving:

	• Students: more independent and active in their learning; increased levels of motivation and collaboration; use of technology; • Teachers: co-learners with students; training and mentoring colleagues; pedagogical use of technology for teaching and collaboration; • Parents: partners in their children's education thanks to better teacher-student-parent communication; IT support at home; • School principals: co-learners with staff; involved in student learning; encouraging risk-taking; technological leaders; • IT technicians: involved in use of tools for pedagogy, technical support, encouraging and sharing best practices; • Pedagogy coaches: coaching, mentoring.

District School Board of Niagara – Project #1

Project Title	DreamBox – Adaptive Mathematics Technology to Support Student Learning
Description	The DreamBox project is designed to meet the individual mathematics needs of elementary students through a computer-based program called DreamBox. This adaptive mathematics computer program responds to the individual needs of each student as they play through the activities and lessons within the program. DreamBox adapts to the learning needs of each student, and while it generally aligns with our Ontario curriculum, it is more focused on aligning with the current needs of each student developmentally (as determined by mathematical landscapes, including work by Cathy Fosnot). The technology provides students with contexts and links to models which enables students to make sense of the mathematics they are learning (e.g., a number line is introduced for fractions being created out of a bike race). Through the teacher's dashboard, student performance in relation to curriculum expectations can be accessed, which provides teachers with another assessment tool to track student achievement and progress. This data allows the teacher to further identify the strengths and needs of their students, both through in-class instruction and through DreamBox.
Context	*Number of students:* 19,148 *Number of teachers:* 777 *Number of schools:* 83 *Grades/Program:* JK-6
Impact on Students	Our DSBN Mid-Year assessment clearly demonstrated that DreamBox is having an impact on student learning in mathematics. Questions that related directly to the content that DreamBox is supporting from our Mathematics Curriculum were better answered than in previous years (according to teachers). The other exciting evidence came from the problems that were not directly related to the content that is learned through DreamBox. On these questions, many students (including those that teachers identify as struggling students) made use of the models that they had learned through DreamBox to solve problems. DreamBox is also impacting regular classroom instruction significantly. Teachers and instructional coaches are consistently sharing that their students are often solving problems and when asked about their thinking the response is, “I learned that on DreamBox”. The strategies, models and tools are moving from the computer into the classroom. DreamBox also provides similar responsive feedback that teachers give students during instruction. This allows opportunities for the students to be engaged in rich mathematics learning and receiving feedback from the program, while the teacher might be working with another group of students (at times during a math lesson).

Impact on Instruction	Teachers are better able to implement mathematics instruction that is appropriate for individual students as they are using the DreamBox Dashboard. Teachers are able to use this data to work one-to-one with students about the content that challenges them. When similar difficulties are being experienced by a group of students, teachers are able to use this data to work with that group of students on the concept or lesson they are struggling with. These decisions, that are being informed by looking at student data from the DreamBox Dashboard, are positively impacting student learning and teacher practice. Teachers are becoming more aware of their student strengths and difficulties, as well as seeing models and strategies that might support students to move forward though DreamBox. This program allows for a blended learning environment to exist and flourish. Teachers and students are using regular class experiences to share learning from DreamBox to extend and revisit regular classroom experiences. Teachers and students both are learning from the technology and each other, to different extents, and at different points in the learning. Teachers also have an increased ability to share student learning with parents through DreamBox and its Parent Dashboard. This gives insight to parents about their child's development. This helps to further strengthen the lines of communication about mathematics in the classroom, through technology and to the home.
Impact on System	We have worked to better inform educators across the system about the program and all of its benefits and connections to the curriculum. As teachers, administrators and superintendents have better understood the power in this responsive, adaptive technology, we have seen a significant increase in student usage. DreamBox is also helping the system to scale up our understanding of technology-enabled practices to engage students in learning the mathematics curriculum. DreamBox presents all concepts through visual models that help students to visualize what is happening in their strategies. These models help students to make sense of the mathematics they are doing by using their visual reasoning. The concepts which DreamBox underpin much of the mathematics students learn in our curriculum and thus help to provide every student with important experiences that research shows are foundational to mathematics understanding. As well, there are certain concepts in mathematics that some elementary mathematics teachers don't fully understand or know how to support students in learning. DreamBox is providing both the students and teachers with some of this missing knowledge and experiences in order to help the system learn mathematics more effectively.

District School Board of Niagara – Project #2

Project Title	Google Read & Write
Description	During the 2015-2016 school year the DSBN has worked to further integrate Google Apps for Education (GAFE) into the daily practice of our teachers and students. Weekly active users of Google Drive are up almost 50% from approximately 9000 users in September to 15,000 users in March. Our file count in Google Drive has steadily doubled over the last six months. Throughout the school year the DSBN has offered entire classes and individual teachers and students training using the Read & Write extension for Google. Due to its ease of use and unobtrusive nature, Read & Write became a natural fit as a "beneficial for some, good for all" tool. Read & Write gives users access to assistive technology regardless of their specific learning needs.
Context	*Number of students:* 10,000 *Number of teachers:* 350 *Number of schools:* 100 *Grades/Program:* K-12
Impact on Students	The use of Google Read & Write has steadily increased over the term of this project. Of the schools who reported their usage during the 2016 Grade 3 and Grade 6 EQAO testing period, between 70% and 80% of students requiring Assistive Technology chose to use Read & Write. Since the software is not mandated and there is choice within the DSBN for which Assistive Technology students can use, the high level of adoption indicates that both teachers and students are finding the software helpful and easy to use. Over the past two years, as Read & Write's adoption rates have increased, we have seen an upward trend in student achievement at the elementary level in the Reading and Writing strand of the report card. We have data that shows an increase in students achieving Levels 3 or 4 when we compare their achievement from the 2014-15 school year to the same cohort's achievement in the next grade in the 2015-16 school year. This trend is seen among students who have IEP's and as an overall trend in the DSBN. By providing Read & Write to all users in the DSBN, and by training whole classes instead of specific students, we help to remove the stigma surrounding the use of Assistive Technology. Since Read & Write has a diverse set of tools and all students are using GAFE, the students who need the software based on their IEP do not stand out from their peers.
Impact on Instruction	There has been an increase of adoption throughout the DSBN of GAFE based largely on the integration with Google Read & Write. As a result, we are seeing increases in teachers adopting a Blended Learning model using either Google

	Classroom or D2L. Both of these tools integrate with Google Read & Write. Teachers no longer need to provide specialized versions of content for students using Assistive Technology. This decreases teachers' workload and students requiring Assistive Technology do not stand out from their peers. In the past, Assistive Technology was only provided to students who had significant need because the technology was specialized and expensive. With our new model, the DSBN provides Read & Write to all users in our system. This has had an impact on how students and teachers use the technology. In the past, teachers did not have access to or training on how to use the Assistive Technologies that the DSBN provided unless they were in specialized areas like LRT or SERT. With the new model, teachers are not only trained to use the software but they are encouraged to use it to assist in their own work.
Impact on System	Although throughout this initiative Read & Write has been available Board wide, training has been ongoing for both teachers and students. As part of the implementation plan, board Consultants and Coaches have been trained on the use of Read & Write. This has helped to increase the speed of adoption throughout the DSBN. Central staff have been encouraged to find ways to integrate the use of Read & Write into their subject areas with the school based staff that they are working with. Also, many secondary subject-based Program Leaders have been introduced to Read & Write through their central learning meetings. These approaches have helped to reframe Read & Write from being thought of as a program for students who struggle with written language to being used by all student at all levels of proficiency. This initiative has changed the way that we see Assistive Technology being used in our system. Read & Write aids all learners in our system.

District School Board Ontario North East

Project Title	Making Student Thinking Visible by Redefining Our Tasks
Description	For the 2015-16 school year, our innovation research project will build off our 1:1 pilot projects from last year as we spread our 1:1 initiative from 3 classrooms to all grade 7 through 10 classrooms. Our inquiry question is: ***"What is the impact of a 1:1 iPad environment 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 to teachers on the effective use of iPad technology and the SAMR model, **THEN** teachers will use the iPad to transform/redefine their instructional practices." "**IF** teachers transform/redefine their instructional practices with a focus on fostering creativity, critical thinking & collaboration with the iPad as the tool, **THEN** students will be more engaged." "**IF** students are more engaged, **THEN** they will make their thinking visible through the use of the iPad." "**IF** students make their thinking visible, **THEN** teachers will be able to provide precise, timely, feedback." "**IF** students receive precise, timely feedback, **THEN** their achievement will improve." Our board has made a substantial investment in 21st Century learning by purchasing an iPad for each student in grades 7 through 10, and for all teachers. Not only has redefining learning been supported through a hardware investment, but also through a human resource investment with the hiring of 5.5 Innovation Coaches (iCoaches) to support teachers in the effective integration of technology. Each of these coaches works with a small group of schools to support teachers on redefining their tasks, and incorporating the iPad into their pedagogical tool kit. The iCoaches support teachers on three diverse levels, depending on the teachers' readiness. The first level of support is helping teachers with "iPad Essentials" and foundational skills. This level of support is focused on gaining technology skills and learning to use the iPad. The next level of support "Integration" which is focused on effectively integrating the iPad, and various applications, into classes and curriculum. The third level of support is "Redefinition" which is focused on redefining learning and helping teachers to reach the redefinition level of SAMR by using technology to make learning authentic, personalized, and real-world. When teachers can redefine their tasks and learning opportunities for students, students can develop the ability to be innovative and creative thinkers.

	While the iCoaches are working with all teachers in grade 7 through 10, they each will have 3 teachers with whom they will work closely to monitor the impact of the iPad on student learning and engagement.
Context	*Number of students:* 400 *Number of teachers:* 11 *Number of schools:* 18 *Grades/Program:* Gr.7-10, Language, Math, Science
Impact on Students	Our student survey shows that • 76.8% of students are using the technology in their classroom daily • 53.3% of students report that technology has improved their overall • 57.9% of students report that the technology has improved their organization. • 51.5% of students said they were more likely to complete assignments when using the technology. Our survey also asked students to reflect on how well the technology helped them to develop their 21st Century Competencies. Students reported the following: • 55.1% agreed the technology helped them to understand how they learned best, and how to be a self-directed learner • 58.7% agreed the technology helped them develop collaboration skills • 59.7% agreed the technology helped them develop communication skills We looked at how many students performed at level 3 or above in each strand for Language and Mathematics, as reported in the report card. We made comparisons based on how each cohort did against themselves. For example, we looked at how many students in grade seven this year, performed at level 3 or above, and then looked at how many students in grade 6 last year, performed at level 3 or above. Some results are shown below. **Grade 6 2014 to 2015** Language % of students at level 3 or above Media: 80.7% Reading: 61% Writing: 59.2% Oral Language: 76.7% **Grade 7 2015-2016** Language % of students at level 3 or above Media: 85.6% Reading: 69.1%

	Writing: 61% Oral Language: 70.7% **Grade 7 2014-2015** Mathematics % of students at level 3 or above Number Sense: 61.5% Measurement: 65% Geometry & Spatial: 77.1% Patterning & Algebra: 62.5% Data Management: 71.2% **Grade 8 2015-2016** Mathematics % of students at level 3 or above Number Sense: 64.4% Measurement: 76.2% Geometry & Spatial: 73.2% Patterning & Algebra: 81.9% Data Management: 75% ***<u>Secondary Achievement</u>*** **Grade 9 Credit Accumulation (% of students earning all credits)** 2014-2015: 79% 2015-2016: 85% **Grade 10 Credit Accumulation (% of students earning all credits)** 2014-2015: 75% 2015-2016: 79% **Grade 9 Applied Classes with Improvement in pass rates from the previous year** ENG1P: increased from 84% to 86% MFM1P: increased from 86% to 95% SNC1P: increased from 88% to 90% FSF1P: increased from 93% to 100% **Grade 10 Applied Classes with Improvement in pass rates from the previous year** CHC2P: increased from 92% to 96% ENG2P: increased from 87% to 93%
Impact on Instruction	The change in educator practice was monitored through an Educator Technology Profile (ETP) survey, from Apple Education. Our baseline survey, conducted in the fall, had 78% of teachers use of technology fall in the substitution category, and 22% in the substitution/augmentation category. This information was used to

	plan the types of teacher supports provided by the iCoaches. Many of our teachers still needed foundational supports on how to use the technology, and how to integrate it into the curriculum meaningfully. Our post ETP survey, conducted in June, showed 64% of our teachers' technology use being in the substitution level. 20% of teachers were in the substitution/augmentation level, with 6% being in the augmentation level, and 10% in the modification level. We also conducted a task analysis to determine where student tasks were placed along the SAMR continuum. As the iCoaches worked with teachers, they classified where the task fit on the SAMR model. In the fall, 92% of the tasks fit in the substitution level, and 8% fell in the augmentation level. This spring, 55% of the tasks fit in the substitution level, 24% fall into augmentation, 18% in modification, and 3% in redefinition. The data shows that our teachers are changing their practice, as they become more familiar with the technology tools they are using. School visits by innovation lead principal, superintendents, and the District Reviews were also used as part of the monitoring. As teachers and students became more familiar with the technology, the nature of the tasks started to change. Students are given more choice in how they show their learning, as they can choose a tool or application that is best suited to their learning style. Teachers have started shifting away from text based tasks, and allowing students to use more multi-media to demonstrate their learning.
Impact on System	This year represented a major scaling effort. The first half of the year, our iCoaches found their time was monopolized with helping teachers in the area of “Foundational Skills” on how to use the technology. However, as students became more familiar with the technology, they became the teacher support for foundational skills. We trained and organized a group of students in each school to function as “Digital Ambassadors.” Once teachers became more familiar with the tool, our iCoaches could shift their time to supporting teachers in redefining student learning by moving along the SAMR model and shifting out of substitution. To help ensure that pedagogy is the driver, and not technology, we have not made a specific section for technology in our Board Improvement Plan, nor our School Improvement Plans, rather, we have chosen to embed technology in the work we are already doing. This shift has resulted in the iCoaches and the curriculum coaches working closely together. The iCoaches support our curriculum coaches in effectively leveraging technology in the area of literacy and numeracy, and the curriculum coaches support our iCoaches in how to use high yield strategies. This alignment of work has helped to move our teachers’ pedagogy and our student achievement. The innovation lead, also works with senior admin, and principals, much like the iCoaches work with teachers, to

	ensure that they are co-learners and model the risk taking required to use technology as well. Having principals and senior admin on the same page has helped to move effective technology enabled pedagogy forward. Our innovation work from the previous year, with the 3 pilot classrooms, taught us that teachers need "just in time" differentiated support to move their practices forward. The project also required that we made major infrastructure investments to support mobile devices for learning. Investments were made in our: bandwidth, wide area network, access points, tablets, and storage. As well, a 4-year replacement plan has been drafted to ensure the technology is refreshed. This has required some careful budgeting and long term planning.

Dufferin-Peel Catholic District School Board

Project Title	Supporting the Implementation of the Creating Pathways to Success Document Focusing on the About Me: myBlueprint K-6 Electronic Portfolio
Description	Dufferin-Peel Catholic District School Board will be implementing the All About Me K-6: myBlueprint online student reflection tool board-wide. The board is interested in exploring a smaller pilot of schools to first implement the reflection tool with their students. The pilot will include 14 schools, comprising of 2 schools from each school family within the board. In particular, the goals for the pilot are to identify successful practices that support all learners in their own reflections, learnings, well-being and transitions through kindergarten to vocation. Additionally, this collaborative inquiry project seeks to support, through knowledge mobilization, teacher efficacy in the pedagogically effective use of the All About Me K-6 online portfolio. This online portfolio aligns with the Ministry of Education's document "Creating Pathways to Success," which suggests the usage of an online portfolio that further develops students' understanding of who they are and what they want to become. The pilot will provide opportunities to better understand the "real world" implementation realities associated with the launch of the All About Me K-6: myBlueprint online portfolio at a sample of schools. Secondly, the project intends to explore/develop a range of preliminary pedagogical supports and ideas for participating principals and teachers to help them integrate the All About Me K-6: myBlueprint online portfolio into their schools and classrooms. The findings and learnings from the pilot will be shared board-wide and incorporated into the supports provided during the system-wide implementation.
Context	*Number of students:* 850 *Number of teachers:* 56 *Number of schools:* 14 *Grades/Program:* K-6, SERTs
Impact on Students	Early-implementation and post-implementation data has been collected to assess educator perceptions regarding the impact of the All About Me: my Blueprint online portfolio, strategies for implementation, ideas for supports, improvements, etc. Preliminary findings have indicated that educators: • Commonly felt that All About Me is user friendly for students (40%) • Found that it took them a lot of time to go through the tool with students when the tool was first unveiled (30%) • Believe that some elements of the tool are too complex for certain ages to reasonably engage in (23%) • Suggested that diverse learners could benefit from more one-on-one support

	regarding this tool (20%) • Suggested adding more links to Catholicity through the addition of a badge relating to the virtues (41%) as well as the addition of reflections on faith experiences and/or perceptions (33%) • Observed that the most engaging aspects of the tool for students was collecting badges (40%) and exploring different career paths and jobs (19%) Post-implementation findings from educators supported many of the findings from the pre-implementation survey. Some suggestions for moving forward included: • Implementing the tool and differentiating supports depending on division to meet the unique needs of students and educators within different divisions • Ensuring a greater faith-based component is incorporated into the tool than is currently available • Providing additional resources to educators that would be made accessible to all, for reference at the convenience of the educator (e.g. FAQs document, how-to videos, etc.)
Impact on Instruction	Based on the data that has been collected it is anticipated that the impact of the K-6 All About Me: myBlueprint portfolio in our schools will be such that our students will have more opportunities for reflection leading to a better understanding of themselves as individuals and learners. Furthermore, this understanding will be non-evaluative in nature. Through this reflection, it is anticipated that students will have a deeper understanding of their own likes, dislikes, interests, future options and greater understanding of future transitions. Educators will continue to support students as they implement the K-6 All About Me: myBlueprint portfolio in order to develop the students' self-awareness and provide opportunities to students to make decisions, set goals, and create plans for achieving their goals.
Impact on System	A variety of system-level impacts have grown out of this project so far. Learnings to date have indicated a need to: • Establish a consolidated repository for all resources, to be accessible by educators to ensure continued, real-time support. • Develop/refine sample lessons and other resources with multiple entry points for educators to use in the integration of the K-6 All About Me: myBlueprint portfolio in the classroom/school. • Differentiate support of grades K-2, 3-6 and 7-8 as a recognition of the unique needs and supports required within each of these divisions. The K-6 All About Me: myBlueprint portfolio pilot project provided us an opportunity to work directly with the developer of myBlueprint in refining the

	tool to better meet the needs of both students and educators. Our experience has recently been shared with other boards with a focus on next steps and learnings. As a result of our sharing, our experience throughout our pilot project journey was affirmed regarding planned next steps, challenges and our plan for implementation.

Durham Catholic District School Board

Project Title	The Power of One (Phase II Learning Commons)
Description	Our current project is a continuation of our Round 4 Project: **The Power of One**. The project focused on three areas: One Portal (the creation of an online student/teacher learning portal), OneNote (investigating the benefits of OneNote in the Classroom and other cloud based tools within O365), and One Creed (Piloting "Footprints", a unit that combines the Catholic Graduate expectations and the 21st Century Competencies delivered via D2L). There has been significant scaling and systematizing for **Round 5**. We introduced OneNote into five more classrooms. These students are working in a 1:1 environment with HP 360's and their teachers are using Surface Pro 3's. **Phase 5: The Power of One (Phase II Learning Commons)** focused on the Learning Commons as a hub through which the learning from Phase 3 and 4 can be scaled up to a wide school level. TLF funding was used for both the technology in our New Learning Commons (Chromebooks, iPads, Desktop computers) and the professional development portion was used to in-service over 120 teachers and teacher librarians. They explored the "New Pedagogy", learned about the resources in our new Online Learning Portal (**LaunchPad**), and were introduced to OneNote and Footprints. Other areas, such as working in a BYOD environment, Digital Citizenship, effective use of iPads, and Coding and robotics were also explored. These teachers were given release time to work with colleagues on technology enabled teaching and learning back at their home schools. An online community was created via a SharePoint site for the teachers. This site has enabled teacher to teacher learning partnerships. By connecting the TLF and Innovation Research Project we were able to significantly scale up our initial project goals.
Context	*Number of students:* 355 *Number of teachers:* 8 *Number of schools:* 7 *Grades/Program:* Gr.7-10, 12
Impact on Students	The Power of One (Phase II Learning Commons) has had a substantial impact on student engagement, learning and achievement. First, with regard to engagement, we know that there has been a huge increase in the amount of students using the online tools within our virtual learning portal – LaunchPad. LaunchPad went online in September of 2015. The portal contains single sign on links to Desire2Learn, Office365, Lean360 and many more OSAPAC licensed resources. We can see that by May 2016, 9107 students had logged into the

	LaunchPad. That is an increase of over 230% from last year. Clearly, more students in our system are engaged in online learning than ever before! Student and teacher response to the new Learning Commons have been very positive. The physical space was designed to promote communication, critical thinking and collaboration and student well-being. We have continued to support the students and teachers involved in the 1:1 laptop initiative which started with our Phase 3 project and was expanded in Phase 4. Teacher and student interviews and surveys also indicate that using laptops and Office 365 – specifically OneNote -- has impacted student engagement. 100% of the teachers surveyed said that their students were more engaged when working in OneNote on their laptops than when they were working in a traditional binder. Teacher also indicated that using student laptops and OneNote improved student learning and achievement. 100% of teachers surveyed said that the combination of student laptops and OneNote improved student achievement. One teacher noted that there had been a "5% increase in student achievement". Also, teachers reported that they had more time to work with students during class time, were able to spend more time on "higher order" questions, and were able to cover more material than in previous years. These observations were verified by means of a student survey. Two-thirds of students surveyed indicated that they believed that using OneNote and laptops had a "positive effect on their learning". [S]tudents that used Office 365 found new way to collaborate, be it through email, sharing documents or through the collaboration space in OneNote. Teacher-Student collaboration was increased due to the fact that teachers were able to apply instant descriptive feedback to students.
Impact on Instruction	Teachers involved in both the 1:1 classrooms and Learning Commons schools were in-serviced on "new pedagogy" and technology-enabled teaching and learning. Of the teachers surveyed, 36% said they have changed their practice "a great deal" while 61% said they have changed their practice "somewhat". We have seen evidence of "new learning partnerships" in many ways. [T]eachers have taken the stance of co-learners in the classroom and are allowing more opportunities for students to lead the learning. Teachers are also beginning to involve students in Professional Development. Many teachers are bringing students with them to training sessions provided at lunch demonstrating that they are in fact "co-learners" in the area of digital technology. Our teacher librarians are increasingly taking a "lead learner" role as the Learning Commons becomes a gateway to 21st Century Teaching and Learning.

	Further, our teachers, with the support of our teacher librarians, are continuing to develop rich tasks that result in “deep learning”. They are finding ways for students to be knowledge and content “creators” rather than just knowledge and content “consumers”. Whether or not the tool for creation is within Office 365 or another piece of software, students are creating and sharing their work in new, and in the past, unimaginable ways.
Impact on System	Scaling up has been achieved through moving from looking at cloud-computing and OneNote in a 1:1 classroom environment to how a 21st Century Learning Commons can be the center for scaling up technology enabled teaching and learning in an entire school. The lessons learned in Phase 3 and 4 were utilized in Phase 5 with the Learning Commons and shared devices (Chromebooks, iPads, desktops …) as the focus. Also, the creation of Technology Integration Lead Teachers (TILT) through the Professional Development portion of our TLF has impacted our system. Teachers from every school in the system were trained on pedagogically-driven, technology enabled practices. These teachers have been able to request school-based release time to work with colleagues in the area of technology enabled teaching and learning. The availability of release this has increased teacher-teacher collaboration and done much to build capacity in the area of technology enabled teaching and learning. Further, our investments in new technologies for our libraries that are being transformed into Learning Commons have made them the technology "hubs" of their respective schools. The lessons we have learned from our 1:1 Innovation Projects are benefiting many!

Durham District School Board

Project Title	Cloud Learning through Mobile Technology
Description	The C21 Shift Document defines and lists the following 21st Century Competencies: Creativity, Innovation, Entrepreneurship; Critical thinking; Collaboration; Communication; Character, Culture and Ethical Citizenship; and Computer and Digital Technologies. Our project impacted student achievement and engagement within the competencies of Creativity and Innovation; Critical thinking, Collaboration; Communication; and Digital Technologies. The project focused on embedding technology into classroom learning, with a focus of mathematics and technology integration. The focus of this multi-year project has been to provide 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). 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, but always had an added focus of mathematics and technology integration.
Context	*Number of students:* 16,000 *Number of teachers:* 320 *Number of schools:* 110 *Grades/Program:* Gr.5-8, Mathematics
Impact on Students	Our project impacted student achievement and engagement within the competencies of Creativity and Innovation; Critical thinking, Collaboration; Communication; and Digital Technologies. The project focused on embedding technology into classroom learning, with a focus of mathematics and technology integration. Student impact was measured through a survey of all teachers participating in the project which contained both open ended and Likert scaled responses. In the DDSB, we use the term "Technology at the Point of Learning" when referring to students specifically using technology within a learning context. This is unlike the "Technology at the Point of Instruction" label which describes a more traditional teacher-led and technology in the hands of a teacher approach. 96% of teachers have responded that the frequency of student use of technology has increased because of the project. This is an important statistic for our district

	as past observations of most junior and intermediate classrooms would describe student use as occasional and periodic and based on access to a central lab or mobile cart signed out for a "tech. session" rather than regular or frequently. Most teachers have tended to favour "Technology at the Point of Instruction." The impact of increasing the student use of technology at the point of learning is a benefit as it could be argued that it provides the student with the potential of a learning environment which is more personalized, collaborative and differentiated. Teachers were asked to report on "how" students were using the technology in this project. The most frequently reported uses of the technology by students were for Inquiry (96%), Word processing (95%), and the creation of Multi-media presentations (91%). Though word processing and multimedia presentations results are traditional use for computers in the classroom, Inquiry (91%) and as well Library Learning Commons (51%) have been an important focus of project training in the past year to complement curriculum initiatives. It was heartening to see this use which clearly is related to the 21st Century Competency of Critical Thinking. Also significant was the report that 55% of students use the technology for collaboration within the DDSB Campus and 24% using the technology to interact with the district LMS (D2L/Moodle). Both of these components linked directly to the 21st Century Competency of Collaboration and Communication. The open ended prompts with respect to "how" students used technology specifically in the area of numeracy indicated that students were using technologies such as using mathematics websites for remedial work and game play. These two areas suggest a greater personalization and differentiation occurring with the use of technology in the math classroom. 61% of teachers reported that students were using personal devices to supplement school provided technology and 63% of teachers reported they were using this technology either regularly or frequently. All students in our sample classroom survey reported a desire to see a greater number than the allotted laptops. Teachers were asked to rate their perception of student achievement with respect to the project both in terms of everyday classroom subjects as well as specifically considering numeracy. 79% of respondent teachers report that student achievement increased or significantly increased with the project's allotment of technology and cloud links for the classroom. Most teachers highlighted the greater access that was made available to students by placing the pods of laptops in the classroom as well as the greater engagement of their students for everyday learning as the major impacts on student learning. Also significant were the reported ability of students to use the devices for the

	purposes of inquiry and for the student to differentiate the inquiry or content. In terms of an impact specifically in the area of numeracy, 59% of responding teachers perceived that student achievement either increased or significantly increased. 40% reported that achievement was not affected by the presence of the devices. Though we are optimistic that these results reflect a “first year implementation” focus of math and technology and the complexity of some online math software applications, and a desire to focus on hands-on manipulatives rather than virtual and a lack of resources online to engage students.
Impact on Instruction	90% of teachers responding to our survey report that they use the project equipment and training “at the point of instruction” either frequently or regularly. Furthermore 86% of respondents report that the frequency of their technology use in classroom as increased. Though these are very positive data, it is of interest to see 90% of teachers reporting that they are using technology at the point of learning and 95% of them reporting that this is an increase before the project was initiated. 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 positive note regarding 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. Themes emerging from open responses include a preponderance of teachers reporting that the technology in the classroom aids and supports guided grouped learning in their classroom practice. Teachers report that the technology allows for a more engaged approach to grouping the class as well as providing a personalized learning experience for students.
Impact on System	This project is aligned with our district teacher technology allotment program in the elementary panel. This initiative, because of its impact and size, is linked directly to the Board’s annual System Improvement Plan and provides a technology solution for all affected teachers and students. More specifically, within the district Board Improvement Plan, curriculum and program delivery will “Embed technology to assist students in developing skills within a global context where teaching and learning is collaborative, innovative and creative.” The plan further demands that “Teachers will: employ 21st Century technologies, at home or in the community, as responsible digital citizens.” Collaborating with application design experts from Unlimited Viz and our own Technical and Information Services department, our initiative provides a one stop and easily accessible online portal for all mobile devices both in the classroom and at home. Online classrooms are automatically created and updated as

	necessary for students and teacher access and secure and safe online collaboration is provided through the Office365 environment. The DDSB Campus was created as an online portal for all students which provides a direct link to resources offered by the provincial Ontario Educational Resource Bank through the provincial VLE D2L as well as to our own LMS (Moodle) and collaborative space through O365. All students have the ability to enter this student portal using mobile devices within the classroom and collaborate together on inquiry projects, lessons and assignments. The use of an allotment model for technology pods of laptops in grades 5-8 which was developed by representative Superintendents of all municipalities in the district and principal associations ensures that the technology hardware that is used across the district is standardized and proportionate to the number of classes in each school. This policy ensures an equitable allotment of opportunity for technology use for all schools. One of the most important organizational outcomes of this initiative was the reframing of the decision making and planning structures for educational technology. In the past 5 years (and very key to this multi-year project), a consolidation of interdepartmental cooperation has been created. The Technical and Information Service department staff managers regularly meet with Program Services department personnel to ensure that applications, networks, student portal access requirements, hardware and software purchases etc. meet both the needs of the district's infrastructure, but also meet the needs of teachers and students. This project has focused the decision making and responsibilities for training, support and acquisition and now allows are district to quickly make decisions on a scaled level for 71,000 students and 5000 staff in an efficient and much more collaborative manner.

Grand Erie District School Board

Project Title	Ed Tech Student Groups
Description	"Ed Tech Student Groups" is a new, formalized approach to including student leaders in the process of teaching others (staff and students) about technology enabled learning and teaching in Grand Erie. We have invited students 3-4 students from each of 15 schools to begin the process of establishing teams in schools that can support staff and students in their respective schools with the use of Ed Tech tools. The support may look like: sharing at staff meetings, setting up a "drop in" center, presenting to classes of students, or creating "how to" resources. Our pilot group of students will be released with their staff advisors to join in 2 full days of professional development in March and April. At these sessions, they will learn about various routine tablet troubleshooting, digital citizenship, and several different digital tools available to staff and students in Grand Erie. Then they will help support further rollout to all the other schools in the Board. We are also developing a course in BrightSpace/D2L where our student leaders can learn more about various Ed Tech tools and earn badges to become certified to support a variety of digital resources. All student leaders will also be able to collaborate within this BrightSpace course to share their learning and support each other through this professional learning network. Our intention is for these Ed Tech Student Groups to grow in every school as an Ed Tech support channel for each school community. This new form of support will benefit the student leaders as they develop new skills in the uses of technology by attending our workshops and by teaching others. It will also help them build leadership skills and further develop in all 21st Century Competencies.
Context	*Number of students:* 60 *Number of teachers:* 18 *Number of schools:* 15 *Grades/Program:* K-12
Impact on Students	Our main goal with our ESC students (Ed Tech Student Groups) is to create a learning environment that is more connected to the real world. We want to make a difference with these student groups and get to deeper learning for all (teachers and students alike). <u>Connections to the 21st Century Competencies:</u> • Critical Thinking & Problem Solving – Students participated a "Tech Quest" where they had to solve various technical issues as well as digital resource questions that support teaching and learning with technology. All of these were real-life examples that teachers and students see in the classroom on a

	regular basis and need to troubleshoot and solve effectively and efficiently to support learning. • Innovation, Creativity, and Entrepreneurship – Students learned about effective creation of "How To" resources so they could begin to create digital resources to help support their teachers and other students in their schools. Students spent time creating their first "How To" resource together with ESC students from other schools. • Learning to Learn/Self-Aware & Self-Directed Learning – Students observed a variety of role playing scenarios to consider various aspects of customer service since they will be working with a variety of learners coming from different entry points. Students were then asked to discuss with their group and then suggest various improvements to the scenarios. As they work through various mini courses and earn badges for successfully showing their understanding, students must be able to monitor their own learning as they progress. • Collaboration – Students participated in team meetings with other ESC students in their own school and worked with students from other schools. • Communication – Students returned to their schools to share their new knowledge with staff and other students in their schools. Some presented at staff meetings; some join classes to present to groups of students. • Global Citizenship – Students made connections with others ESC students from other schools (outside of their own school community). Through our work with the ESC students, there are greater opportunities for sharing (within schools and between schools). Student isolation is reduced and relationships among students, between students and teachers, and among teachers are developed. We anticipate further impact on students as we move forward with our ESC teams and as we scale up to include more schools and more students per school. We intend to collect more data around the future implementation.
Impact on Instruction	The focus of our initiative was not on teacher practice (at the onset). Our focus was on supporting students on the ESC teams so that they could feel comfortable in supporting their teachers and other students in their schools. We did have some direct impact on the teachers (Staff Advisors) who joined in PD with their ESC team students. We also developed some online tools to help with overall management and sharing. [W]e learned that the establishment of ESC teams has resulted in teachers being more willing and able to leave more progressive (technology dependent) lesson plans for Occasional Teachers. Knowing that students in the class understand what technology needs exist, allows for Occasional Teachers to support the class

	in more similar ways to their regular classroom teacher. Teachers not involved as Staff Advisors were also impacted by the supports provide by the ESC teams as students returned from central training days to share with teachers help support learning their classrooms.
Impact on System	Round 5 of the 21st Century Innovation Research Initiative was not a system rollout, but rather a pilot of our new concept around “Ed Tech Student Groups” Our initial goal was to include students in the learning and teaching experience to help scale up the Ed Tech movement in Grand Erie and help us have a deeper impact at the system level. We wanted to tap into students’ skill sets to help further teachers’ skillset (as well as that of other students). We have shared details and goals of our Ed Tech Student Groups with all administrators via monthly “Director’s Meetings” and have shared with trustees and other stakeholders. Building forward, we plan to expand and scale up to include more schools next year. Specifically, we intend to include the pilot students in helping us train students from other schools. We also anticipate the ESC teams expanding within the existing pilot schools. There are many other exciting and powerful learning opportunities around student and teacher use of technology that we are working on into next year and we continue to seek to share with others on our own successes and the successes of other Boards. Attendance at conferences helped …contribute to knowledge mobilization around technology enhanced teaching and learning around the province. We’re also building towards development of a Library Learning Commons model and we’ve connected with leaders in the Thames Valley District School Board to learn from their TLF experience around Learning Commons development this year.

Greater Essex County District School Board

Project Title	System-Wide Implementation of Technology-Enabled Pedagogy to Support Higher Order Thinking and 21st Century Competencies through Building Capacity of Formal and Informal Leaders and Connecting Board Improvements Priorities
Description	We are focused on different approaches to supporting change through our formal and informal leaders including: **Edsby**: We are implementing the "Edsby" tool focused on our secondary panel. The first phase is to use it for electronic attendance a task that every teacher must complete and in turn will become comfortable with the navigation aspects. Teachers will then move towards using the assessments tools and online classroom/LMS features. We are working with every secondary department head assessment practices linked to this tool, and tracking changes in practice. Whereas in other years our focus has been on inspiring change through changes in pedagogy, this focus on assessment allows us to move through this process in reverse, where teachers are realizing the benefits of change through assessment practices and the student experience. **System-Wide Professional Learning Support**: We have replicated our "Digital Learning Team" model from last year and applied it to our math focus. Every elementary teacher will receive professional learning to support the GECDSB Math Vision (https://publicboard.ca/Staff/Teachers/Pages/GECDSB-Math-Vision.aspx) and to consider the role of technology in supporting math learning. The PD focuses on changes in pedagogy for deeper learning, connecting to real-world tasks and learning through problem solving. A team of OT's will be delivering exciting math lessons and engaging the students in collaborative math learning while their teachers are in their sessions. **Partnership Priorities:** 1. Our 5th "EdCamp" event involves a partnership among GECDSB, WECDSB, and LKDSB. This year linked to math learning with a technology focus. Marian Small is presenting a keynote address and breakout sessions. Relationships between educators from across boards are strengthened. It is a key to our knowledge mobilization efforts, and inspires our teachers to try new ideas in the classroom. 2. An established partnership with the University of Windsor to support teachers in collaborative inquiry projects. We have expanded the learning in this group to include teacher candidates, our occasional teachers, and our contract staff. During this work, teachers explore new pedagogies, changes in practice, and ideas such as the global competencies, social justice, and project-based approaches to learning. 3. A new partnership with the Royal Conservatory in an advisory and pilot capacity. They are interested in expanding their definition of, and supports for,

	arts in the curriculum to include media arts and media literacy. We will work with teams of teachers across several schools to contribute to the development of provincial and national supports for teachers and students. **Coaching and Research**: (This work has been impacted by the labour situation.) Relying on the expertise of a coach we are exploring the following inquiry questions: 1. Where and how can we use technology to enhance mathematical literacy, specifically procedural knowledge, conceptual understanding, adaptive reasoning, strategic competence, and a positive disposition towards math learning? 2. How do we use technology to enhance the mathematical learning environment through the use of video creation and multimedia representations of mathematical thinking? 3. How does the use of technology support increased math discourse and further opportunities for metacognition? 4. How does the use of technology within a "Three-Act Math" structure contribute towards becoming mathematically literate? 5. What is the role of technology in supporting students creating their own mathematical models and representations and what impact does this have on their learning? 6. How is the instructional core in a mathematics class impacted by the implications of a SAMR approach to technology integration? 7. How does technology enhance mathematical learning for students with a traditional gap in achievement such as our English Language Learners, Mennonite and FNMI populations, and students with a learning disability? **Investment in Leadership:** All Principals will the Connect Conference April 2016. This will be one component of a larger capacity building effort that will also include sessions with lead teachers in each school and the implementation of program reviews for technology and school walk-through/observation templates and protocols. All of the work we do will be linked to School Improvement Plans for Student Achievement and Well-Being, and will be based on the ideas that we are moving innovations to scale.
Context	*Number of students:* 35,141 *Number of teachers:* 1,807 *Number of schools:* 72 *Grades/Program:* K-12, Mathematics and Assessment Practices
Impact on Students	There are a large number of factors which influence improvements in student achievement. … to say the TLF alone has resulted in measurable, sustainable,

	systemic improvements in student achievement might be a stretch. It has certainly contributed significantly, but in isolation there is a limit to the impact.[W}e do know that the TLF has contributed to refining the focus on the use of technology in our schools, to building the capacity of formal and informal leaders, to supporting evolutions in pedagogy, and to creating conditions for innovation to occur. Our classrooms look like they belong in the 21st Century because of this work. We have some student achievement data to support these assertions … using our most recent EQAO data (June 2014) as a starting point. We believe increases in student achievement occur when there is: • Capacity built with the formal and informal leadership in the school • Sufficient resources (including technology, infrastructure, and professional learning) are provided to support change • A specific focus through the work of school improvement to address student learning needs • A collaborative learning culture among staff • A willingness and ability to evolve teaching and learning conditions, and a deepening of pedagogical understanding For the time of the 2014 EQAO testing, these conditions were met in six of our schools. We anticipate eagerly the 2016 EQAO data, as we believe all of these conditions are now fully evident in 28 of our Elementary schools. We also believe that some of the conditions are evident in our remaining schools. We have spent this year trying to focus on changing assessment practices to reach more consistent and valid measures of student learning. Because valid benchmarks don't exist due to the changing expectations of the teacher, quantitative measures that support this work are hard to ascertain. What we do know, through surveys, observations, and teacher reports, is that the following things are making a difference: • Use of mobile technology (iPads) to support students with creative process and multimedia, specifically in early years and primary. • Use of iPads screen-recording tools such as Explain Everything to encourage student conversations and reflections, and apply the creative process to their work. • Use and adoption of specific board supported platforms to create consistent practices for communication and collaboration and to support students in their personal organization. • Use of games to support students in developing problem solving habits of mind.

	• Use of some digital manipulatives to support math learning. • Use of blogging platforms, including micro-blogging and social media, or places for students to publically share their work with the class and beyond. This is impactful K-12. • Use of YouTube to share video creations, including with family and the community. • Access to information and the ability to make connections locally and globally, through communication tools. • In our secondary schools, use of a "Flipped Classroom" approach using technology. • Use of interactive technology in Early Years and primary to support small group instruction and students working in independent centres. We have also determined that significant numbers of students in both the elementary and secondary panel have been using the tools regularly. Across the system, 75% of grade 7 and 8 students are regular users of their accounts, with over 80% in grade 9 and 10 also using regularly to enhance their learning. The usage data also showed the students and classes as young as grade 2 are using the tools to enhance their learning.
Impact on Instruction	An important note is that two factors have contributed to less change in teacher practice this year than previous rounds of TLF funding. Firstly, the union sanctions and subsequent impact on professional learning significantly delayed our work this year. The second is that we were looking less at changing practice and more at spreading the changes from the previous four years of this work. This has meant more indications of changes or challenges to student learning, and less changes to teacher practice as the focus has been on fully implementing previous or emerging practices. Many schools who had previously had a focus on technology as part of the SIPSA now feel that technology-enhanced pedagogy is understood and implemented. The use of Board purchased tools and overall bandwidth has become a better indicator of technology-linked instructional change. Using tracking statistics from our system, we have been able to ascertain both student and teacher use of our current Office 365 tools. We have found that 100% of teachers have used the tool for email in the last 30 days, while a significant number have used tools within the cloud suite, indicative of, or a precursor to, changing practices in the classroom. A significant number of teachers engaged in the EdCamp learning with a view to changing practice. As well, the Connect conference gave our principals considerable new thinking and ideas, which we expect to see reflected in the next SIPSA cycle. We are through the learning about technology phase of this spread of

	implementation and are now looking at the application to change learning. We needed a concerted, organized approach to reach every teacher in the system and build a foundation level of knowledge and understanding of new digital tools and their impact on teaching and learning. With this as the background, our "Digital Learning Team" was created. This team consisted of: 1 Vice-Principal Lead Facilitator, 1 Teacher Leader Facilitator, 16 Elementary Occasional Teachers, 10 Secondary Occasional Teachers. The aim of this project was to spend a half day providing professional learning for every teacher in our system from Kindergarten to Grade 12, focused on the digital learning tools available through our board. For the half day that the teachers are engaged in their professional learning, they are covered by a member of the occasional teacher team, who collaboratively planned a half day of learning for students in every grade to explore digital citizenship and responsibility, as well as implement the themes of the boards new "Digital Responsibility" policy. We have invested in the Edsby Learning Engagement System. Our implementation began in January 2016 with a focus on our secondary panel. Initially the board has mandated the use of Edsby just as a tool for taking electronic attendance, but has allowed teachers to explore and use any features they wish beyond this, leading to an unprecedented level of innovation and self-directed educator learning. There is significant evidence of the changing nature of teacher-student communication and collaboration, teacher-teacher communication and collaboration, and student-student communication and collaboration. Technology enhances the math environment when the teacher has sufficient math content knowledge, sufficient pedagogical understandings, and sufficient pedagogical understandings related specifically to the domain of mathematics. These conditions were not frequently evident. We supported a math learning model that involved two administrators leading a half day learning for every elementary teacher in their own school, to begin to articulate our board vision for math learning… the use of digital cameras and recording devices, and the availability of screen capture tools such as Explain Everything, have been a major contributor to new pedagogies in the math classroom. The use of digital cameras and recording devices, and the availability of screen capture tools such as Explain Everything, have been a major contributor to new pedagogies in the math classroom.
Impact on System	Our intent through the course of the TLF projects has been to create the conditions where every classroom can be innovative, as we have the tools and infrastructure in place, the support and guidance of knowledgeable formal and informal leaders, and the freedom to explore based on the needs and interests of

	students. We have tried to understand and provoke innovations, and then bring them to scale through increasing the capacity of formal and informal leaders to influence and change pedagogy in all of our schools. We have committed to, and will continue to, align the work to the BIPSA and priorities of the board. The work of the CODE/TLF has led to a review of our current board governance structures for Information Technology. In order to leverage the learning from the work, a broader stakeholder base is needed in system decision making, and a more refined focus on the use of technology to support teaching and learning will be developed. We have had a prolonged, sustained focus on building the capacity of formal and informal leaders to support the evolution of technology-enabled teaching and learning in their schools. This has included ongoing school-based supports, central offices support, and opportunities to attend conferences and learning sessions such as the Connect 2016 conference. We have had several different learning models for educators in our system. The model that we used for Digital Learning during 2014-2015, where a team of occasional teachers works with a facilitator to provide learning for educators and students has been adopted this year as a structure to support math learning, once again allowing us the chance, through collaboration and intentional alignment, to provide consistent messaging and learning opportunities to every teacher in the system.

Halton Catholic District School Board

Project Title	K-12 School Team Collaborative Inquiries
Description	The purpose of our project continues to be the development of 21st Century competencies in teaching and learning system wide as defined by our board's 21st Century blueprint through the use of inquiry-based learning. Embedded within this model is the supportive role of technology to enhance the achievement of the 21st Century competencies in ways that may not be accessible without it. Our focus for Round 5 continues to be scaling up our professional learning model – school project teams engaging in collaborative inquiry tied to our board's 21st Century outcomes. To support this focus we have initiated the following projects: 1. School team collaborative inquiry projects - K-12 2. Learning commons and teacher collaborative inquiry – secondary 3. Release days for previous participants wishing to build on last year's inquiries 4. Online professional learning modules In addition we are expanding the scope of our inquiries to more specifically include the impact on student learning.
Context	*Number of students:* *Number of teachers:* 142 *Number of schools:* 29 *Grades/Program:* K-12
Impact on Students	HCDSB has identified 6 domains of 21st Century Skills and Competency framework. They are: a) Creativity and Innovation, b) Digital Citizenship, c) Research and Innovation Fluency, d) Communication and Collaboration, e) Critical Thinking, Problem Solving and Decision-Making and, f) Technology Innovation and Concepts. Collaborative Inquiries: Each inquiry was coded for evidence of the competencies. The most common competency demonstrated by the teams was the use of Technology Innovation and Concepts, followed by Communication and Collaboration. The data informing the evidence of student achievement and impacts were realized at the collaborative inquiry level, that is, each educator team systematically collected pre and post, or other assessment of/for/as data that was relevant to their theory of action. As a board, we focused on scaling up practice and innovation, and did not analyze the student outcomes, as we believed that the ownership of the impact lived with the inquiries and the educators-student teams.

Impact on Instruction	We asked all our collaborative inquiry teams to provide reflections on their learning so that we were able to discern impacts. In the context of the International Society of Technology and Education (ISTE) teacher standards, our educators demonstrated strengths in the first standard, 'Facilitating and Inspiring Student Learning and Creativity' - and this could be seen in any of the inquiries that focused on student inquiry, research skills and encouraging self and peer assessment. We also captured evidence of number fifth standard, 'Engage in Professional Growth and Leadership' – in almost all of the inquiries, educators demonstrated ownership and agency. Educators shared decision-making responsibilities, applied technology creatively, and demonstrated a high level of professionalism. Of the reflections, we noted that many of the educators were engaged with the technology, and employed and modeled the same 21st Century skills and competencies expected of the students. Educators were not only engaged deeply in their inquiry projects, but were excellent at embedding the tools and equipment into their practice. As the system team, we felt that the one thing missing from the momentum and work was the idea that the educators could not readily map the 21st Century competencies and skills onto their pedagogy. Moving forward into the next iteration, we need to figure out how best to measure the less tangible skills as part of our scaling up so that educators are able to explicitly articulate of the connections between their work in inquiry, the 21st Century competencies, the SIP, BIPSA and board strategic vision and as how we do business at HCDSB.
Impact on System	[Collaborative Inquiry teams] submitted reflections on a) their preferred future, b) their inquiry question, c) their theory of action, d) what they had learned, e) how they incorporated the learning into their practice, f) the impact on the student learning, g) share their Ignite presentation (final consolidation task), h) identify what their next steps were and what their new or updated inquiry question is going forward, and last, i) provide overall feedback about the process. The researcher analyzed the reflections submitted by the collaborative inquiries. Out of the 21 inquiries many teams focused on more than one competencies. Seven inquiries focused on peer or self-assessment strategies, six on collaboration, six on student inquiry, and four on descriptive feedback. By using a rubric for assessment, it became clear where HCDSB's strength areas are, and which areas we need to focus on the next few years. *Results* <u>Impact of actions we took to **deepen** the power of our innovation model.</u> Evidence collected showed that the educators dug deep into the subject matter of interest and in doing so, they were able to change student expectations

	through effective instruction. 66% of our collaborative inquiry groups engaged in deep actions that affected instructional practices. The data showed we need to work on emphasizing more of a co-learning stance with educators in order to explicitly recognize connections between student voice and their own learning. <u>Impact of actions we took to make our innovation model **sustainable**.</u> 33% of our teams were able to provide evidence in this area... some of our teams struggled with being able to balance collaborative inquiry work within the day-to-day practices… there was less evidence that the collaborative work permeated beyond the group themselves to the whole school or beyond the school's learning communities. There were several teams who were successful in engaging all divisional partners, and a few were successful in engaging the entire school. Several teams demonstrated evidence that the administrator was an active participant in their collaborative inquiry however, for the most part, the work lived in the participating educators' classrooms. We believe that meaningful and complex reformative change take time for true sustainable impacts to take hold across multiple barriers within and outside of the school. <u>Impact of actions we took to **spread** our innovation model.</u> 34% of our collaborative groups provided evidence of spread in innovation. The largest gain in spread was reflected in the change of pedagogical principles. Educators utilized modified flipped classrooms, blended learning, utilized technology for student self and peer assessment, delivered innovative lessons, collected assessment data systematically to inform their inquiries, and really pushed the employment of student inquiry successfully. <u>Impact of actions we took to facilitate the **shift in ownership** and evolution of our model.</u> Within this domain HCSDB was successful at giving collaborative inquiry groups the authority and autonomy in their inquiries, and the knowledge lived with the teachers. Forty-two percent of our collaborative inquiry groups were able to show that they owned their own learning and the leadership was shared. In the cases of collaborative inquiry involving early childhood educators and the teachers working together or in examples where there were multi-divisional or cross-departmental influences, distributed leadership was clearly evident.

Halton District School Board

Project Title	Innovations Halton
Description	The purpose of the project is to provide school teams with the opportunity to engage teachers and students in learning experiences that focus on pedagogies for deeper learning, innovative practices and the use of technology tools to enhance learning and learning partnerships. The Halton District School Board is examining "The Impact of School-Based Innovation Projects on Student Learning". Multiple schools (elementary and secondary) are involved in teacher led projects focused on student learning opportunities incorporating technology. Each school submitted a proposal identifying an innovative idea targeted to increase student achievement and connected to the Halton District School Board’s Multi-Year Plan (2012-2016). They follow an inquiry approach and will be asked to submit their final reports at the end of this school year. There are 11 projects in this round focused on student and inquiry and the use of technology to enhance learning opportunities causing increased engagement, collaboration and deep learning. There will be a sharing event for these teams at the end of the school year in order to spread the learning across the system. Previous rounds have focused on Cloud-based learning environments. We are carrying forward with the same learning outcomes of our original projects (Bring I.T. and Cloud-Based Learning). We are focusing on GAFE (Google Aps for Education) in this round as well. Our research and data from Rounds 1, 2, 3, 4 showed we have moved well past the “early adoption” phase of both BYOD (Bring I.T.) and the use of cloud-based learning environments for a number of reasons (e.g., access, cost, efficiency, quick learning curve, manageability, equity, etc.).
Context	*Number of students:* 1,776 *Number of teachers:* 72 *Number of schools:* 11 *Grades/Program:* Gr.1-8
Impact on Students	Alexander’s Public School: • Students demonstrating stronger vocabulary as well as their overall understanding of the “Steps to Inquiry” • Students demonstrated increased ownership of their learning Dr. Frank J Hayden Secondary School: • Students noted when they miss the physical aspect of the course, they feel the impact • Students were fully engaged in their own performance and they were observed helping and encouraging their peers

	<u>EW Foster Public School:</u> • General atmosphere in the classrooms has been calmed down through lighting, decor and noise control • Collaboration, there was a 15% improvement, for Initiative, there was a 23% improvement, for Self-Regulation, there was a 26% improvement. <u>Forest Trail Public School:</u> • Primary: at beginning of the unit, 75% of students were achieving levels 3/4; at the end of the unit 88% of students were achieving levels 3/4 • Junior: students learned through integrated technology and technology drove the learning in multiple subject areas • Intermediate: increased student engagement with 71 % of students reporting preference to integrated learning; 75% of students increased their achievement by a half level or more <u>Harrison Public School:</u> • MakerSpace promoted inquiry based learning and celebrated diversity in learning styles and diversity of solutions found • 78.3% of students identified that they like working with others to solve problems <u>Irma Coulson Public School:</u> • Student metacognition shifted towards the thinking and solving versus the recalling of math procedures • Increased student self-awareness <u>Oodenawi Public School:</u> • 96% of students reported that they were focused during design and technology class • 96% of students reported that they enjoyed designing, planning and building activities to learn about science, social studies and math <u>Pine Grove Public School:</u> • Greater grasp of concepts by students • Greater student engagement in learning <u>Sam Sherratt Public School:</u> • Students enjoyed using Google hangouts as a way to collaborate • Alternate learning environments and learning how to communicate and collaborate between schools <u>T.A. Blakelock Secondary School:</u> • Students were able to use common terminology and language • 20 out of 21 student earned a level 4 or higher on their sport/game strategies evaluation

Impact on Instruction	<u>Alexander's Public School:</u> • Shift from teacher led to student led learning • Organization of units have shifted from direct instruction to a collaborative inquiry approach to learning where teachers are facilitating curiosity <u>Dr. Frank J Hayden Secondary School:</u> • Teachers build capacity around personal wellness and mindful practices • Teachers are building resources to support other staff in this learning <u>EW Foster Public School:</u> • 80% of the Primary teachers surveyed as part of the project now provide access to a variety of seating options during instructional time, • 70% have incorporated a variety of work surfaces to accommodate differing needs and 80% of the teachers have incorporated more natural elements into their classrooms, to provide a calming atmosphere. <u>Forest Trail Public School:</u> • Teachers learned how to use the technology and modify instruction for the younger students to keep them engaged • Teachers refined their planning, pedagogy and assessment while emphasizing 21st Century competencies as part of inquiry based learning <u>Harrison Public School:</u> • Teachers stated that MakerSpace 'promoted critical and creative thinking skills' and that it 'creates and environment of risk taking and perseverance' <u>Irma Coulson Public School:</u> • Increased capacity building and thinking out loud with colleagues reinforced the power of integrated math instruction <u>Oodenawi Public School:</u> • All teachers also identified the intent to plan and integrate design and technology into their teaching in the future <u>Pine Grove Public School:</u> • Increased use of integrated teaching between the English and French teachers <u>Sam Sherratt Public School:</u> • Promotion of learning partnerships between teachers and deprivatization of practice • Increased effective use of technology in the classroom <u>T.A. Blakelock Secondary School:</u> • Teachers became the facilitator of student learning

Impact on System	The foundation for the FDK-to- Grade One bridge has been laid, and the work continues. Overall, the project has served to inspire and equip not only the teachers involved in the project, but colleagues throughout the schools to reflect on their practice and to take risks to go deeper in their understanding of their learners. This growth is evident in the transformed-and still transforming physical learning environments, in the explicit teaching of and provision for student self-regulation in these classrooms, in the increased access and comfort with technology for both assessment and learning, and in the enthusiasm for the rich learning opportunities that inquiry-based learning will provide for our 21st Century learners. The encouragement for innovation in the district and the direct investment of monies into innovation has caused a synergistic impact which has spurred additional innovation.

Hamilton-Wentworth Catholic District School Board

<table>
<tr><td>Project Title</td><td>Deepening Technology-Enabled Practices Among Educators</td></tr>
<tr><td>Description</td><td>Round 5 is designed to further support student achievement and student acquisition of the Ontario Catholic Graduate Expectations which encapsulate 21st Century skills including: critical, creative, and innovative thinking; communication; collaboration; and ethical citizenship. The Initiative is grounded in key learnings gained through past years' Innovative Research Projects and is 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 expands the 2014-2015 Junior Divisional Innovation Research Project to include all 49 schools and 122 teachers within two research projects. Both projects are exploring how the provision of mobile technology for teachers coupled with focused support in its use, impacts the development of educator learning partnerships and instructional/assessment practices that incorporate increasingly sophisticated use of technology. Project A involves teachers from all schools within HWCDSB, while Project B is a school-based research initiative.

Project A – HWCDSB <u>Board-Wide</u> Innovation Research Project

Project participants are divided into five groups. Each group formed a professional learning community that involves participation in four collaborative learning sessions. The learning sessions incorporate basic iPad training; focused discussions on 21st Century Competencies, deep learning, and the TPACK model; lesson analysis in light of the SAMR Framework; and the introduction and sharing of various apps and web tools that support evidence based research instructional practices and deep learning and assessment practices.

Project B – HWCDSB <u>School-Wide</u> Innovation Research Project

The project cohort is comprised of teachers with varying initial comfort levels and experience in using technology to support teaching and learning. Project participants have been divided into two groups: Primary and Junior/Intermediate. Each group has formed a professional learning community utilizing three half-day collaborative learning sessions.</td></tr>
<tr><td>Context</td><td>Number of students: 3,341
Number of teachers: 124
Number of schools: 56
Grades/Program: FDK-12</td></tr>
<tr><td>Impact on Students</td><td>The impact on student engagement and learning was mainly measured through observations made by project teachers and school administrators and the establishment of technology-focused teacher-student learning partnerships.</td></tr>
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	Project A – HWCDSB Board-Wide Innovation Research Project Multiple teacher respondents made mention of the following scenarios occurring in their classrooms: the students becoming the teacher, the teacher and students learning how to use the technology together, and students being supportive when the teacher made mistakes or encountered problems by offering encouragement, solutions or ideas for improvement. The technology-focused teacher-student learning partnerships that emerged through this project provided multiple opportunities for students to learn collaboratively with their teachers and to develop and apply critical thinking and problem solving skills. Teachers also noted: • Increased enthusiasm for learning when technology was integrated into learning tasks; • Increased student participation and task completion when technology use was integrated into learning tasks, especially from those who experience limited success with paper/pencil tasks; • Increased willingness of students to share their work/thinking with one another when using technology or when sharing was supported by the use of technology; and • Greater desire from students to have their learning documented by the teacher. **Project B – HWCDSB School-Wide Innovation Research Project** The School-Wide Innovation Research Project fostered the establishment of technology focused teacher-student learning partnerships within a designated school. Teachers learned how to use technology, apps and web tools together with their students, and on many occasions were learning from their students. Teacher participants noted: • Increased participation and task completion from students; • Greater enthusiasm for learning when technology was integrated into learning tasks; and • Increased willingness of students to share their work/thinking with one another if technology was involved. Both Project A and Project B positively impacted student engagement and the development of teacher-student learning partnerships. When students were more engaged, they were more attentive in class and more likely to complete assigned tasks. Teacher-student technology focused learning partnerships empowered students to see themselves as valuable contributors to the learning environment.

Impact on Instruction	The 2015-2016 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 educator learning partnerships, and supporting the development of learning tasks that incorporate more sophisticated use of technology. **Project A – HWCDSB Board-Wide Innovation Research Project** • The greatest gains in teacher comfort were seen in: • Using technology to make student thinking visible; • Student use of technology to demonstrate their learning; • Using technology to promote learning partnerships among students; and • Using technology as a professional development tool. Project involvement led to the greater use of the following specific technology-enabled practices by project teachers: • Allowing students to use technology to demonstrate their learning; • Developing digital citizenship; and • Using technology to provide students feedback on their work. It is interesting to note that increased teacher comfort with technology and technology-enabled practices paralleled greater student use of technology in classrooms. The percentage of participant lessons considered to be transformative within the SAMR Framework (i.e. Modification and Redefinition) increased by 13% over the course of the project. In addition, the percentage of lessons identified to integrate technology at the Substitution level of the SAMR Framework decreased by 14%. Principals indicated that teacher participation in the project sparked technology focused discussions and sharing at the school level. Sharing of project learnings and experiences were witnessed to occur during staff meetings, divisional meetings, after-school in-services, informal hallway meetings, and among same grade partners. Teacher-Teacher learning partnerships were also supported through the project Yammer group. This tool provided teachers with an online forum to share examples of technology-enabled practices, and to troubleshoot technical issues The technology focused teacher-teacher learning partnerships developed through this project modeled life-long learning/Self-Aware and Self-Directed Learning for students and helped support the development of authentic learning tasks that integrate technology for deeper learning. These partnerships also helped shift some teacher mindsets with regards to their abilities to use technology in the classroom.

	Project B – HWCDSB School-Wide Innovation Research Project Analysis of pre and post data revealed the greatest gains in teacher comfort were seen in: • The use of the LMS (classroom vLE) to support learning; • Using Office 365 as a collaborative tool; • Using technology to support inquiry; • Using technology to create learning supports accessible to students 24/7; • Using technology as a professional development tool; and • Using technology to capture evidence of learning to support assessment for learning (diagnostic and formative assessment). Project involvement led to the greater use of the following specific technology-enabled practices by project teachers: • Using a virtual environment to support the development of teacher-student learning partnerships • Using social media to connect with other educators to further my teaching practice This enterprise social media tool [Yammer] provided teachers with an online forum to share examples of technology-enabled practices, new learnings and success stories, and troubleshoot technical issues in between scheduled face-to-face sessions and after-school hours. The growth in project teacher comfort in using technology and the positive impact of the teacher-teacher learning partnerships on teacher practice and student learning was also articulated by the school principal. She noted that mentoring and coaching empowered teachers to take risks, learn from each other and provide rich learning experiences that incorporated technology for students.
Impact on System	Actions that have resulted from the initiative include: • Working to ensure that each school has at least one teacher to support technology-enabled instructional and assessment practices at the school level. • The consideration of the impact the provision of mobile devices for teachers has on teaching practice and student learning when purchasing technology. • The continued use of a professional development model that incorporates multiple face to face small group collaborative learning sessions over time. • The expansion of school-wide teacher capacity building focused on the development of technology-enabled instructional/assessment practices. • The expanded use of Yammer as an online forum to support board-wide learning partnerships and the sharing of technology-enabled instructional and assessment practices.

Hamilton-Wentworth District School Board

Project Title	Transforming Learning Everywhere - Phase Two
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. This vision is driven by the Ontario Ministry of Education's "Achieving Excellence" vision, the next phase in Ontario's Education Strategy. Central to our vision is the instruction (or pedagogy) that occurs in our schools. Every day educators make critical decisions about how to design, deliver lessons and assess student learning. They consider the learners in their classroom—their needs, strengths, interests – to determine what strategies will help them succeed. Educators use both evidence-based approaches and new innovative practices, all while ensuring we meet the key Ontario curriculum expectations. This is the art and science of good teaching. This is pedagogy. Transforming Learning Everywhere is also about accelerating instruction with technology/digital tools. Technology introduces some necessary changes to transform our learning environments. Our educators are engaged in training and are provided with access to resources to support the development of engaging rich learning tasks. What will result is instructional practice that will increase student engagement and improved learning outcomes (in foundational skills as well as problem solving, critical literacy and higher order thinking) in both the physical and digital world.
Context	*Number of students:* 11,420 *Number of teachers:* 896 *Number of schools:* 103 *Grades/Program:* FDK-12
Impact on Students	<u>Student engagement and learning:</u> Our students are able to learn and demonstrate effective thinking strategies in areas of personal interest, and they are taking more ownership for their own learning. Video creation apps are allowing students to document their own learning processes as they complete a variety of tasks, allowing educators to provide better assessment of the process of learning rather than merely assessing the final product. Through the digital window of the classroom, parents and community partners can see opportunities to offer support; through digital sharing, the system can identify champions, and leverage their expertise in

	system professional development. Our students' ability to use technology to communicate basic needs and as a social exchange has increased within and outside of the classroom. Most students who completed a student survey about TLE (n=700) indicated they support and use digital tools in their classrooms. Students use iPads, digital projectors and smartboards the most 3 or more days a week in their classrooms. [S]tudents described their classroom environment as including learning partnerships (e.g., I work together with other students in my class to support my learning) and where digital is leveraged (e.g., I use technology to find local or global information for my school work) but not as one where students' engage in self- and peer-assessment or have a shared desire to have learning take place anytime/anywhere with anyone. <u>Student learning and achievement:</u> With parent permission, we have begun to track students' foundational skills based on their report card marks and EQAO scores. Rich learning tasks from schools participating in New Pedagogies for Deep Learning (NPDL) highlighted areas of strength including (1) learning partnerships where both students and staff have a common understanding of what success looks like, and (2) learning environment where student voice serves as a strong driver and includes physical and virtual learning environments. Areas of improvement include assessment, learning how to best leverage digital tools and establishing equity in the relationships between students, educators and families. HWDSB is using an online tool to assess students' 21st Century skills. It provides an overall score as well as scores individual 21st Century competencies. In 2014-2015, students who wrote the elementary assessment (Grades 4-5) had an overall score of 252, which is considered a basic proficiency level. This is compared to the global rating of 295 which is also considered a basic proficiency level. Students who wrote the middle school assessment (Grades 6-12) had an overall score of 244, which is considered a basic proficiency level. This is compared to the global rating of 288 which is also considered a basic proficiency level. These scores will be used as baseline data and the same (as well as additional students) will be taking the same assessment in 2015-2016 and 2016-2017.
Impact on Instruction	<u>Changes in educators' practices:</u> Educators are becoming more responsive to student voice and material is more relevant to student interests and curiosities. They are exploring tools that better fits their teaching style, their technological readiness, and the learning needs of their students. Close to half of educators that provided feedback indicated supporting and using digital tools in the classrooms while the other half held a neutral opinion

	towards their use. Laptops/desktops, digital projectors and iPads were the tools educators reported using the most, 3 or more days a week in their classrooms. When describing their classroom environment, educators defined them as including learning partnerships (e.g., students' interests, needs and strengths drive what they learn) but not as one where students' engage in self- and peer-assessment or have a shared desire to have learning take place anytime/anywhere with anyone. Educators described changes in their practice as including changes to their role, use of online tools to transform the classroom environment, and using technology to scaffold the learning process and provide feedback. Challenges experienced include devices serving as a distraction. <u>Capacity Building:</u> Educators are learning in a variety of ways, including self-learning, which has provided tangible strategies that are used effectively in classrooms. Networking and collaboration are starting within and between schools, but educators need more time to meet, plan and reflect with their colleagues. In our elementary schools, instructional coaches are the first point of support for educators and strong co-learning relationships have developed.
Impact on System	Our theory of action for Transforming Learning Everywhere (TLE; HWDSB's 21st Century Learning Vision) is that the use of evidence-based pedagogy, accelerated by digital tools will ultimately lead to increases in student achievement. By providing teachers with appropriate support and resources, their engagement will increase followed by increases in student engagement. These increases in engagement will ultimately lead to increases in student achievement. Since year one of implementation of TLE in 2014-2015, it has had an impact on system plans, capacity building as well as leadership development. It took some time before the vision of TLE was developed and shared with stakeholders. Some staff understood TLE as a technology project while others saw it as a project that focused on pedagogy. Participants cited the importance of understanding TLE as an inquiry based learning initiative and the need for explicit, consistent, repeated messages about TLE was strongly endorsed. All stakeholders who provided feedback did not start with the same willingness to change their practices. Some were eager to adopt change, some followed along when others were participating and some remained reluctant throughout the whole process. Key informants shared that access to knowledge and information and resources are essential for the successful implementation of TLE. Capacity building sessions that focus on pedagogical practices that include use of technology to support those practices are needed. While parents/guardians are pleasantly surprised about changes they have seen in their child(ren), they still have concerns about changes to classroom environments and use of digital tools to support learning both in the home and school.

Hastings and Prince Edward District School Board

Project Title	CODE Literacy in Action
Description	System-wide we are working on sharing and developing an understanding of HPEDSB's Globally Minded Learners and Leaders competencies. A key competency is to have literate learners. To support closing the gap in literacy, we are getting more precise in knowing our learners and documenting their learning journey and growth. In the junior class, we will be focused on improving quality of writing using Google Read and Write. Pre and post samples of writing will be gathered throughout the project. For the secondary students, we are using running records to determine student reading level and then using the technology, we are locating text at the just right reading level, along with being able to differentiate what they are reading through literature circles. Students will have access to KOBOS/IPADS for this work.
Context	*Number of students:* 65 *Number of teachers:* 5 *Number of schools:* 3 *Grades/Program:* Gr.5/6, Gr.9 Applied and Gr.10 English
Impact on Students	<u>Junior Classrooms:</u> A junior teacher targeted 5 students with literacy gaps for data analysis and noted significant academic impact upon their ability to communicate their thinking and ideas. Integrating AT tools such as 'Read and Write' with the collaborative potential of Google Apps the teacher prioritized the importance of teacher feedback and student growth mindset (21C Competencies). The targeted students showed a gain of at least one achievement level (e.g., L2 moved up to an L3). In two cases the students' achievement jumped 2 levels. Although engagement was not specifically measured it is important to note teacher observations that huge gains in student engagement were made. <u>KOBO/iPads:</u> Using GAFE tools, which were accessible on the Android device, students were able to collaborative read. They could discuss, take notes and annotate on a single file, in real time, right on the device. In the end, the shared reading experience led to increased knowledge of the text and deeper perceptions into the experiences/ideas being brought in by their peers. Teachers were able to deliver live, interactive and descriptive feedback to students … while the assignments were being produced. Feedback on the final copy had the possibility of being interactive, as students can respond to teacher questions via comments, transforming descriptive feedback into discussion-based feedback.

	Responsibility and Time Management was increased through use of Google Classroom and Google Calendar, even syncing to devices (Kobo/iPad/Personal). Having a shared calendar and an easy means to access it allowed students to begin to develop time management skills modeled for them in very real, dynamic and interactive ways. Tracking and ease of group projects in GAFE led to increased participation of students. This also led to increased accountability on the part of the students, but the engagement came through the ease of the collaboration; with these tools it is easier to work together than it is to do no work at all.
Impact on Instruction	<u>Junior Classrooms:</u> Teacher pedagogy has seen tremendous change through this CODE Literacy initiative as shift moves from teacher directed, assessment OF learning to student driven assessment FOR learning. Intentionality in the integration of technology with a focus on the SAMR model has moved teachers across our system away from simply “using technology” to knowing our learners and monitoring their progress via tech tools. Technology integration with the help of Google Apps has built a culture of co learners. <u>KOBO/iPads:</u> Since teachers were able to ‘peek-in’ on student interactions via GAFE tools such as Google Docs and comments, teachers could develop much more engaging and personal lessons for student needs in the classroom, especially in regards to writing (editing skills, format, etc.) and reading (how to connect to the text, making meaning from text, etc.).
Impact on System	<u>Junior Classrooms:</u> This CODE literacy initiative is taken on a tiered approach, paralleling our HPEDSB BIPSAW plan. When we think about technology integration we need to consider the tools that support ALL, SOME and FEW. Here we offered training in Google Apps as collaborative/feedback tools for ALL and embedded it in existing Comprehensive Literacy programs as part of an essential assessment FOR learning practices. <u>KOBO/iPads:</u> *Flipped Classroom*: Working with this technology in the classroom is allowing us to develop procedures/best-at-time practices regarding flipping the classroom. When teachers have the tools in their classrooms, they feel more motivated to start to capitalize on that technology and start to shift their practice to accommodate it. *Personalized Education*: Working with this technology is teaching many of the benefits that come along with teaching students ‘where they are’ rather than where teachers want them to be. The use of reading records and data-driven

	education is more manageable with this technology *Discussion-based feedback:* While personal, one-on-one, discussions are the best form of feedback a student can receive, having teachers deliver this descriptive feedback continuously in-person would be an impossibility. Technology offers students a window to that conversation throughout a course.

Huron-Perth Catholic District School Board

Project Title	The HPCDSB Summit Series: Professional Development for both 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 21st digital tools. We have created "The Digital Certified Student Program," the "Classroom Summit Series", and "Expanded Blended Learning Training Program" and a "Teacher Coaching Program." For example: **The Digital Student Certification Program** This program will be a staged approach with multiple levels of certification that will help initially provide equitable access to all students with opportunities to grow technical competencies. 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. **The Classroom Summit Series** Inquiry question for 2015-16: How does providing technology for all learners build and support metacognition in students, especially students with an LD? <u>Theory of Action:</u> If we provide students with training on inclusive technologies, then students (especially students with an LD) will feel empowered to use technology to support their own learning. If we support teachers understanding and implementation of blended learning, learning profiles, and metacognition then teachers will be able to differentiate to meet the needs of all students. If we provide additional devices (Chromebooks/iPads) with training support in the classroom, then students will be able choose the best technology to support their learning. If we host a Learning Summit, then students will be able to develop leadership strategies to help organize their own workshops in their respective schools/classrooms (Level 2 and 3 DSP certification).
Context	*Number of students:* 2,000 *Number of teachers:* 85 *Number of schools:* 17 *Grades/Program:* K-12
Impact on Students	A year ago, our project attempted to normalize technology use in the classroom, especially for students with an LD. Our research indicated that students and classrooms in general lacked both introductory training for powerful collaborative and inclusive technologies as well as structures to promote innovation and digital leadership among the student population. This project focused on offering both

	professional development for students/classrooms and attempted to provide a formal structure for student digital leadership by promoting three levels of digital benchmarks that could be achieved throughout this project. The three benchmarks are: digital student, digital expert, and digital leader. The project reached a significant number of students in our system compared to our baseline data from a year ago. Last year, only 14 classes received the training/support where this year over 100 classrooms were directly involved. In fact, from K-12, over 2200 students achieved "Digital Student" status. Previous rounds exposed that many students did not have access to the tools (was mostly teacher dependant) and, if they did have access, the students were mostly self-taught. This project has helped ensure that all students can have access and training to these powerful, 21st Century digital tools. Teachers reported that this level of support coupled with blended learning professional development had a significant impact on both student engagement and achievement. A clear trend that arose is that students with learning difficulties now have better access to the curriculum and that reluctant learners are more willing and able to share their ideas. Teachers also reported that because of the student training that allowed students to show their thinking in additional ways. In addition, almost every teacher in the project reported how collaboration improved and that new peer-to-peer partnerships emerged as students were learning and supporting each other. What is unclear at this point, is how this interplay of engagement and productivity relate to student achievement. The project last year also exposed that the classroom summit may have not offered enough support for some students, especially students with an LD. To better understand this and the level of support needed to fully support students with an LD, additional support was offered. This research indicated that small technical glitches and issues can and did impede implementation. Without a structure to support these students, the smallest technical glitch (no mouse, a voice command setting, or a simple accessory feature adjustment) will deter both the student and teacher from moving from the first training session to sustained, independent daily use. In conclusion, when supported, it appears that most LD students in the focus group became independent and benefited from the technology use. In order to promote the development of digital expertise in the classroom, every school had the opportunity to identify 8 student digital experts to attend our System Technology Summit. These students received training with the goal that they would lead a project back at their respective schools. The result of the summit demonstrated how 21st Century Competencies and learning partnerships

	can work together to transform how students can demonstrate their learning in the classroom while providing leadership opportunities in their school. From the System Summit and Classroom Summit Series, 47 students either lead or co-lead a project at their school and were recognized as "Digital Leaders." Interestingly, students who participated as digital leaders reported that they were surprised they could "be experts and leaders to students, teachers, and parents." This theme was consistent at many locations where a digital project was implemented. Students also reported that they viewed the leadership opportunity not as "extra work" but, rather, a new and fun opportunity that made them "feel better about learning." In conclusion, this strongly indicates that student expertise and leadership is being underutilized in schools as a mechanism to promote 21st Century fluencies.
Impact on Instruction	This initiative has impacted teacher practice as it has allowed a shift to occur where "blended learning" is no longer viewed as "just about devices." The qualitative data demonstrates overwhelmingly that our teachers now view blended learning as a way to improve instructional aspects such as differentiation, improved assessment, and parent communication. For example: *"Blended Learning has helped in meeting the needs of all students. It has also improved student engagement. Blended Learning has allowed for more small group instruction."* *"It has allowed differentiation of instruction to be able to reach all students. Google Classroom is an effective way to provide instructional activities and benefits the students. It allows flexibility in the method of instruction and delivery of curriculum."* This project has had a positive impact on the participating teachers as the "coaching model" provided significant supports that aided classroom implementation. This level of scaffolded supports was missing from previous projects and allowed us to reach teachers who may have been too reluctant join the project in earlier rounds. This scaffolded approach and site-based team emphasis also directly impacted the success of teachers implementing blended learning in the classroom by allowing for a greater focus on the "pedagogy" rather than "just learning the technology." For example, one teacher reflected "It has allowed me to consistently differentiate my teaching practices. I have become a facilitator of learning. I guide, and I steer, but the students are searching, striving towards knowledge, collaborating, and sharing." Another teacher reflected how this project helped them understand that they "perhaps lead the students too much during the self-reflection / success criteria phase of learning." During the focus groups, teachers reflected on how far both they and the students improved using technology. For example, one teacher said "Having

	devices as the point of instruction has been a game changer! When I reflect back on previous years and even September, I am astounded at how far my students have moved learning into the 21st Century. ...I have more opportunity to differentiate learning and provide small group and individual instruction to my students." Another teacher commented, "The classroom looks different now...students are now becoming experts on subjects and teach each other." Moreover, teachers reported that the physical classroom environment has changed and students are working on different things at different times. This leap of practice has resulted in teachers giving more feedback and supported more students with strategies like small group instruction … allows for greater reflection and increased opportunities to adapt or refine classroom practices.
Impact on System	In accordance with the strategic plan for the HPCDSB, our investments and commitments for innovation are rooted in monitoring the following indicators: • Achievement of benchmarks and standards for reading and mathematics. • Conversations with educators about the implementation of full inclusion to celebrate successes and identify opportunities. • Frequency of the use of didactic instructional strategies as compared to small group instruction and guided practice. • Conversations with educators about the successes and opportunities for the consistent use of assessment, evaluation and feedback. • Frequency and quality of the use of blended learning and global classroom collaborations. The project increased the number of "trained blended learning teachers" by almost 50 percent. We were able to train and support approximately 100 teachers. This year 45 teachers joined the project as we continue to support existing teachers and blended learning coaches. The district experienced a 12 percent increase in secondary teacher participation. In terms of sustained use of the digital tools that we monitor, a sharp increase has occurred which strongly suggests that technology is fully embedded into the learning and teaching practices of participating students and teachers. Our inclusive technology tool that is designed to support all students, but especially students with an LD, rose by 266 percent from this time last year. As we continue to scale-up, a new focus on monitoring and sustaining our promising practices needs to be put into place. In particular, it was discussed how assessment is the next great area of work, with an emphasis on the type of tasks teachers are asking students to complete. In addition, our focus on rotational blending learning and responsive classroom instruction is a key element of our current and future commitments.

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. As they are supported in their classrooms (through a model where co-planning, co-developing, co-teaching and debriefing is promoted), teachers will gain the skills to include various collaborative tools into their learning tasks and assessments. Technology will also be used to provide students opportunities to develop 21st Century / Global Competencies, both through direct instruction and indirectly through their learning.
Context	*Number of students:* 4,802 *Number of teachers:* 240 *Number of schools:* 21 *Grades/Program:* K-8 Numeracy, 9-12 all subjects
Impact on Students	Data collected and analyzed to demonstrate the impact on student engagement, learning and achievement included online tracking forms used by our Special Assignment Teachers / Tech-sperts, a classroom teacher feedback questionnaire, and the recording of teacher and student comments. **1.0 Quality of Work:** It was observed that when learning tasks included relevant technology, with job-embedded teacher support, the quality of student work had the potential to increase. When learning tasks included technology with relevant support, approximately 40% of students demonstrated a significant change in the quality of their work, and 60% demonstrated some change. The responses that 70% of teachers noted a change in the quality of student work, where it improved or greatly improved with the use of technology and the support of the Special Assignment Teacher / Tech-spert. Our analysis of teachers and student comments provide us with an understanding that technology allows students to easily revise and correct their work, while reducing the amount of time spent on making corrections. Students found it easier to make necessary changes and were proud of work that appeared professional; this built confident learners. *"Through technology-enabled collaboration, students provided peer feedback, which allowed them to think critically about their own learning and apply the feedback to improve the quality of their products."*

	"There were many students who were able to do the work with the app, who were not comfortable during the original learning. These students would not admit publicly that they were helped by the technology, because that would admit that they were previously experiencing difficulties. The technology definitely helped students to see how translations work." **2.0 Student Engagement:** In learning tasks that included technology with relevant support, approximately 60% of students demonstrated a significant change in engagement, and 40% demonstrated some change. In the Post-Support Teacher Survey, results indicated an increase in student engagement when technology was used with the support of the Special Assignment Teachers / Tech-sperts; 87.5% of teachers observed students who were previously reluctant learners were more engaged in their task with the technology. *"Students were engaged in the use of iPads for the recording of their spring poems. Students who are normally reluctant were engaged in the activity and expressed a desire to complete a higher level of quality in their work."* Technology-embedded tasks allow students to find individualized paths into their learning, as reflected in these teachers' comments: *"I find students posing questions that they would never have thought to ask before."* *"I can really see where each student is at a glance and work with them, knowing that the other students are on task. It is easy to see the misunderstandings of individual students. It's easy to make the learning very specific to individual student needs."* **3.0 Learning with the 21st Century Global Competencies:** As the project rolled out, it was observed that teachers became more familiar with the 21st Century global competencies. This familiarity also led to the planning of lessons and activities which provided students with the opportunity to develop some of those competencies. Approximately 75% of teachers surveyed reported that they are planning to incorporate the competencies into their future lessons. An analysis of comments from students and teachers indicates that students are collaborating and communicating in using the skills of the 21st Century. Programs such as Nearpod allow the student's voice to be heard in real time, discussion to become richer, and students' thoughts and ideas to build. The learning becomes more student driven, which may than have deeper meaning for students. For example: *"I can really see where each student is at a glance and work with them, knowing that the other students are on task. Easy to see the misunderstandings of individual students. Easy to make the learning very specific to individual student needs."*

Impact on Instruction	**1.0 Global Competencies**: Teacher recognition of the 21st Century Global Competencies increased significantly during this project. Teachers were naturally incorporating some of these skills into their daily practice, but were not necessarily aware that this was happening or the importance of it. The project gave voice to this conversation. Teachers are more aware of the competencies and have now begun to provide their students with opportunities to develop the competencies. Approximately 65% of teacher respondents in the Post-Support Survey reported developing clarity with the competencies and almost 75% reported intentional planning with the competencies in mind. A teacher commented: *"I see where some of my lessons were already touching on 21st C learning, but I notice in my planning, that I am thinking about those competencies now."* **2.0 Changes in Pedagogy with SAMR Model**: There has been a marked change in how technology is being used in our classrooms with the Special Assignment Teacher / Tech-spert support. With the support of the Tech-sperts, teachers began to use technology in a way that transformed the learning task; they moved away from substitution and augmentation to modification and redefinition. Modification with support was evident in 54% of the activities during this project (up from 10% without support) and redefinition in 44% of activities (up from 0%). *"Students used the iPad app (Educreations) to identify, name, and draw 2-D shapes. Students created their shapes and presented to their peers, explaining their creation. Communication and self-directed learning were the competencies involved with this learning task."* *"Students explored various 3-D objects in the classroom and identified the length, width, and height using non-standard units of measure. Students used the Educreations app on the iPads to document their learning (camera, voice, text). Communication, collaboration, critical thinking, and problem solving were the competencies involved with this learning task."* **3.0 Changes in Teacher Practice and Attitudes**: Data analysed indicates positive professional growth among teachers. Impact on teacher practice was recognized, as 80% of teachers indicated that they are more comfortable using various devices in their classroom. Also, 70% of our teachers now use a variety of apps, online programs, and software on a regular basis. 72% of our teachers also recognized that their approach to teaching with technology had changed. A teacher commented: *"I am excited about the time-saving tools and assessment possibilities the new technology provides….I have learned many new ways to effectively implement technology for not only student learning, but also for enhanced assessment practices. Excellent tools to take into next year."*

Impact on System	It has been observed that the use of technology on a system-wide level has increased, with many system and school leaders engaged in and excited about the technology. There is greater collaboration, increased data collection and analysis of practices, and improved system-wide direction on the technologies being used. **1.0 Digital Learning Steering Committee**: Our board established a Digital Learning Steering Committee to help set goals and provide direction on technology-enabled learning within our schools. The Digital Learning Steering Committee will continue to provide the leadership necessary to ensure we are providing our students with the best possible learning experiences with technology. **2.0 Change in Practice Among System Leaders**: It has been noted among the senior administration team within our board that many of the new technologies being employed in our classrooms have also created changes among our system leaders. Changes in practices and organizational processes have led to increased efficiencies and collaboration across departments and schools. These shifts have had an effect on the processes and structures being used to support our classroom teachers. There is a desire to work collaboratively on projects involving the various stakeholders, while also finding efficiencies in the work. **3.0 Summer Institutes for 2016**: To meet the needs of classroom teachers, our board will be hosting two summer institutes. The summer institutes are a direct response to requests from educators within our board. These requests are evidence that educators within our board are using technology and have a desire to increase its usage within their classrooms. **4.0 Use of Technology for Professional Learning on a System-Wide Level**: The use of technology to deliver professional learning to the various groups within our board has become a recent area of focus. As educators become more comfortable and familiar with technology, they are more open to using some of the tools to learn and develop. These changes in the delivery of professional learning are a clear indication that the technologies being employed within the classroom are having an effect outside of the classroom. This model of professional learning is both scalable and sustainable.

James Bay Lowlands Secondary School Board

Project Title	Incorporating Technology in the Classroom as a Means of Supporting Student Success with a Special Emphasis on Assistive Uses
Description	The target group will be the students writing the Ontario Secondary School Literacy Test. These students come from mainly the Grade 10 ENG2P and ENG2D courses with some previously eligible students from Grade 11 re-writing. Students identified as being previously eligible were selected by the literacy committee at the beginning of the school year based on their chances for success if given the opportunity to re-write the test. A special focus for this project will be examining the OSSLT success for the 8 students who will be allowed accommodations during the OSSLT. This is the first year NLSS has had the infrastructure in place to support students with electronic assistive technologies. The focus for this portion will therefore be using student success on the OSSLT using assistive technology versus previous tests where said technology was not available.
Context	*Number of students:* 39 *Number of teachers:* 3 *Number of schools:* 1 *Grades/Program:* Gr.10 ENG2P and ENG2D, eligible Gr.11 re-writing
Impact on Students	Each student has a registered school Google account. As well, more devices were purchased to allow greater availability of technology to students in the building. In a survey distributed to and responded by 72 students at the start of June, 57 students agreed or strongly agreed that technology use in the classroom enhances their learning. 49 respondents agreed or strongly agreed felt that they are more engaged when using technology in class. 58 respondents agreed or strongly agreed that computers and technology enhance their daily life. In classrooms, students are using technology as a means to collaborate with their classmates and others in their studies. Teacher comment: *"Technology has improved the speed of learning and deepens the understanding a student can have for a specific subject."* Student comment: *"Technology has helped me throughout school by giving me access to online resources in which I use to research questions that I may not understand."* [T]hose needing accommodations writing the OSSLT saw an improvement when using technology. For example, a group of 8 students wrote a mock test. Without any technological support, accommodated students did not perform well. Using a scale based on the experiences of teachers who have marked the OSSLT, it was estimated that these student scores ranged from 245 to 295, with 300 being a

	pass. In March about a week prior to the test, these 8 students were given the opportunity to test Read & Write, an app that allows text-to-speech and speech-to-text, in preparation for the OSSLT. After the test, many of the students felt they better understood the material and being able to use the speech-to-text and text-to-speech helped them. For the students who wrote the test using technology, 1 was successful with the other 6 scoring 280-295, a large improvement from their earlier scores. It is felt that had this technology been available earlier, there potentially would have been more students be successful.
Impact on Instruction	Technology adoption at school-level has been slow in the past due to lack of reliable infrastructure. However, now that infrastructure has been improved, there has been a significant increase in teachers using technology at the school. The first step this year was to provide each staff member with an iPad with the same software that is available for student use. Also, each teaching staff member had the opportunity to meet with the TELT one-on-one for one hour sessions. Teachers were divided into PLC groups this year with a focus on using technology as a means of promoting deep thinking and inquiry and sharing with their PLC mates. Each of these sessions allowed teachers to try new approaches to using technology in the class. There are times where students are unable to attend school because of transportation delays, illness, medical appointments or other reasons and at times felt stressed upon returning to class in an effort to catch up on work. With the virtual space teacher and students are always present with current information as well as easier communication. Because of the ease of using a blended-learning approach, some teachers have elected to teach their classes in a totally paperless environment. When an assignment is uploaded, the teacher has the ability to see each student's work. This is important as teacher are able to provide ongoing feedback and suggestions as the student works. This has been greatly received by teacher as they are now able to support students throughout their work and provide feedback in a manner where neither student nor teacher feels overwhelmed. *"Students who are more hesitant and shy to present information orally are able to use different Apps and Google Classroom to verbally and visually share their learning and new information."* *"A great example came this semester when a student has to miss a handful of classes due to transportation issues that are faced in our school community. The student was able to complete and submit assignments from home (on time!) using Google Docs and through access to Google Classroom. Utilization of such forms of technology allow students to access resources and enable them to produce quality work in a timely manner, even on days that they are unable to attend classes."*

Impact on System	The creation of a virtual portal allows all staff to be connected and important correspondence to be delivered electronically. Alongside the portal, secure cloud-based folders were set up for IEPs, emergency lesson plans and the sharing of forms and documents. They key has been to have staff experience authentically the digital world that students live in. There has been an increase in technology-based platforms and approaches from staff which have resulted in a demand for more technology to be made available. As inquiry-based learning expands, teachers want to be able to develop the skills to deliver in a manner that promotes student engagement and achievement. As well, increased use of technology will allow for greater use of tracking data by office staff and will have an impact on aiding the ongoing improvement of student and staff well-being.

Kawartha Pine Ridge District School Board

Project Title	KPRDSB New Pedagogies for Deep Learning Project
Description	The TLF 21st Century Innovation Research initiative for KPRDSB is to support teachers working within the New Pedagogies for Deep Learning (NPDL) framework. We are focusing this year on the intentional development of student skills related to the learning progressions (6 C's). Through the use of assessment tools from NPDL, teachers will select 6 students in each class, identify one or more of the learning progressions they will focus on and then design learning to build student skills related to the specific learning progressions they have selected. Principals and teachers will work closely with one another and with district instructional consultants to design, teach and assess the development of learning progression skills. Consultant support will be provided to help teachers with the learning design, assessment and use of technology to accelerate the growth of these skills in students. The learning design and outcomes will be shared as an artefact within a common template built around the NPDL learning framework.
Context	*Number of students:* 1,184 *Number of teachers:* 62 *Number of schools:* 8 *Grades/Program:* FDK-12
Impact on Students	Through the development of Deep Learning Tasks, students were able to reach increased level of engagement with the curriculum, while having the opportunity to develop skills within the learning progressions. As the project spanned grades K to 12 and across different disciplines and grades the impact on students' learning was unique to divisional and/or individual class trends, yet followed general trends: • Students are aware of both global and local issues and understand they can play a role in making a change in the world. (e.g. at one school- 18 students had a pre-rating of 1 or 2 in their development of Citizenship, at the end of the inquiry, 14 students had moved up to a level 3 or higher) • Students developed their ability to work interdependently and synergistically in teams with strong interpersonal and team- related skills. • Students are becoming more adept at leveraging digital tools to aid in collaboration • Students developed communication skills and were able to communicate their learning in innovative ways through the use of digital tools
Impact on Instruction	As the project spanned grades K to 12 and across different disciplines and grades there was a varied impact on teacher practice.

	Some key learnings were: • Purposeful planning is required to integrate the deep learning competencies • Developing learning goals and success criteria that encompass both curriculum and deep learning progressions is necessary • Student ownership and voice led to the development of the learning and engagement • Some deep learning competencies are developed through the learning (e.g. citizenship), while others require direct teaching (e.g. communication) • Learning can occur through the development of rich tasks as opposed to the tasks being the culmination of the learning • Capacity was built for effective integration of digital tools and leveraging those tools to accelerate the learning process
Impact on System	The project stayed with the same 8 schools from the previous year, but within the schools more teachers were included to build a deeper understanding of task design and to further distribute the impact of 21st Century Competencies. Within the school setting, there was an emergence of a leadership structure created that allowed teachers new to the project to seek support, guidance and to learn from the experiences of their colleagues. Teachers were able to see a purposeful use of the district based communication tool (Edsby) to collaborate, share, ask questions and communicate results within the 8 schools involved. Through Consultant support, other collaborative inquiry groups addressed the concepts of Deep Learning and the creation of rich tasks to support student development in 21st Century Competencies.

Keewatin-Patricia District School Board

Project Title	Creating a 21C Learning Organization
Description	This work is a continuation of our last rounds of work to continue to create a 21C Learning Organization for all in Keewatin-Patricia. This work is embedded in our Board Strategic Plan and Board Strategic Improvement Plan (available on our website) in order to align and embed technology enabled teaching and learning with a focus on critical thinking into the broader student achievement agenda in our Board. It is our belief that a system of learners, engaged and supported by technology and research driven teaching practice is the key to improved student achievement. Because we our doing whole system tri- level work at the Board, school and classroom level, it was and continues to be necessary to engage in our efficacy work as a key driver in supporting change and change process at every level in order to establish a culture of change. This efficacy work is driven by the Director of Education who is supported by front line teaching and support staff and external experts to effectively embed and scale both 21C culture and practice within the Board. We see this triangulation of efficacy, research driven teaching practice and technology-enabled teaching and learning as the key drivers in our system transformation that is occurring in Keewatin-Patricia. Technology plays a key role in this work, both in the overall modernizing of our systems, but also in improving teaching, learning and ultimately student achievement. It allows a focus on teaching process, with content as a vehicle, and brings the student learning experience to light in ways that are both more engaging and more relevant for learners. A great example of a 21C teacher is one who can use technology to gather and analyze formative assessment data, as an example, to precisely inform next teaching steps in real time.
Context	*Number of students:* 5,000 *Number of teachers:* 450 *Number of schools:* 23 *Grades/Program:* JK-12
Impact on Students	[W]e continued to build on our key themes around technology enabled teaching and learning in classrooms. This work continues to be led by our principals and technology support coaches who work actively in classrooms with teachers and students. At this point, there has been significant penetration of technology enabled teaching practice into most classrooms in the broader Board. We see extensive student use of technology in most classrooms in K-8, and moderate use of technology by students in secondary schools. Classroom observation shows increased levels of engagement in deeper, richer

	learning tasks that require students to learn in a "21C way" with higher levels of collaboration and communication. This evidence comes from principal monitoring of classroom learning in a variety of ways. Some principals have formalized student voice processes to collect this information, others use more informal ways to so this. We have used video and other methodologies to collect some of this data on a system level. Critical to our data collection efforts is a student and parent survey that has been delayed until the Fall, given how our year unfolded. This will be a part of our ongoing work with Pearson Learning Services that will provide much additional information for us around how we are doing through the eyes of students and parents. In individual schools, we can find significant evidence of attendance improvements, and in many cases achievement improvements. It is not easy to specifically identify the exact reason for improvement. We are operating under the assumption that if we create for students a more relevant and positive learning environment, then engagement and subsequently learning and achievement will improve. In summary, we do see significant change for students as a result of our work. Looking back over the last 5 years, our classrooms look and sound different, students are more deeply engaged in learning, we have seen significant improvements in task design. Much of these improvements come from the leveraging impact of technology and technology enabled teaching and learning as both a catalyst and interrupter. Linking achievement improvements strictly to technology is difficult. We believe that we have a recipe for improved student achievement that resides in our BSIP, and that technology enabled teaching and learning is both a necessary and significant driver to create a student learning environment that is relevant and meaningful for our students.
Impact on Instruction	We have seen significant transformation in teacher practice as a result of this work over the last five years. Our recipe for student achievement improvement starts with our BSIP which has evolved into a way of working that requires teachers to think deeply and be on a constant improvement path with their teaching practice. A technology- enabled environment, both for teachers and students helps to leverage this improved way of working. We continue to work to create the conditions that allow teachers to focus on planning and improved delivery for their students. An example of this type of work is in the implementation of EnCompass, which places all student, parent and teacher data and functions in a convenient platform that provides one stop access and supports for teachers in everything from historical student data, to assessment creation and recording to report card preparation. Supplying teachers with

	laptops and providing professional learning as we have for several years, moving systems to a 21C environment, allowing teachers to work in a mobile and seamless environment drives our change agenda for them. The focus can more easily then be on instruction and learning. Our technology support coaches continue to work with teachers on the leveraging of technology to further improve assessment- based instruction, a cornerstone of our BSIP. Assessment based instruction, in real time, with high levels of feedback to improve learning are aspects of 21C teaching and learning that are most heavily emphasized with teachers. We are at the beginning stages of refocusing efforts on the teaching of critical thinking skills as a significant part of a 21C delivery experience for students. We have done much work in the system on the foundational pieces of this practice for teachers and now have a level of common language and understanding by school administrators and many teachers that will allow us to move further forward.
Impact on System	The TLF process has allowed us to focus on a system level to ensure that the infusion of technology in our system, in schools, in classrooms is a key driver in the overall change processes that needed to happen in both systems and schools for students as we strive to create the 21C learner and learning organization. We see this work and its impact unfolding in all areas in the Board. • The continued work of our overall efficacy agenda now drives change at all levels of the organization. • It has emerged that leaders who engage in servant leadership to move this work forward are most successful, those that hold onto older, now less relevant leadership styles are struggling. • That an unrelenting focus on the needs of the whole student, including the student learning experience, is necessary to drive change across the broader Board. • The work of system change is disruptive and uncomfortable for some professionals, including some teachers who dislike or do not understand the change process. [W]e now have the language of 21C, defined by teachers, in curriculum, instruction and assessment infused into our strategic plan, BSIP and SIPs and being practiced in many classrooms across the Board. We chose to scale our entire system in a relatively short period to time. This created the initial disruption and interruption that was necessary to move beyond where we currently were 5 or 6 years ago, but also created significant challenges that required both vision and leadership to move forward.

Kenora Catholic District School Board

Project Title	Assessing the Impact of an IdeaLab Project
Description	**General Description** – The IdeaLab is a unit within the Instructional Services Department composed of 15 staff members, 10 of whom actively serve to steward internally ideated Learning Projects. Since 2013 we have supported over seventy projects providing 'human' supports (i.e. consultation, organization assistance), resources/materials, funding, and training/professional development for the individuals or groups undertaking Learning Projects. We are focusing on one Learning Project for our Innovation Research Initiative this year assist[ing] in transforming all Grade 7 and 8 classrooms in our High School into environments that are optimal for 21st Century Learning. The applying group believes that in redesigning learning spaces (both physical and digital) there will be a direct correlation to improving 21st Century Competencies and subsequently boosting student engagement. We have started working with four grade 7 teachers this school year, and will continue our work with the grade 8s during 2016-17. **Project scope** – Includes our Board's first 1:1 device deployment (Chromebooks), a complete environmental transformation of 9, extensive professional development (environmental and technology-based), expert 3rd party consultation, daily available in-class supports from our Innovative Technology Teacher, and a unified instructional model. **Purpose** – [Collect] evidence to identify the extent that varied IdeaLab supports may impact learning. **Focus** – Our focus is on the transformation occurring within Grade 7 classrooms. We expect an evolved classroom experience that [supports] both students and teachers to become more competent 21st Century Learners. **Role of Technology** – We've deployed our first enrolled Chromebooks in a 1:1 implementation with this group. Allowing for the creation of digital spaces, enabling the broader development of 21st Century skills, and providing flexibility in learning.
Context	*Number of students:* 105 *Number of teachers:* 6 *Number of schools:* 1 *Grades/Program:* Gr.7
Impact on Students	[T]his research initiative yielded an observable increase in student utilization of 21st Century Competencies. It also had a positive impact on student engagement, learning, and achievement. We collected impact evidence relating to student usage of the following 21st Century Competencies: Communication,

	Collaboration, Critical Thinking, and Creativity (4Cs). The evidence collected revealed that student use of the 4 identified 21st Century Competencies increased slightly between February and June of 2016. However, there were some very significant gains in certain areas. It is clear that student **communication** with digital tools is one of the stronger competencies of this specific cohort of grade seven students. Receipt of digital feedback from others within their classroom increased substantially; in February 47% of students reported never doing this, that figure was reduced to 20% in June. In June 49% of students reported receiving feedback from others monthly and/or at least weekly. There was also a notable improvement in students being asked to receive feedback online from someone other than a teacher. Our data relating to student **collaboration** indicated that there with some very meaningful gains made. In February, nearly two thirds of all students reported never collaborating online with teachers that was reduced to 47% by June. As of June one third of students reported that they are asked to collaborate with teachers online at least weekly and/or monthly. Online document sharing and storage is a standard practice, in June 2016 89% of grade 7 students reported that they do this monthly or more frequently. 47% of students in June reported at least weekly use of digital sharing and storage tools, up from 33% in February. It is quite evident that students are applying **critical thinking** skills on a regular basis. According to June data 82% of students are asked to conduct experiments or perform measurements with digital tools. In February, 31% of students had reported never doing this. As of June, only 3% of students report never using technology to conduct research. Two thirds of students indicate that they do this at least weekly. The majority of students are involved in **creating** and uploading art, music, movies or webcasts in some form. June data indicates that two thirds of students are actively involved in this type of creativity with digital tools. Over time students became much more engaged when using technology in their learning. By May, the majority of students indicated that they enjoyed learning activities more when using technologies … was evident that students felt their learning was being reshaped by available technologies. A strong majority of students indicated that they either agreed or strongly agreed that technology enabled them to be creative and constructive in their learning. In late February (only two weeks after receiving a Chromebook as a part of a 1:1 deployment) students were quite unsure about if technology use would lead to higher achievements levels. However, by May the perception of technology resulting in higher achievement had changed substantially. At that time more 60% strongly agreed that technology was enhancing achievement levels. It is clear from

	student field logs that there is a strong belief that 1:1 technology was impacting achievement; student comments such as "....grades going up," and "...huge difference in school work and grades" suggest this very clearly.
Impact on Instruction	Our impact evidence revealed that the technology-enabled instruction strategies applied resulted in an increased capacity to improve the use of 21st Century competencies for both teachers and students. Our impact evidence indicates that both teacher and student use of the 4Cs increased overall, but the teachers use of the 4Cs moved from 'Proficient' to "Advanced' on the Clarity 'Classroom' aggregated index scores which were generated from teacher surveys administered in February and June respectively. June data did not reveal significant growth relating to the **Communication** competency compared to data retrieved in February data. Teachers exhibited strength in the Communication competency in February, however, June data revealed that 66% of teachers ask students to use web tools to receive online information, up from only 33% in February. June data indicates that 100% of teachers asked students to conduct experiments or perform measurements utilizing technology tools monthly and/or at least weekly. This represents a significant improvement as according to February data 66% did this only monthly or never. Teachers also showed substantial gains in asking students to identify and solve authentic problems. According to June data 100% of teachers do this monthly and/or at least weekly. [G]ains made by teachers regarding use of 21st Century competencies between February and June can be at least partially attributed to the professional development and 'hands-on' support for participating teachers. Comments from teachers' field logs did reveal they felt the 1:1 Chromebook deployment created better conditions for learning and that student engagement was apparent; they believe that students had heightened levels of engagement. However, there was no commentary about a direct impact on student achievement.
Impact on System	[O]ur intent for Round 5 [was] to intentionally structure project work and research to assisting us in answering some complex questions about the future direction of our IdeaLab. Our research was directly focused on the impact this project has on learning. Our impact evidence strongly suggests that learning outcomes were improved as a result of this project. Both teachers and students increased their use of the 4Cs and both reported growth in student engagement and learning. The following system actions for 2016-17 are tangible results from Round 5: • The 1 to 1 'fully supported' Chromebook will continue in grade 7 and will also expand into grade 8 for September 2016. • We will also be beginning mirrored 1:1 Chromebook deployments at the

	elementary level. In terms of attention, support, and encouragement these implementations will be very similar to the deployments that occurred this school year. • KCDSB's Instructional Services Department has officially become "IdeaLab" and is being rebranded for the 2016-17 school year. • We will continue to offer funded, supported, and organized IdeaLab projects and professional learning experiences.

Lakehead District School Board

Project Title	Inspiring Technology Enabled Learning Teams
Description	LPS will enhance student achievement and develop global competencies through the use of 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 and connect learning to students' lives and the world around them. • Foster student inquiry • Increase collaboration • Support assessment for learning Specific tools used to support the above include: • Explain Everything App & Reflector • SeeSaw • Office 365 – including: OneDrive, Yammer and OneNote • Skype and VROC • Desire2Learn Learning Management System • Web 2.0 tools including Padlet, Kahoot and MinecraftEDU Training will be led by school based IT Teams, compromising a minimum of two teachers on staff, program, supports and a school administrator. These teams will be supported to increase their knowledge in global competencies and modern teaching and learning models, understanding that pedagogy is driving change in classrooms with technology as a support. These teams will help all teaching staff learn the strategic use of technologies that support school improvement.
Context	*Number of students:* 8,971 *Number of teachers:* 650 *Number of schools:* 30 *Grades/Program:* K-12
Impact on Students	• Students have commented that they are increasingly proud of their work, feel more connected with their parents or guardians, and are eager to learn more when technology helps them to connect their learning to the world around them. (Grade 8 Student **-** "*I like SeeSaw because I get to explain my work, in my last class I couldn't explain my work because I was kind of shy. Now I get to record my voice and me showing people that I can do the work. My Grandma says that I am doing great and she likes that she can see my*

	work when I am at school.") • Students have documented their thinking and learning through technology and reported that using the technology to communicate has made it easier to explain their thinking. (Grade 9 Student - "*This year we used Explain Everything in our science labs and it was a great way to take photos and videos of our experiments. We were quickly able to share our work on the SMART Board and we were able to see how other teams were running the experiments. We would then use Office 365, and everyone was able to work together at the same time on writing our reports.").* • Teachers have reported higher engagement, task completion and increased success with encouraging student inquiry. (Grade 6 Teacher - "*Integrating tech and Office365, OneNote, and other tools has changed the way I teach, and the way students learn in my classroom. Good inquiry-based learning, is now possible and easy to do with technology. Students have become self-driven learners, with me as a guide or facilitator. Students get more work done because it means more to them and they are more in control of their own learning.*") • Students reported increases in achievement and learning after using online tools for peer feedback. (Grade 5 Student - *"I feel like I became a better writer reading and commenting on other people's writing. I really know the parts of the paragraph better now that I have looked at so many of my friends. Now I have seen so many different hooks."*) • Students reported the use of technology helped make learning authentic and more relevant to their life goals. (Grade 10 Student - "*I find tech helps with my problem solving skills. When I'm doing online projects I use things like Prezi and Piktochart. With tech I can make it look better, I can make it unique and my own style, I have to figure out all kinds of things like text styles and how to fit everything in and how to make it look the best it can be. It makes me more motivated and proud.*") • Students have reported that the use of simulation and learning games have increased their engagement and task completion. (Grade 3 Student - " *Minecraft helped me multiply by 1, 2, 3, 6 and 9 by building arrays. Studyladder helps me learn my times tables, reading and subtracting and it's fun. These games make learning feel different and not always the same thing.")*
Impact on Instruction	A pre survey from May 2014, and post survey from May 2016 indicated significant changes in teacher practice with respect to technology integration: • Teachers have reported that technology is helping them to differentiate instruction to meet the needs of a variety of students. Survey data indicates

	a 9% increase of teachers that use technology to differentiate lessons and activities with a total of 88% of teachers agreeing that they use technology for this purpose. • Teachers have reported increased use of technology (up 11% from 2014) to help students with critical thinking skills including searching, evaluating and organizing information from a variety of sources with a total of 79% of teachers agreeing that they use technology for this purpose. • 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. Survey data indicates a 23% increase with a total of 87% of teachers agreeing that they use technology for this purpose. • Teacher attitudes towards student owned devices (BYOD) and their usefulness in the classroom to support learning have increased. Survey data indicates an 8% increase in teachers who allow the use of student owned devices for learning during class time with a total of 58% of teachers agreeing that they encourage the use of student owned devices in their classrooms for educational purposes. • Teachers have reported that technology has 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. Survey data indicates a 28% increase with a total of 66% of teachers agreeing that they use technology for this purpose. • Teachers have reported that the use of social media as a discussion platform in the classes has helped students to collaborate and connect learning to the world around them. Survey data indicates a 17% increase with a total of 28% of teachers agreeing that they use technology for this purpose. • Teachers are reporting success with engaging their students through online learning games, simulations and apps. Survey data indicates a 12% increase with a total of 75% of teachers agreeing that they use technology for this purpose. Referencing a research study by Aporia Consulting (Katz, and associates) submitted June 2016 indicates a number of findings with respect to technology use and assessment practice: • A high number of teachers (62%) found the provincial virtual learning environment to be very useful in supporting their assessment practice. • Teachers in the focus group felt that the technology made their assessment practice more efficient. • Teachers also indicated that technology opened up opportunities to design assessments that they weren’t able to before, and that they were now better

	equipped to find out what students know. • Most teachers (88%) found provincial virtual learning environment to be the most useful in supporting their assessment practice. • Teachers reported that technology has allowed them to design assessments that allow students to demonstrate their understanding in authentic ways. • Most teachers (78%) reported that the use of online collaboration tools such as Office 365 has supported their assessment practices. • Although the teachers felt that there were many positive benefits to incorporating technology into their assessment practice, they also identified some significant challenges. Not all of the teachers in the group felt comfortable with incorporating technology into their practice. They felt that they had a lot to learn around the “how to” of the various applications and devices.
Impact on System	This year, a strategic choice was made to switch from individual school based champions to Technology Enabled Learnings Teams that included multiple educators as well as an administrator from each school. The Technology Enabled Learnings Teams have contributed to improving and sustaining of pedagogically-driven, technology-enabled practices by building leadership teams in every school. These teams have assessed school needs, identified areas in the school improvement plan where technology could be a vital support and launched training, and “at the elbow coaching.” 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. Part of the premise of this program is a commitment on the part of educators to transform their teaching practice through technology based training sessions. To date 384 Early Childhood Educators, administrators and teachers have participated in the program which represents nearly half of the staff who qualify for the program. A continuing theme throughout the various Technology and Learning Fund projects at Lakehead 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 model of learning has led to long term and continuing growth and models the shift in learning that is necessary to prepare students for a digital world. As a result 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	Impact of Professional Learning Focused on Technology Integration on Leadership Practices, Teaching Pedagogy and Student Learning
Description	*“In LKDSB, the first innovative project with a focus on the integration of technology into the hands of students and teachers occurred during the 2011-12 school year. A 1:1 Take-Home iPad Project within a rural Family of Schools (1 secondary school with corresponding feeder schools) with teachers and students of Grades 7-10 was introduced. The following fall the project was replicated in a neighbouring Family of Schools. The project was then expanded to include a FDK iPad project with a focus on pedagogical documentation engaging the FDK team and parent community as learning partners. These innovative projects resulted in the creation of the LKDSB Technology Enriched Learning Plan (TELP) in 2014-15. In the past five years, funds have been dedicated to devices, the expansion of bandwidth throughout the District and to professional learning opportunities. This project studied the Impact of professional learning focused on technology integration on leadership practices, teaching pedagogy and student learning.”* **Purpose of TLF 21st Century Innovation Research Initiative, 2016:** **To examine:** “What impact, if any, does a professional learning program focused on technology integration have on leadership practices, teaching pedagogy, and student learning?” **Focus of TLF 21st Century Innovation Research Initiative, 2016:** **Tri-level research:** 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. **Desired Outcomes:** • Artifacts reveal student learning environment and opportunities have been enhanced through authentic integration of technology • Teacher surveys reveal pedagogical changes according to the SAMR model • Leaders can clearly articulate vision for a culture of innovation and the steps to realize this vision within the school community
Context	*Number of students:* 461 *Number of teachers:* 20 *Number of schools:* 16 *Grades/Program:* FDK-8; Core French, French Immersion; Social Studies/History & Geography/Language Arts/Science

Impact on Students	**Impact on Student engagement, learning and achievement:** During a *Challenge Based Learning* project, students explored a challenge at great depth gaining a holistic understanding of a big idea vs. learning isolated facts of a topic. This process varied greatly from the students' past experiences in a Social Studies/History/Geography class where textbooks were the primary source of learning. As student voice is integral throughout the *Challenge Based Learning* process, the students were active learners in tasks that were authentic to them not passive recipients of knowledge. Students learned important leadership, organizational, and communication skills. The 6Cs were intentionally taught to students through the *Challenge Based Learning* process. Authentic experiences such as interacting with experts in the field of the focus of their project heightened the students' awareness of the importance of these skills. During the *Challenge Based Learning* process, students received feedback through many lenses – self, peer, teacher, parent, community members and/or global experts. Through receiving and reflecting on this feedback, students enhanced their critical-thinking skills as they learned to interpret the perspectives of the many voices. The students' learning environment changed as their teachers reflected upon the conditions to truly embrace the philosophy of *Challenge Based Learning.* Students moved from sitting in desks in rows in some classrooms to sitting in flexible groupings and/or at tables. Students were trusted to explore learning areas throughout the school – hallways, Learning Commons areas, and outside. Learning was no longer a solitary event but one in which all students could learn with and from one another as well as on behalf of one another. **Impact of the integration of technology:** • Through the use of technology, all students were able to participate fully in all aspects of the *Challenge Based Learning* projects. The confidence of students grew when their individual learning needs were not emphasized through overt accommodations or modifications. Unlike in the past, everyone in their classes was utilizing technology to facilitate their learning; • The portability of the iPad allowed the device to travel with the students wherever they were conducting their inquiry. Videos, pictures, audio recordings of their focus and notes were captured with ease on one device; • Students were able to archive their learning in creative methods and in the manner in which best fit their learning styles*;* • Students were able to explore concepts with different aspects of technology in Mathematics classes; • Technology facilitated the application of their knowledge into a creative final product utilizing a variety of media and

	• Through technology, students collaborated both within and outside the classroom walls forging partnerships across the globe.
Impact on Instruction	Through the professional learning opportunities teachers experienced, the following changes in practice were documented and/or articulated: • Teachers became co-learners with their students exploring the possibilities of technology together vs. teachers being "in control" of all aspects of the learning and teaching occurring in the classroom; • Teachers' depth of knowledge of an app was enhanced through the Apple Foundation Training. They were therefore able to introduce different opportunities to their students; • The "walls" of the teachers' classrooms came down as they and/or their students accessed experts in various fields through digital means; • A de-privatization of practice occurred when the like-minded teachers collaborated, shared successes/challenges and encouraged one another with their respective use of strategies with an digital underpinning; • This de-privatization of practice continued through the regular visits of a Learning Coach for Innovation; • Through the use of various digital means, pedagogical documentation became far more precise. Parents became key members in the assessment process*; and* • Teachers became knowledgeable about the SAMR framework and to realize the possibilities that technology holds to transform a learning task.
Impact on System	**System Scaling:** The Principals participating in this research initiative were strategically selected in order that their learning could be shared both informally and formally with others this year and in the future. The focus of the ***LKDSB Leadership Symposium*** was deepening our understanding of the authentic integration of technology into our classrooms. During the 2016-17 school year, a cross-panel Principal inquiry group will be formed with their learning replicating the process that was introduced to this year's Principal team. The *LKDSB BIPSA 2016-17* will have two overarching goals – one for Literacy and for Numeracy – both with a digital underpinning. Learning from this initiative has influenced the *professional learning opportunities* being planned for 2016-17 in support of the *LKDSB Technology Enriched Learning Plan.*

Limestone District School Board

Project Title	Going Deeper: Embedding Technology in Math and Literacy
Description	The purpose of this project is to enhance educators understanding of the 7 mathematical processes to assist with the development of conceptual understanding in mathematics, with the support of iPad technology. Teachers involved in this learning have received an iPad to learn from. Our experience tells us that teachers for the most part, need to be comfortable with the device in order to model its effective use and foster student use in classrooms. Each classroom was provided with 6 additional iPads tor student learning. Each teacher involved has been able to select from a menu of professional learning opportunities that includes large group learning, small group learning, co-plan and co-teach with the support of a Connected Technology Teacher and two mathematical consultants. As teachers become more comfortable in this learning or change grade levels, etc., they are able to modify the way they are learning. We are working with a relatively small group of educators in Grades 3 – 6 around efficacy in mathematics (mathematical processes) and building a deeper conceptual understanding of the math, as well as using technology to leverage, enhance and support learning. We are modelling the effective use and management of technology with the educators, including applications such as Explain Everything to ensure all students are able to demonstrate their learning in a variety of ways and that educators involved in the project are becoming more comfortable with the evidence through conversation and observation.
Context	*Number of students:* 1,500 *Number of teachers:* 67 *Number of schools:* 13 *Grades/Program:* Gr.3-6, Mathematics
Impact on Students	Our 13 schools involved in this work have found that there has been a significant improvement in the area of intellectual engagement that has contributed to greater communication of the mathematical strategies to solve problems and the digital representation of those strategies. By working with educators and guiding them to design authentic learning tasks that explicitly integrate mathematical competencies, they were able to create a culture where students could make choices in how they demonstrated their learning. Using programs like Explain Everything has our students excited to engage in their work as it is being completed in a way that is more relevant and authentic to them. Problems that they are assigned are meaningful and complex and require them to transfer their learning from the traditional classroom setting, with pencil

	and paper tasks, to one where they need to communicate their thinking and apply taught strategies to real life problems on a presentation that will be presented to groups that need to learn new strategies for their own success. They use Explain Everything and Book Creator to support communication, problem solving and reasoning to develop a deeper understanding of mathematical concepts. One teacher noted that the use of the devices has "been most useful for our students who are exceptional. The differentiation using the iPads helps them feel more confident and be able to say to themselves 'I can do this math'. They don't see themselves as not being able to do it or not as smart as anybody else because they are able to use voice activated software and access visual supports. It has given [students] more freedom to show what they actually know, what they actually learned and what they actually understood which is much closer to grade level than with traditional pencil and paper tasks". We can see the transformation occurring between success within the classroom setting and overall student well-being when our students who were not typically identified as leaders are beginning to take on a leadership role as they are becoming more confident in their abilities to learn and share their knowledge.
Impact on Instruction	Providing opportunities for our educators to become comfortable with their technological devices and focus on how to teach mathematics through the processes while leveraging technology has created a culture of greater student ownership over their learning in our schools. Through well planned professional learning (in the form of workshops, co-plan/co-teach sessions and one-on-one mentoring) that modeled deep mathematical thinking leveraged with technology, our educators' instructional strategies and assessment practices are becoming more responsive to the needs of our students. Workshops were differentiated for the variety of needs of the educators involved, with less experienced sessions that focused on the accessibility features and more intermediate sessions that dug deeper into applying technology in ways that would redefine classroom teaching and educator pedagogy. We also provided individual and small group co-plan/co-teaching support based on feedback provided by educators. Educators found the one-on-one sessions "invaluable" when initially incorporating the devices into their classroom. One educator said "I always could see the benefit [of using technology in the classroom] but couldn't figure out how to work it into my curriculum, how to work it into my classroom. If I didn't have [the one-on-one support] I wouldn't have been able to figure out how to do it in my classroom." Educators involved in the co-plan/co-teach sessions worked in small groups which allowed for impactful shifts and advancements in practice, pedagogy and

	technology implementation. The partnerships between the educators and the students is something that has seen a tremendous shift in some of our classrooms – with the transition from the teacher being the sole provider of information in the class – to educators and students as co-learners. Our focus on enabling and encouraging the educator to be a co-learner with their student is a step towards achieving excellence. It has also allowed for significant transformation in the way educators are conducting assessments for, as and of learning in their classrooms. Educators have found that recording the communication and the stream of consciousness of their students has been invaluable in what their students know and are able to achieve. Educators can change their approaches and individualize representations that they are working on with their students better differentiating to support the needs of all of the learners in their classroom
Impact on System	Sharing authentic examples of deeper learning in mathematics, we are creating a transformational shift in classroom practice and teacher pedagogy. This project will easily integrate into the renewed math strategy that our board will be implementing next year as it is already focusing educators on deep thinking and use of the processes in mathematics instruction. Cross-school partnerships are being enhanced through our collaborative OneNote and education on the use of social media and Skype has allowed the walls of the classroom to expand and for meaningful collaboration to appear among educators and their students in different locations. This use of online discussions and communities has fostered critical thinking, communication and collaboration among our classrooms. [O]ur educators are recognizing the power of technology for connecting to other educators, classrooms and experts to collaborate and utilize as a source of professional learning. Our LDSB twitter chat engages educators in conversation about issues that are current and meaningful to today's classroom and connects all levels of stakeholders in our organization. Our afterschool learning series is facilitated by educators within our system as a way to promote leadership from the middle and promote growth of the other educators around us. Sessions focus on different technology or learning strategies and are connected to the best pedagogical practices encouraged by our BIPSA. Our system also includes a group of administrators who are passionate about learning current trends in technology and modelling technology in the support of pedagogy at all of our administration meetings. These administrators embed technology to model communication strategies so that leaders at all levels understand how we can utilize technology to differentiate and meet the needs of the students. We are currently experiencing a shift towards students bringing their own technology into the classroom (BringIT) for deeper learning purposes.

London District Catholic School Board

Project Title	Scaling a Culture of Collaboration: Shifting System and Individual Beliefs about the Virtual Learning Environment
Description	Our TLF project expands on the premise that the effective use of enabling technology can serve to enhance student engagement, learning, and achievement if we can scale up and sustain a culture of collaborative learning and innovation amongst educators, staff, and students. Success indicators include: • Increased comfort and confidence (self-efficacy) amongst educators and staff in using technology, as well as effectively using connected learning communities (i.e., vLE, Office 365) to towards informing assessment and instructional practices • Integration of technology in the classroom to facilitate authentic learning opportunities for students and global (21st Century) competencies • Development of teacher-librarian and teacher-teacher partnerships enabled by technology • Development of teacher-student partnerships enabled by technology The lead learners selected for the TLF project play a pivotal role. Some of the expectations for our lead learner include: • Support Board vision and rationale for alignment regarding the use of technology • Support staff in accessing technology-related information • Support staff in their awareness of professional learning modules available in the vLE • Engage with hardware/software apps provided • Increase knowledge base in order to assist others at the school level • Build on existing technology knowledge/skills by practicing with increasingly complex ideas • Support technology integration in the classroom (SAMR Model) Through implementing a graduated release model for their colleagues, our expectation is our lead learners will be comfortable and confident enough to share their knowledge and use of technology with their colleagues. This can brought about either by modeling for staff how to do things, (e.g., using an app, using the vLE, using a mobile device), coaching staff or informing staff where they might go to find the information they require. In essence, we hope our lead learners will serve as a first point of contact within their respective schools for technology enabled learning and teaching. Round 5 serves as an opportunity to continually scale up the effective use of technology, so that it becomes common practice within and across our elementary and secondary schools.

Context	*Number of students:* *Number of teachers:* 63 *Number of schools:* 54 *Grades/Program:*
Impact on Students	Our Theory of Action for the TLF initiative mostly focused on building teacher/librarian (i.e., Lead Learner) and school-system capacity towards using technology and ultimately to enable student engagement, learning and achievement. As such, our data collection methodology mostly centered on Lead Learner centered metrics and only indirectly on student centered metrics. Lead Learners over the course of TLF initiative perceived that their use of the vLE significantly impacted student engagement. At base line, only 10% of Lead Learners indicated that their use of the vLE had a large to great extent on student engagement relative to 25% at post-survey # 1 and 47% at post-survey # 2. At post-survey # 2, 30% of Lead Learners also indicated that their use of the vLE had at least a moderate to moderately high impact on student engagement. With respect to the impact of the TLF initiative on student learning and achievement only 8% of Lead Learners indicated that their use of the vLE had a large to great extent on student learning relative to 37% at post-survey # 2 using a seven anchor point scale. A relatively high percentage of Lead Learners (i.e., 52%) indicated that at post-survey # 2, their use of the vLE had at least a moderate to moderately high impact on student learning and achievement. Lead Learners perceived their use of mobile devices and their use of the vLE impacted 21st Century competencies in students including collaboration, critical thinking, creative thinking, communication, and digital citizenship. Lead Learners indicated that the TLF mostly impacted communication skills, closely followed by collaboration and creative thinking. Overall, these results are fairly promising, given that the focus of the TLF was on building Lead Learner capacity and school-system capacity as a prerequisite and foundational step towards enhancing student learning/achievement.
Impact on Instruction	One of the key aims of the TLF initiative was to have Lead Learners integrate the use of mobile devices such as iPads and Pro Books into their respective roles at schools. Only 24% at baseline of Lead Learners had indicated that they integrated their use of mobile devices into their roles at school at a moderate to great extent compared to 63% at post-survey # 1 and 72% at post-survey # 2. In their open-ended responses to this question, a number of Lead Learners also commented that their use of mobile devices along with their use of OneDrive and OneNote have significantly enhanced their recording student work, providing feedback to students and collaborating with students. Over the course of the TLF 2015-16 initiative Lead Learners have also become

	more comfortable with sharing with their respective school staff, a basic use of mobile devices. For example, at baseline only 14% of Lead Learners indicated they felt largely or very comfortable with sharing with school staff a basic use of mobile devices compared to 22% at post-survey # 1 and 50% at post-survey # 2. At baseline only 4% of Lead Learners indicated a relatively high comfort level in sharing a basic use of D2L with school staff, relative to 8% at post-survey # 1 and 21% at post-survey # 2. An additional 53% of Lead Learners indicated they were at least moderately comfortable in sharing a basic use of D2l at post-survey # 2. Overall and over the course of the TLF initiative, Lead Learners became increasingly more proficient in the use of board enabled technology resources. The use of D2L represented the technology resource warranting the most opportunity of improvement. This finding should not be too surprising though given that approximately 40 of the 104 Lead Learners were librarians who did not have the same level of access to the D2L platform as classroom teachers did. Lead Learners were asked to provide any additional comments. A thematic analysis of the comments revealed the following three key themes: • Tremendous professional learning impacting student engagement/learning • Enhanced self-efficacy regarding use of technology to enable student learning • Impactful networking and collaboration
Impact on System	One of the system-level outcomes that the initiative has contributed to is the finding that 100 % of classrooms are now engaged in the vLE, and 100% of all staff have participated in at least one professional learning session via the vLE. Our plan moving forward is to sustain the gains we have made through the TLF by retaining our Lead Learners in all of our schools. We will need to rely more heavily on the use of the vLE and collaborative networking sites and forums for continual learning and sharing. One of the key challenges identified in a debriefing session was the inequity of access to mobile devices amongst schools especially those schools with significant socio-economic disadvantages. This will be an important consideration in our system level planning and roll out of major initiatives such as our Board's mathematics education strategy and other initiatives.

Moose Factory Island District School Area Board

Project Title	Ministik School Integrates iPads in to Health and Physical Education/ Mathematics and Numeracy
Description	The purpose of this project is to increase engagement, participation and academic achievement in Mathematics/ Numeracy and also continue to integrate technology into Health and Physical Education. Lessons will be delivered by paper and pencil 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 math 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 Math and Health and Physical Education.
Context	*Number of students:* 300 *Number of teachers:* 4 *Number of schools:* 1 *Grades/Program:* JK-8
Impact on Students	This initiative has positively impacted students' engagement. More students are able to use iPads regularly during the week. Students are becoming more familiar with routines and understand expectations. Students like to use the iPads 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 are able to research sport and rules quickly. Mathematics participation has increased when using iPads. Every student can work independently using the iPads. 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. 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.
Impact on Instruction	Health and Physical Education has implemented the use of iPads and specifically chosen iPad applications, during individual and/or small group instruction, consolidation, and assessment portions of lessons. Teachers from each division have integrated IXL math lessons into their regular

	math routines. IXL is an online-based application where students develop and practice math strategies and problem solving skills. Teachers have had opportunities to use their smart boards to deliver lessons and content. Teachers that are not very familiar with the iPads are starting to use them more and learn more about them. The CODE project is keeping teachers current and the students are interested in using the technology. It is encouraging teacher to collaborate together and teachers are sharing strategies and ideas with each other. Teachers have asked for additional technology based Professional Development sessions to help them learn new ways to use the devices.
Impact on System	This initiative has changed the way we have organized our school. iPad carts are available for teachers to sign out at different locations throughout the school. Lessons can be mobile and travel throughout the school with access to Wi-Fi. Classes are able to take iPads in the school yard, look at different ecosystems and take pictures and videos and upload the instantly to their classroom file folder. These opportunities were not possible in the past. Students are able to get instant visual and descriptive feedback in Health and Physical Education and in Math electronically. This is helping teachers and students stay organized and uses a lot less paper.

Moosonee District School Area Board

Project Title	Broadening the Assessment Repertoire through Pedagogical Documentation of Student Learning
Description	The 2013/14 collaborative inquiry confirmed that primary students, struggling with reading comprehension skills are more engaged if assessment provides timely and tailored feedback to specific learning goals. We have built upon that discovery to incorporate junior division students, teacher/student learning teams and a PLC focus on examining student work through the lens of pedagogical documentation. Reading comprehension and communication skills will be the target. The 2015/16 research will focus on the results if educators increase significantly their use of technology in a greater variety of evidence-gathering strategies. Providing professional learning would be a priority as well as encouraging opportunities for teachers to develop partnerships with other educators that have expertise in the use of technology as an effective assessment tool.
Context	*Number of students:* 87 *Number of teachers:* 10 *Number of schools:* 1 *Grades/Program:* JK-6
Impact on Students	After using the various iPad apps, teachers noticed an increased student engagement. Students were demonstrating an increased sense of responsibility, accountability, and independence in their own learning as they now had a new platform to convey information visually. All teachers noticed that students enjoyed using the technology to create a visible representation of their thinking. Students also enjoyed seeing each other's work and were establishing positive relationships with their peers by giving encouraging and positive feedback. Student engagement also increased as a result of teachers providing feedback and parents being able to comment or "Like" their child's Seesaw postings. When using google apps for education, teachers noticed that students enjoyed the immediate feedback that teachers were able to give as students were working in the computer lab.
Impact on Instruction	Prior to the PD sessions, less than half of teachers used digital media for a variety of assessment. After an in-school PD session on their chosen technology application, teachers were asked to use the app in their classrooms for a period of 2-3 weeks and evaluate its application and value in the classroom. A majority of classroom teachers chose the app Seesaw, a student driven portfolio or online learning journal that allows students to independently share and document their learning at school. Teachers reported that it enabled them to do the following and is reflective of 21st Century Competencies:

	Critical thinking • Gave students more opportunities students visually share their ideas/learning through creation of digital stories • Promote self-regulation in students. Students management and organizational skills are clearly evidenced by submissions to learning journal **Collaboration** • Promote peer-to-peer feedback as students were able to see what other students were documenting • Promote teacher-to-student feedback as teachers were able to provide comments to added items and allowed teachers to have concrete evidence that could be revisited to support their formative assessments. • Engage Parents in their child's learning. **Communication** • Promote increased student oral communication as Seesaw or embedded apps allowed to students a safe and encouraging environment to practice their oral skills and develop their academic voice. • Align 'newer' curriculum expectations such as Media Literacy with digital tool application as students were expected to plan and create media texts. In summary, teachers were able to use iPads in the classroom in more purposeful and authentic ways.
Impact on System	A Google Classroom Staff classroom was created as one method to increase communication among staff and for teachers to highlight and share their ideas of how students successfully used the IPad app in their classrooms. The major themes that have risen from teacher reflections after a 3-week commitment to using chosen IPad app in their classroom is that technology does not have to be overwhelming. While many teachers valued the idea of using tools to enhance curriculum and documentation prior to the project, less than half of teachers were actually using any type of digital tool. Teachers reported that their IPad app were much easier to use than they feared. The findings in using 21st Century pedagogical documentation project suggest that teachers were able to use iPad in the classroom in more purposeful and authentic ways to document student learning rather than kill and drill applications. The project team attended a school Board meeting and presented a NearPod presentation. The school board had previously committed to purchasing selected documentation apps for the IPad but many members had not realized the potential or power of the selected apps for creating new learning experiences for students and teachers. We know that technology will support pedagogical documentation and based on feedback from teachers, our students are making great strides academically.

Near North District School Board

Project Title	Adaptive Technology to Support Success in Mathematics: Blended Learning in the Primary Math Classroom
Description	Our 2015-16 inquiry, with its focus on blended learning, adaptive technology and online pedagogical support, asked: "Is blended learning, featuring collaborative rich tasks and DI, supported by a digital adaptive technology, in particular DreamBox Learning (DBL), a successful model for math instruction and fostering spatial reasoning in primary classrooms?" Our research project looked closely at math learning tasks and how technology-enabled instruction can improve student achievement. We hoped to see increased ability of students to: • Select and use appropriate tools and strategies that will enable them to solve problems independently, and • Create visual representations to communicate their thinking and justify their solutions. The technology that was tested, DreamBox Learning (DBL), provides teachers with tools to regularly examine data and make evidence-based instructional choices. DBL also offers a wealth of embedded pedagogical support. We were looking for information and data on DBL's ability to deepen mathematical/ conceptual understanding using personalized tools that emphasize spatial reasoning, virtual manipulatives, etc. We measured: • Students' ability to transfer success from the digital environment of DBL to solve "unplugged" problems using paper, pencil and hands-on manipulatives. • Teachers' comfort level in using diagnostic information to inform instruction with real-time data.
Context	*Number of students:* 650 *Number of teachers:* 56 *Number of schools:* 28 *Grades/Program:* Gr.2, Mathematics
Impact on Students	Our research project looked closely at math learning tasks and how technology-enabled instruction can improve student achievement. The key 21st Century competencies being measured in this study are Critical Thinking and Communication. A random sample of our Grade 2 math students met with one of our research team members to solve two, two-part math problems using paper, pencil and their choice of manipulatives. Notes on observations were recorded, and audio and video artifacts were gathered. The resulting student work was assessed against the rubric, in moderated marking groups composed of team members. The students were tested twice, once in January and May, to provide

	pre- and post- data. **Student Engagement:** There were 12 questions, and here are some typical response levels. Over 80 per cent of all students chose symbols for Strongly Agree or Agree to respond to the statements: "I think working with numbers is fun," and "I believe there is more than one way to solve a problem." About 78 per cent chose symbols for Strongly Agree or Agree to respond to the statement: "I am able to talk or write about my math thinking." About 60 per cent chose symbols for Strongly Agree or Agree to respond to the statement: "At home I talk about the math work I do at school." Anecdotally, teachers reported that students were enthusiastic about using DBL in class, and the usage and growth rates would support this observation. In a few instances, teachers reported that students found the DBL environment confusing and questions too difficult. Support was provided to these teachers to address these issues. **Student Learning:** The use of DBL as part of the Grade 2 math program built teacher-to-student learning partnerships enabled by technology. Teachers had the opportunity to sit at the student's shoulder, to help clarify problems or figure out how a given activity "works." These partnerships were formed with single students or with small groups sharing common needs or goals. DreamBox Learning is an online learning environment, and therefore cloud, wireless and mobile technologies are fundamental to its use. Several times a week, when students used DBL for their math learning, they accessed it via laptops or tablets. In this way, the digital world of DBL combined with in-person classroom practices to form a blended learning approach to teaching math. Technology also fostered home access to this tool, opening the door to extended use of DBL, and its gamified approach to learning, beyond the school day. DBL data showed: Students in Grade 2 spent an average of 13.73 hours per week using DBL; finished an average of 4.7 lessons per week; 7 per cent of all students used DBL outside the regular school day; and students showed an average 45.46 per cent growth in the DBL online environment. **Student Achievement:** Student assessment was a key feature of our research and took two forms; **t**he "unplugged" assessment activities which formed part of our data collection, and **t**he DBL tools enabling teachers to obtain data on individual student progress from the DBL dashboard. When we met face-to-face with students and asked them to solve problems using paper, pencil and manipulatives. A *sample selection* of results when comparing our pre- data and our post- data is shown below.

	Selecting Tools and Computational Strategies (Question 2): • A 2% decrease in Below Level 1 • A 7% decrease in Level 1 • A 15% decrease in Level 2 • A 25% increase in Level 3 and 4 Communication (Question 1): • A 2% decrease in Below Level 1 • A 6% decrease in Level 1 • A 13% decrease in Level 2 • A 21% increase in Level 3 and 4 Representing (Question 1): • A 2% decrease in Below Level 1 • A 6% decrease in Level 1 • A 14% decrease in Level 2 • A 22% increase in Level 3 and 4 When we compared trend lines for success in face-to-face tasks and success in the DBL environment, we are able to see parallels in growth.
Impact on Instruction	The project has had an impact on teacher practice, both explicitly in building capacity in DBL and data-driven instruction opportunities, but also in the way it stimulated discussions across the board about teaching math. One of the main features of DBL that augmented assessment practices is the ability to see the progress of every student, every day, in a way not even the best teachers can manage when limited by the clock during the school day. Teachers made significant progress in developing this data-based insight into student work to inform their instruction, forming new teacher to student partnerships, one-to-one or in small groups. Extensive teacher PD occurred in connection with the project. 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. Teachers met in their Families of Schools with their VPs to discuss the specific kinds of interventions they could make using to assist their students using DBL data. In-class Instructional supports were provided on an ongoing basis. Teachers completed a survey to gauge teachers' comfort levels with the blended learning model, the use of DreamBox, the use of DBL data to meet individual needs, and to guide instruction. The vast majority of responses placed themselves on a continuum towards more intentional use of data to drive instruction, and a balanced math program that incorporates adaptive technology.

Impact on System	Leadership Development - Concurrent with the start of this study, the board established the role of Family of Schools vice-principal. Among their other duties, the FOS VPs play a strong role as instructional coaches. As such, they provided continuity and consistency across the board with this study. System Plans - Having a system-wide study led to opportunities for different kinds of observations and analyses, as compared to individual school CIs, for example. It allowed us to look for commonalities, to set goals and to compare results from school to school, and class to class. Scaling and Sustaining – As a critical mass of teachers at each school grows, we anticipate that scaling these approaches to Grade 1 and 4 would become easier and the initiative therefore more sustainable.

Niagara Catholic District School Board

Project Title	Effective Integration of Technology to Foster Transformational Learning
Description	There are four key components to the TLF and 21st C project. They involve: 1. Mobile technologies, GAFE & effective technology enabled learning 2. Knowledge Mobilization 3. Wireless & Internet infrastructure 4. VDI (Virtual Desktop Infrastructure) Mobile technologies as well as knowledge mobilization is the main focus of the TLF portion of the project. A portion of the TLF 21st Century Innovation Research Initiative funding will be utilized to support these key components. As part of those key components, we created Google Apps for Education accounts for all students, ELKP-12, as well as senior administration, Principals/Vice-Principals, system leads and support personnel, classroom teachers, educational assistants, early childhood educators, library techs and child and youth workers. The custodians will receive Google ID's in the next phase of our rollout. All members of our curriculum group, the Program department, as well as all members of our special education department have received IDs and have received training on effective integration of GAFE. In the initial part of the year, we identified 8 sites (3 secondary and 5 elementary) to field test the use of Chromebook device and to develop training tools for the board-wide GAFE rollout. This device is accessible to students and schools are encouraged to have students utilize the device to person research, collaborate, create and communicate. A portion of the TLF 21st Century Innovation Research Initiative funding is intended to acquire additional devices to support GAFE. One aspect being explored in order to introduce real-world applications into the classroom, is purchasing devices which would be used by high school students to develop applications that are cross-platform, i.e. can be used on mobile devices supporting Chrome OS, android and iOS as well. The applications would then be tested on the Chromebooks that are being utilized in the schools.
Context	*Number of students:* 45-90 *Number of teachers:* 3-4 *Number of schools:* 4 *Grades/Program:* Gr.7-12
Impact on Students	Teacher comments include: GAFE • Students are self-directed in their learning choosing to use Google to create

	inquiry projects, even from home and share with the class via classroom • Use of Chromebook and Google slides has given confidence and enthusiasm to 3 struggling learners in the classroom who otherwise do not produce written output of similar quality • Use of chrome book for voice typing for students with special needs / writing difficulty- has improved student learning, independence and confidence Literacy • Students can easily voice type their ideas and are feeling better about themselves because they are able to finally communicate their thinking • Students are improving their writing skills - use of word processor in programs with autocorrect gives them the ability to notice spelling errors and correct them independently and to feel success 21st Century Skills • Proven success using Google slides for collaboration in the classroom - working together on projects within Google classroom and using Google drive to share projects
Impact on Instruction	Teacher comments include: *Real-World & Problem Solving* • The other day my class needed to determine how far a kilometre was. We pulled up Google Maps, created our own map, found our school, map a landmark and then the students one by one placed a marker on the map to indicate where they though 1 kilometre was. What a great visual representation. We then went for a walk and walked an actual kilometre. When we got back to class we used the ruler tool to actually mark it on our map and see who was most accurate. *Descriptive Feedback* • GAFE allows for ongoing descriptive feedback DURING the process. Students like that they have a next step when they open their work and I have left comments for them. *Parent Community* • Google sites was used as a hub for files so both parents and students had access to important information, whereas, Google classroom is restricted to teacher and students. *PLN* • Everyone on staff is beginning to see the value in using this tool as it makes staying informed, organized and collaborating with others a piece of cake. …
Impact on System	System planning included: • Meeting with stakeholders in each of the various subject councils to continue

	the dialog of effective technology practices.
	• The development of a new educational technology blueprint for the years 2016-2020 and vetting of the blueprint with the technology steering committee, administration as well as the committee of the whole.
	• Conversations about effective technology integration carried through into the BIPSAW process
	• The relevant priority in the BIPSAW was to:
	    o Enhance technology design resources that support digital discipleship and the appropriate response and use of social media
	    o Expand social justice experiences, global citizenship and international educational opportunities
	Knowledge Mobilization (leverage the experience of others within their classrooms/schools):
	• Face-to-face Learning (some examples)
	• Building capacity at each of the field test schools through a series of visits by the project district lead.
	• Participate in Google Summits
	• Training sessions – tech facilitators, Board staff, administrators, …
	• Online learning (some examples)
	• Develop and maintain a Google site to encourage effective technology integration in the classroom.
	• Utilize an embedded GAFE training program to further support students/staff.

Nipissing-Parry Sound Catholic District School Board

Project Title	Learning For All: Taking It To The Cloud
Description	This year's Innovation Research Initiative will extend the focus of providing GAFE access to students and staff to enable the development of the core practices of assessment: creating rich tasks that are aligned with curriculum expectations, learning goals and success criteria; co-constructing a common understanding of learning goals and success criteria; providing descriptive feedback and providing opportunities for peer and self - assessment. Our action research will provide students and teachers with opportunities to incorporate digital technologies (specifically Google Apps for Education) using a Collaborative Inquiry framework to improve student learning and engagement and teacher learning. Teachers and students will investigate how the integration of Google Apps for Education (GAFE), devices such as Chromebooks, laptops, and iPad transforms student learning, instruction and assessment practices. For example, the purpose of one inquiry is to enhance students' ability to generate and organize their ideas. Cloud-based technologies, such as GAFE, will provide students the opportunity to share their writing with a genuine audience that includes their peers and teachers.
Context	*Number of students:* 275 *Number of teachers:* 11 *Number of schools:* 7 *Grades/Program:* Gr.3-8, Language Arts: Reading and Writing
Impact on Students	Student feedback to a peer was a challenge for students. They were not always certain of what to "look-for". However, with the use of GAFE Google Docs and the Google Classroom, students were keen to give feedback to their peers. With the use of technology, students and teachers could provide immediate feedback and students could act on that feedback to improve their work effortlessly. Students needed only to focus on making improvements using technology so the learning process was much more efficient than re-writing their whole piece of writing. When students are effectively able to give their peers feedback it reflects their understanding of Success Criteria.
Impact on Instruction	Our collaborative inquiry focused on deepening understanding of assessment for learning practices through the effective integration of technology through building collaboration skills between students and teachers. Participants completed a survey at the beginning of the project and at the end of our journey. The SAMR model served as a reference for our collaborative inquiry. At the beginning of our journey, just over half of participants placed themselves at the level of Substitution in terms of how they integrate technology into their

	instructional practice, with some identifying themselves at the level of Augmentation and a very small percentage placing themselves at the Redefinition stage. After a period of learning and, teachers re-assessed their journey along the SAMR continuum and there was measureable growth. In this most recent assessment, there were no teacher (0%) that placed themselves at the level of Substitution and over half of participants (55%) placed themselves at the Modification stage of the SAMR model, 33% at modification and 11% at redefinition. This data represents a significant shift in the pedagogical practice of integrating technology of our teachers involved. Over half of our teachers have shifted from using technology to enhance learning to integrating technology to redesign learning opportunities for students. This research initiative has also impacted teacher practice in that teachers are much more reflective and conscious of the research based model of SAMR and its application to the design of learning opportunities. Over 88% of teachers involved in this innovation research initiative focused on deepening assessment for and as learning practices through the integration of digital technology resources selected 'strongly agree' and 'agree' that involvement in this initiative has had an impact on their teaching practice. Our Collaborative Inquiry has impacted teacher practice in that teachers are learning collaboratively in the area of assessment for learning and are deepening the quality of descriptive feedback to and between students. This research initiative also has highlighted the importance of teachers working together, developing inquiries, implementing actions and assessing their impact. [T]eachers reflected on their journey and shared the following impact on their teaching practices based on student learning results: There was consensus that giving feedback is a necessary component of assessment "for" and "as" learning. At the conclusion of the project, teachers set out to gather evidence that students were actually meeting the overall expectations in writing. Students completed an on-demand writing task that required them to respond to a writing prompt. The results confirmed that with deliberate and well-planned explicit teaching, students can achieve success. It was concluded that teachers who learn and moderate student work together, foster collaborative and independent learning in their classrooms. They build a common understanding of assessment practices, as well as an understanding of what level 3 student work looks like across grade levels or within the same grade level. It was also determined that GAFE played a vital role in improved teachers' instruction enabling collaboration … to communicate daily and to work together on planning and sharing of documents and student work.

Impact on System	Our board's journey of the next phase in 'Learning For All: Taking It To The Cloud" has 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 system wide collaborative inquiry served to form a strong foundation on which to build a sustainable model of teaching and learning. We engaged a total of 15 teachers supported by their principals and three system teachers in a collaborative inquiry focused on assessment for and as learning practices and building collaboration skills through digital technology resources. A strategy to expand our Collaborative Inquiry to include every school and our secondary school will be to plan and facilitate a September 2016 sharing session of all of this year's collaborative inquiry innovation projects. 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 [and] served to build capacity of our educators to feel confident in sharing their best practices and learnings with their colleagues. . As a result of our innovation research initiative our system Teaching and Learning Through Technology Committee (TLTC) is developing a renewed plan building on the system vision … [with a] focus on fostering the following 21st Century learning skills of our students: digital fluency, collaboration, problem solving, communication, critical thinking, creativity and innovation.

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 NCDSB's educational technology phase training initiative for all staff members, and in turn, students. We are measuring 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 Gmail, Read & Write for Google Chrome (our web-based assistive technology), and Google Drive and Docs Editors. As an integral part of this initiative, NCDSB's Ed Tech Champions were established in April 2015, and formally trained on Google Apps for Education in May 2015 in a two-day intensive workshop. This core group of educators are providing leadership and the support teachers will need (on site) to use these Web 2.0 tools to further facilitate enhanced learning in every classroom. The Ed Tech champs are trained by the Ed Tech SAT for each phase, and provided with training materials and a link to a survey/checklist on Google Forms, which they then use to facilitate training at their schools. During phase 5, we have broadened implementation of a standard platform (Google Apps for Education) for student and staff collaboration, communication, and creativity. We are investing in our educators, and providing them with multiple opportunities to learn about technology enabled learning and teaching, so that their practices are engaging students.
Context	*Number of students:* 2,174 *Number of teachers:* 144 *Number of schools:* 14 *Grades/Program:* JK-12
Impact on Students	Two Likert scale surveys (Academic Staff, and Students) were administered to help us determine impact of GAFE on student learning. A sample of responses is shown below. **Academic Staff***: I believe that the integration of Google Apps for Education has positively impacted student learning.* Out of 116 respondents to this survey, 37 (31.9%) of academic staff Somewhat Agree that GAFE has positively impacted student learning, while 36 (31%) Agree with this statement. 25 (21.6%) Strongly Agree. The majority of respondents responded favorably to this question, which tells us that academic staff recognize the benefits of using GAFE in the classroom to enhance student learning outcomes.

	Students: Do you like using Google apps in your class? This question was used to gauge student engagement with GAFE use in the classroom. 132 students (43.3%) state that they like using GAFE in class Very Much, and 76 students (24.9%) responded with a 4 on the scale. These results are very positive and may be linked to familiarity, as they also coincide with 86.3% of students often or always use Google Drive and Docs in their classrooms. **Students:** *Does using Google apps in your class help you to learn better?* This question was used to help determine to what extent students perceive GAFE helps them to learn better in class. 32.1% students responded with Very Much, while it was an even split between 3 and 4 on the Likert scale. Again, students believe in the value of GAFE in their classrooms, but this is also tied to *how* teachers are using GAFE to present their lessons. For example, when asked how the students actually used these apps in their classrooms, 253 responded with "I use Google Docs to type up my work." The focus for next year will be applying technology, specifically GAFE and our core suite of iPad apps, in meaningful ways in the classroom. As we increase the levels of difficulty and concentrate even more on practical classroom applications rather than simply how to use the apps, we will use these surveys as baseline data for next year's phase.
Impact on Instruction	In the Academic Staff survey, we asked two Likert scale questions that address Impact on Teachers: *I believe that the integration of GAFE has positively impacted my own practice*. Most respondents (39, or 33.6%) returned a 4: Agree, 33 (28.4%) responded with 3: Somewhat Agree, and 20 (17.2%) returned a 5: Strongly Agree. These results tell us that the majority of staff recognize the positive impact GAFE has made in their classroom with regards to collaboration and sharing work to provide immediate student feedback. *I believe that the integration of GAFE has improved the efficiency of my classroom.* Most respondents (36, or 31%) said that they Somewhat Agree with this statement, while 34 (29.3%) said they Agree. 24 (20.7%) responded with Somewhat Disagree. These results were not as promising as the preceding question; however, this question deals with efficiency. There could be a relationship between this and the "Comfort Level and Ability" question.
Impact on System	The purpose of our project is to determine the effectiveness and impact of NCDSB's educational technology phase training initiative for all staff members, and in turn, students. We are measuring 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

	Gmail, Read & Write for Google Chrome (our web-based assistive technology), and Google Drive and Docs Editors. As an integral part of this initiative, Ed Tech Champions were established and formally trained on Google Apps for Education in May 2015 in a two-day intensive workshop. The Ed Tech team wanted to get an idea of where our staff members were at in terms of using any type of technology in schools. A small sample of survey results are shown below. **Academic Staff:** *Comfort Level and Ability: Gmail* Of 116 respondents to our Academic Staff survey, an overwhelming majority ranged from 4: I'm capable/comfortable and 5: I could teach others with regards to Gmail. 51 (44%) responded with a 4, and 53 (45.7%) returned a 5. There appears to be a correlation with in terms of frequency of use, **Ed Tech Champions:** *Do you believe that your role was critical in the implementation of technology in your school?* 9 champions, or 64.3%, returned a Strongly Agree response, while 5 (35.7%) said they Agree. It was our intention that in establishing this core group of champions and having them present at each of our schools, that we would build and develop leadership. We believe this was accomplished, and will be continuing the initiative next year. *How often do you use your LCD projector or Smartboard?* 19.7% of academic staff use these tools Every Day, 29.9% use them Almost Every Day, and 29.1% use them Occasionally/Sometimes. These results show that this hardware is being utilized in our schools, which is encouraging. We are investing in our educators, and providing them with multiple opportunities to learn about technology enabled learning and teaching, so that their practices are engaging students. We intend to close any gaps in learning through follow-up GAFE training sessions, and revisiting other staff with more advanced training sessions.

Northwest Catholic District School Board

Project Title	Exploring Technology Integration
Description	We planned and implemented scheduled training sessions for administrative staff, teachers and principals in order to 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. We identified people who were committed to and had a passion for technology. These people became our technology coaches to help us support the teachers and principals to adopt technology into their daily practice. We scaled up the 1:1 ratio of devices to students so that there would be a continued move toward greater personalization of student learning, student voice, differentiation and transitions.
Context	*Number of students:* 677 *Number of teachers:* 90 *Number of schools:* 6 *Grades/Program:* FDK and 5-8, Literacy and Numeracy
Impact on Students	Evidence of impact of iPads on student engagement, learning and achievement included: • 45% students reported that the main impact of the iPads at school is *fun*. iPads are fun to use for learning activities. Students reported that iPads were more versatile than pen and paper and more accessible than laptops or desktops. They can get their work done faster. They like using it with their friends for work and socialization. • Some students (about 20%) reported that iPads helped them socialize and work together. For example, *"My iPad impacted my friends and I! We all became a little more closer since the IPads came around. We usually all bond when we watch educational videos or do work together and help each other out! The iPads are great!"* • While most of the data suggested that student engagement was positively impacted by the iPads, a few students had contrary opinions. For example "I don't like how it takes a lot of recess time to finish work on the iPads because we can't take them home for work. Also others play games and it's distraction to them and to the others" • 76% of teachers reported that iPads have a small (27%) or large (49%) positive impact on student engagement in the area of *student interest and motivation* and 71% reported iPads have a small (49%) or large positive (22%) impact on student effort.

	• 67% of students strongly agreed that the iPads improved their research skills. This is 10% more than the results from the 2015 student survey, which indicated that 57% of students strongly agreed that iPads improved research skills. • 45% of students strongly agree that the iPads improved their creativity at school. This is 10% more than results from the 2015 student survey, which indicated that 35% of students strongly agreed that iPads improved creativity at school. • 40% of teachers reported that iPads had a strong positive impact on communication. Teachers reported that iPads only have a small positive impact on other aspects of learning such as independence, collaboration, organization, and responsibility. • Most students are not sure if the iPads improve their achievement in reading, writing and listening. 67% Teachers reported that iPads had a small (36%) or large (31%) positive impact on achievement in reading. 53% Teachers reported that iPads had a small (29%) or large (24%) positive impact on achievement in math. • The EQAO scores in reading, writing, and math indicate that there has not been a significant increase in student achievement over the time that the iPads were implemented. One teacher explained, *“Students don't dig deeply when reading on their iPad. They tend to scan rather than really understand reading within context. Their writing tends to be less formal, which might be appropriate for some assignments; however, they forget to consider the writing traits when using their iPad … .“* • When asked to comment on the impact of iPads on student achievement, teachers tended to revert to comments about student engagement.
Impact on Instruction	Evidence of impact of iPads on teacher practice included: • 64% teachers reported using iPads in their classroom in 2016. About a third of the teachers reported using iPads daily in their classroom. • Teachers reported that the iPads had the largest positive impact on the following areas of teaching practice: resources for planning learning for individual students, technology-enabled instruction, assessment and evaluation of student work, responding to the needs of individual students, and knowledge of student development. • Case study: A teacher corroborated the importance of collaborating with a colleague *“Having the time and the resources to work with another colleague is very powerful -for creating lessons, for reviewing best practises, for making improvements, - that focus on very specific learning goals. These create better/richer work for students and improve student achievement. This also*

	has a positive influence on my attitude towards learning which I believe transfers to my students' attitudes towards learning…" • Case study: A teacher talked about the impact of the iPads on her teaching practice, *"The impact on my teaching practice has been that by providing so much information for students to find at their fingertips, it is no longer my responsibility to be the "expert" in the room. The students and I can find the answers together and have in the moment discussions about topics that interest them. It also pushes me to stay current with my teaching practices since the use of technology is constantly changing."* • When administrators were asked about the impact of iPads on teaching practice, their responses were mixed. One administrator said it had a positive impact on general teaching practice, another said it had a positive impact on teaching students with special needs, another said it has no impact because teachers don't know how to use them effectively for teaching or that teachers don't have pertinent apps.
Impact on System	**SIPS/BIPS:** School improvement plans and Board improvement plans include a focus on moving technology into the hands of students. **Leadership development:** Steps have been taken to support leaders learning in a risk-free and supported environment so that educational leaders have a deeper comprehension of the programs and tools. **Ongoing support:** To build towards an effective technology-enabled learning environment, a coordinated effort to implement iPad technology in the classroom and support teachers as they transition into full implementation of the iPads in classrooms.

Ottawa Carleton District School Board

Project Title	Deeper Learning in Life After Labs
Description	The project will focus on six schools who are participating in the New Pedagogies for Deep Learning (NPDL) project to see how they use technology to leverage deep learning tasks. New Pedagogies for Deep Learning (NPDL) is an international innovation partnership involving students, teachers, administrators, parents and education communities working together to design teaching and learning that leads to greater student engagement. Student progress will be measured against the learning progressions in the NPDL framework (the 6 C's). The six C's (Collaboration, Citizenship, Creativity, Character, Critical Thinking and Communication) are measured against rubrics. Teachers will conduct a self-assessment prior to the project and at the end of the project. This self-assessment measures the teacher's progress in forging learning partnerships with their students, colleagues and the community, creating a learning environment which encourages student voice and choice, using pedagogical practices which foster deep learning, and leveraging digital at the modification and redefinition stages of SAMR. Schools will be given release time to allow for teachers to participate in co-planning of deep learning tasks. Using the collaborative learning cycle they will design, implement, reflect and change and assess their tasks against the rubrics provided on the NPDL Deep Learning Hub (website).
Context	*Number of students:* 2,678 *Number of teachers:* 102 *Number of schools:* 6 *Grades/Program:* Gr.6-8
Impact on Students	Through focus group interviews and their participation in the Learning Tasks, students have clearly articulated how they have been impacted. We find that the results have been remarkable given that this is only the first or second year for these students. All students reported that increased access to wireless digital tools in their classroom improved their ability to learn, by providing opportunities for deeper exploration of materials. They could research information at any time, rather than waiting for access to a reference book or a computer lab. Students reported they were focused more on the learning than on the mechanics of writing or creating multiple drafts. The appropriate digital tools made the writing and presentation process more efficient. Students indicated through the interviews and their work that digital tools such as Google Classroom allowed them to collaborate seamlessly on projects, even with students in other classes. Students reported that they were able to concentrate more on the task, knowing that they could easily edit and revise their work.

	Students spoke about how a variety of digital technology also supported the different types of learners in the classroom. This improved both student engagement and achievement by providing a variety of ways that students could approach their learning. In several of the schools the teachers and administrators reported that it is the students who are now beginning to ask questions around their learning, what the expectations are and what opportunities they have to demonstrate their understanding.
Impact on Instruction	We have seen impact on teacher practice in numerous areas. These have been identified through teacher self-assessment surveys, principal surveys, interviews and the learning tasks. There is evidence of growth toward the development of richer learning tasks that allow for teachers and student to be co-learners and meet curricular expectations through the examination of open-ended questions and problem-solving. In all involved schools there are indications that staff is becoming more confident in working with their students as activators of learning, rather than providers of information and answers. Both staff and principals note that there has been an increase in the acceptance of BYOD, shared, and embedded devices outside of a computer lab in their classrooms. As staff has become more comfortable with Google Apps for Education, they are seeing how they can leverage student engagement with the devices and the opportunities that technology provides to impact student learning. The rich tasks demonstrate how students are being challenged to engage in their learning and collaboration within the classroom and outside its walls. Students and staff have indicated that there is ongoing need to maintain discussions around appropriate use of devices and digital citizenship. Both teachers and students report that technology has also allowed for increased opportunities for teacher to student communication and opportunities for feedback. {S]tudent voice and conferencing opportunities (teacher to student, student to student) were important to achieving meaningful learning and shared goals. Teachers have worked together to prepare the rich learning opportunities for their students. After participating in the process of creating and employing the deep learning tasks with their students, it is evident in the task reports that teachers are reflecting on the positives and negatives of the experiences and are identifying next steps for continued work next year.
Impact on System	While the focus of this project has been concentrated within six school sites, lessons learned are being shared system wide. As part of an initiative that was begun several years ago, each school within the OCDSB designates a staff member to be a Digital Learning Advisor. These DLAs have become advocates for the integration of technology in support of deep learning in every school. They

	have also strengthened two-way communication between the schools and central staff. The DLAs are becoming the champions of technology enabled practices within their school thus providing opportunities for increased staff learning and collaboration. The DLA meetings have also strengthened communication between schools and central staff. This has begun to impact how coaching is provided in the schools and has resulted in connections and collaborations being made between staff, both within schools and between schools. All schools in the district are shifting to having a variety of digital devices and tools that are available in the classroom. An increasing number of schools and classrooms are allowing students to bring their own devices. District coaches continue to support teachers in leveraging mobile devices to accelerate learning and engagement in the classroom. Elementary schools that are currently under construction have been designed as buildings with collaborative work spaces, shared commons areas and in-class technology.

Ottawa Catholic School Board

Project Title	Intermediate Learning Connections
Description	This was the first year of the Intermediate Learning Connections (ILC) initiative. Beginning in September 2015, a team of 4-6 educators and a vice-principal from each Intermediate (Grade 7/8) panel in our board formed to engage in collaborative inquiry about engaging their students in deeper learning. In planning for this initiative, a core team of cross-panel teachers (Gr 5-9) and a vice-principal, with a variety of perspectives, experiences and expertise were brought together. Under the guidance of the leadership team, the goal of the "core team" was to help organize, plan and facilitate professional learning networking and growth opportunities for their colleagues teaching Grade 7/8 around the Ottawa Catholic School Board (OCSB). In alignment with our board's involvement in the New Pedagogies for Deeper Learning (NPDL) Global Project, the ILC's main focus was on developing the 4 elements of Deeper Learning (Pedagogical Practices, Learning Partnerships, Leveraging Digital and Learning Environments), to engage students in developing global competencies (Creativity, Collaboration, Citizenship, Character, Critical Thinking, Communication) and build capacity across our system. School teams were encouraged to pursue inquiries around a chosen Global Competency that supported both their curriculum, and the goals identified in their School Innovation Plans for Student Achievement and Well-Being (SIPSAWs). Participants were encouraged not to see this as a requirement to produce a "project." The ILC was not a "project", but a learning journey where teachers assessed their own professional practice and identified where they needed to grow and how they could transform their practice to improve their students' learning experience. Educators were invited to dig deeper, using the elements of deeper learning as a framework to guide their mindset and practice, to potentially try something new, or to innovate something they had previously been doing.
Context	*Number of students:* 2,500 *Number of teachers:* 82 *Number of schools:* 17 *Grades/Program:* Gr.7-8
Impact on Students	Participating teachers reported that student engagement was positively impacted by this initiative. Whether students were shy or disengaged, rich learning experiences that were relevant to their interests enticed all students to engage in the learning. Student voice played a key role in this, as teachers increasingly provided students with choice in how they demonstrated their learning to their teachers, and had the opportunity to share it with a wider audience.

	As an example, by creating their own 'how-to' videos, students were able to select topics of interest and leverage digital to demonstrate and capture their achievement of FSL curriculum expectations. Students also demonstrated development of critical thinking and communication skills as they carefully planned, analysed and produced a video that would be shared with an authentic audience through YouTube. As a result of their teachers' participation in ILC, students also engaged in fostering a variety of learning partnerships -- from the broader community, to cross-school collaboration, peer feedback within the classroom, and learning alongside their teacher. Cross-panel collaboration was strengthened between elementary and secondary students as they engaged in deeper learning together. Once again, Language curriculum expectations were addressed, but with the additional dimension of an authentic audience in their elementary collaborators.
Impact on Instruction	Participating educators completed the NPDL Self-Assessment, based on the four elements of new pedagogies twice throughout their Intermediate Learning Connection experience. We were specifically able to correlate the individual pre- and post- responses of 34 educators. Generally, teachers self-assessed as higher in the 22 areas, especially around the use of student voice to drive learning design and improvement. Teachers also indicated an interest in continuing to learn more, and as evidenced by their inquiries, many have already begun to share their learning with their colleagues. As a result of ILC, many teachers began to transform their learning environments to support the engagement of their student in deeper learning. This often resulted in a shift from the traditional placement of desks in rows to groupings of desks, to promote collaboration and shift the focus of the classroom to the student desk. This represented a significant shift from the traditional learning environment, where all students are working individually on the same task. This new flexible environment became interactive and student-centered. The layout allowed for the teacher to vary instruction based on the needs of the students and to continually assess understanding and progress while giving meaningful feedback. Evidence of shifting pedagogical practice was also observed as a result of ILC. Educators involved their students in a variety of assessment and feedback strategies that promoted self and peer reflection to help activate and inform the learning. As an example, students participated in a process of building common understanding of this essential global competency. They then applied their learning through peer and self-assessment as they worked together. This resulted in the amplification of student voice as they meaningfully engaged in deep learning collaboratively. By moving from the use of a traditional teacher-created

	rubric to the co-construction of student-friendly progressions, students not only developed their ability to collaborate, but also strengthened their metacognitive skills and gained a deeper appreciation for how meaningful feedback can improve their own and others' learning.
Impact on System	Our Board's ongoing success, starting with our K-6 Learning Connections initiative a number of years ago, and now growing to include our Intermediate educators has created a strong foundation of knowledge and capacity around engaging students in deep learning and the development of global competencies. The self-assessment that was used in ILC will be part of all system learning networks next year, as will a focus on the four elements of deep learning to support the development of global competencies and academic achievement of our students. These tools will allow us to take the capacity that has been built throughout this project and scale it across all schools, all panels in our system. The NPDL school conditions rubric will be used by Supervisory Officers and School Leaders to engage in discussions about what conditions are required for deep learning to flourish in a school community. System staff will also be engaged in learning alongside the educators with whom they work to identify the pedagogical practices, learning environments, learning partnerships and digital tools that will allow their students to demonstrate progress in relation to one or more of the global competencies.

Peel District School Board – Project #1

Project Title	Student Learning Notebook
Description	The Student Learning Notebook is an assessment app that allows teachers to align their assessment practices from overarching learning goals (OLG) situated within a learning map, to learning goals and success criteria. This tool allows teachers to upload evidence of student learning in various forms (audio, video, pdf, link). This evidence is then tagged by OLG, learning goal, achievement chart category, type of assessment. This app will eventually sync to google classroom and integrate more fully with those features.
Context	*Number of students:* 420 *Number of teachers:* 13 *Number of schools:* 13 *Grades/Program:* Gr.1-12
Impact on Students	Through the provision of clear feedback, students were able to determine next instructional steps and were beginning to engage in peer and self-assessment. Teachers and students were able to review learning goals, adjust learning goals and build learning maps that reflect not only the curriculum, but also learning profiles, supporting a more individualised invitation to learning
Impact on Instruction	Teacher relationships were forged between teachers and coaches, supporting capacity building and adding to coach social and pedagogical capital in the project. Collaborations continued between teachers and coaches beyond the initial collaboration. All the teachers and coaches involved in the project were continuing their work on learning goals and success criteria, with most also continuing to align assessment practices to overarching learning goals. Through active derivatization, teachers were showing, sharing, adjusting and reflecting on their assessment practices and moving toward a more student focused approach to assessment.
Impact on System	The SLN is a tool for aligning assessment practices and a supporting the board's numeracy focus. As teachers deepen their understanding of curriculum, student learning needs and equitable assessment practices, they are supporting the implementation of the purposeful assessment planning framework. Professional learning for the use and implementation of the SLN will continue to take place, increasingly being supported by the teachers involved in the pilot.

Peel District School Board – Project #2

Project Title	Science Collaborative Inquiry Opportunity
Description	Theory of Action: If we support teachers in collaborative inquiry, using iPads to engage students as scientists with an emphasis on cross-curricular numeracy, then students will develop their creative and critical thinking abilities, improve their communication skills, and collaborate in an inquiry-driven environment.
Context	*Number of students:* 3,000 *Number of teachers:* 100 *Number of schools:* 33 *Grades/Program:* Gr.9-12
Impact on Students	Evidence was collected by teacher participants during the collaborative inquiry process and shared as a large group during a consolidation day. Key learning shared on that day included: • Inquiry and rich tasks provided opportunities for authentic triangulation of evidence, experiential learning, opportunities for reflection, connection to real-world, and opportunities to step outside of student and teacher comfort zones. When students knew that their work would be published, this provided accountability. • Collaboration seemed most effective in groups of 3. Accountable talk made thinking visible during the learning process. • Students were able to choose their own technology tools in some cases, and it was interesting to note that sometimes low-tech is also engaging.
Impact on Instruction	Peel DSB used a collaborative inquiry process, allowing time for teachers to explore and reflect on their own practice. Virtually every teacher noted benefits in student learning and would adopt inquiry/rich tasks in a collaborative environment going forward. As a group, these teachers were able to access each other and board-wide supports (such as Instructional Coaches, Instructional Technology Resource Teachers and Instructional Coordinators) that they may not have connected with prior to this study. Connections like these, once made, are long lasting.
Impact on System	A model of learning where teachers collaborate, guided by instructional leaders, has long lasting impact and supports positive change in pedagogy. All secondary schools in Peel DSB were invited to participate in this program and awareness of these supports is now broader, through science departments across the board.

Peel District School Board – Project #3

Project Title	STEP App
Description	The Peel Board's new web-based STEP App puts the Ministry of Education assessment for learning framework to support ELLS English language proficiency in the hands of all teachers in Peel. The app is easy to use and works a little bit like Facebook. Multiple teachers working with the same students can observe students during the learning through observable language behaviours (OBLs) and track when they observe the OBL during the learning. Teachers vote on the descriptors within various elements across the strands of Oral language, Reading and Writing. This app can be used in multiple learning contexts and across the curriculum. When teachers see what students can do, they are better able to adapt the curriculum for students in a way that is responsive during the learning. When teachers can see what descriptor students have not yet achieved they are better informed in providing students with learning goals, descriptive feedback and learning opportunities that are scaffolded for students within their zone of proximal development. The application's user friendly program enables collaborative work between classroom and ESL/ELD teachers, uploads data to our Student Information system (SIS), allows educators to view data trends at a glance, collects evidence of student learning to support ESL/ESD programming and promotes paperless documentation of student progress. More importantly the STEP App supports school wide planning and programming for English language learners. Promotion of the App is now happening. A small pilot project is also in progress. The learning sessions are being promoted in a way that facilitates learning across collaborative school team. Instructional Resource teachers as well as Special Education Resource teachers have been invited to initial professional learning sessions. We feel the most beneficial feature of the app is its functionality which enables user to interact actively with dynamic collaborative features of this new tool.
Context	*Number of students:* 47,000 *Number of teachers:* *Number of schools:* 250 *Grades/Program:* FDK-12
Impact on Students	We are still in the very early stages of implementation of this STEP app. The vision for the app is to bring the STEP framework closer to where the learning is happening. Since STEP can be used to support assessment as learning, it would be beneficial for us to highlight to teachers opportunities when students could

	conference about their own progress and learning goals as they relate to the STEP framework. According to our project manager, using the code that tracks when an employee views a student profile (it's there so we can check if there are unseen observations for a student), as of May 19, 359 employees had accessed a student profile and 1522 distinct students have had their profiles viewed. As of June 6th, 455 employees have viewed student details of one or more student, and 2763 students have had their details viewed. We are pleased at these numbers given we have only just recently begun showing the app at learning sessions we conduct in Peel.
Impact on Instruction	In February-early March our curriculum dept. conducted a small pilot project with the Step app to ensure it was functioning correctly and to gain initial understanding of its potential with elementary school teams. Three schools were involved (3 teachers per school- 2 classroom teachers and 1 ESL/ELD teacher). Each teacher was provided with an iPad and came to a half day professional learning session with the Step App project manager and an ESL resource teacher. They also had follow up visits with one of our central ESL resource teachers. These teachers provided feedback in written and verbal form. Some of them also attended our Step APP launch (2 evening sessions- approx. 80 to 100 educators per evening) and provided voices from the field. We also introduced the Step App to our 4 regional secondary ELD sites during part 3 and 4 of our ELD Collaborative Inquiry. We provided each site with at least 2 iPads for their work with students on other apps and felt this would also be a perfect opportunity for them to learn about then Step app and practice using it. The teams at each school were very keen to use the app in their schools with their students who have unique literacy/numeracy needs due to being ELLs with significant gaps in their prior schooling. This was our first time introducing the app and although the premise was very promising to them, the ESL leads at each site (ELL Monitor teacher) did not have the same access within the app as their elementary counterparts. So these initial opportunities to show them the app helped to inform our Step App implementation team as to what information will need to be communicated to future secondary sites when we roll out the app more widely. Further, through these types of trial opportunities we are finding out if any glitches or technical errors need attention. The secondary teachers at one site have been spending a lot of time on co-planning and co assessment. They loved how the app would now be able to reflect their ongoing observations of students. We were able to bring the Step App to 20 school teams (approx. 90 teachers) as part of the learning offered during a 2 part series. The sessions were focused on supporting Students from Syria and Beyond with ELD needs.

Impact on System	The Step App will be launched more fully across all elementary schools in the Fall 2016. Due to labour disruption in the last 10 months, we have been on pause in many respects to the work we do system wide to support professional learning. This year was really about exposure and helping those with a keen interest to begin with the app. We will use the ESL/ELD Teacher Fall Institute to provide information to every ESL/ELD teacher across 200 schools so they may begin conversations with their staff at school. We will also help secondary ELL monitor teachers to use the app in secondary schools as they gradually learn how the STEP framework will support. The goal is to use the STEP app system wide to implement step. We have already been approached by one board as it is interested in developing a similar app tour Peel Step App, so we are in the process of arranging a meeting between our project manager and their IT dept. and ESL coordinator.

Peterborough, Victoria, Northumberland and Clarington Catholic District School Board

Project Title	Leveraging Technology to Support Learning and Leadership
Description	Our board has invested our focus on New Pedagogies for Deep Learning and 21st Century Library. A major component to this project is to recognize the new learning partnership that arises between and among students and teachers when digital tools and resources become pervasive. Through this project we are improving our capacity among Principals, Teachers and students for using technology to capture Critical Deep Learning. We have allowed for 6 days for Principals and Teachers to share best practices and ideas as to the successes of using New Pedagogies for Deep Learning. Our Board is determined to create a more teacher-student learning partnership and real world, authentic learning tasks enabled by technology. Alongside this focus we believe that providing professional learning about assessment practices that reflect deep learning pedagogy are at the route of our Initiative. Our 21st Century Library is intended to position the school librarian as a technology enabled learning coach to students and teachers. We work with the librarians six times throughout the year on technology enabled learning, focusing on the devices we have provided for each school, iPads and netbooks. We are also working with our IT staff to position them to transition from a repair role to more of a coaching role, this transition will become even more important as we migrate our teaching technology to a Windows 10 platform.
Context	*Number of students:* 702 *Number of teachers:* 27 *Number of schools:* 8 *Grades/Program:* JK-12
Impact on Students	We have used a two-pronged approach, New Pedagogies for Deep Learning and 21st Century Library. We have transformed all our libraries into a 21st Century Learning Commons with equipment for loan and extensive training for the board's librarians. On average our Grade 3 and 6 students engaged in NPDL outperformed the rest of their peers on EQAO by 8.7%. The biggest improvement was on Grade 3 Reading, where 89.3% of the NPDL cohort achieved level 3 or 4 where only 69.5% of the remaining students achieved Level 3 or 4. With the exception of Grade 6 Reading, the NPDL cohort outperformed the control on each EQAO test in 2014-2015 school year.
Impact on Instruction	The use of technology-embedded instruction has become a standard practice with the teachers involved with NPDL. They have had many opportunities to share best practices and then take what they've seen from other teachers and

	administrators and bring it back into their classroom. The idea that teacher-student learning can be as impactful for learning is very prevalent. The immediate feedback and continual learning with teacher and student is very obvious. Community engagement as part of NPDL has also increased which has been beneficial for students in building citizenship but also build excellent relationships within our communities. 21st Century Library is helping to transform teacher practice by making available technology tools for their classroom. We have data from a number of our elementary schools and know from that data that on average the library technology spends half its time in classrooms within our schools, signed out by teachers for specific activities.
Impact on System	This year marked the first that we have fully deployed and transformed our libraries and we look forward to refreshing the equipment we purchased for our first phase in 2012. The equipment in our libraries is solely dependent on the TLF money, we will not be able to continue with refreshing the 21st Century Library equipment without it. The 6 C's and framework of NPDL has been a significant driver in improving pedagogy and technology integration, so much so that next year we are planning to employ NPDL at all of our schools so that next year we will be "fully deployed" in both NPDL and 21C Library. We expect that some of the learning we had this year in moving all our librarians to a 21C Library will be leveraged in moving some of our schools into the NPDL model. We also had the opportunity to send some of our system leaders to NPDL network events where they engaged in learning with other networks from around the world and are now able to bring this learning back for the new school year as we scale up.

The Protestant Separate School Board of the Town of Penetanguishene

Project Title	Educational Technology Teacher Empowerment Program
Description	The long term purpose and goal is to scale up and systemize 21st Century technology-enabled innovation in teaching and learning. Once this is achieved, we will see our entire board operating within the redefinition portion of the SAMR model. This will be achieved through strategically setting out an incremental plan to expand the breadth and depth of knowledge for students and teachers. We will access teacher leaders to share knowledge with colleagues around past experiences and learning. In essence, the learners are now becoming the coaches. We will continue to use the expertise of our media literacy lead. **Focus:** • Our primary classes are using tablets, whiteboards and computers to support learning and assessment • **To** further incorporate immersive media, games and simulations (e.g. Minecraft, EcoMuv. Hour of Code, Beyond Code etc.). • **To** continue to improve teacher-student, student to student, parent-teacher, parent-student partnerships and communications through implementation for Productivity applications (GAFE, Google Classroom, and All About Me Portfolios) • To further expand our BYOD policy to include grade six • Students will increase connectivity, collaboration and communication outside of our own community **Outcomes:** • Increased student engagement, enthusiasm, and student partnerships • Better differentiation of learning, immediate feedback for learning, increased sharing of learning • Students will increase collaboration, communication and global citizenship, learning **from** and with others in a safe and responsible manner • To improve students' engagement, understanding, and attitude toward mathematics by using mathematical games, simulations and immersive technologies • Target students will perform higher on diagnostics and programs
Context	*Number of students:* 235 *Number of teachers:* 18 *Number of schools:* 1 *Grades/Program:* JK-8

<table>
<tr><td>Impact on Students</td><td> Impacted student engagement: Statistics regarding engagement depicts an increase from 2014/15 to 2015/2016, as reported by Mathletics participation data and GAFE usage data. Impacted student learning: Students indicated increased confidence and well-being when using immersive technology, as measured by pre- and post- surveys in Google forms. Impacted student achievement: Statistics from 2014/15 to 2015/2016 regarding achievement has increased, as reported by Sumdog diagnostic results. There has also been an increase in the quality and quantity of writing with the use of assistive technology. E.g. Read and Write for Google. Comparison of writing samples has been made without the use of technology and with the use of assistive technology. Teacher and student feedback around student-to-student, teacher-to-student, and teacher-to-teacher collaborative learning has increased, with greater communication, collaboration, critical thinking and creativity taking place. This is reflected through teacher comments, student comments and student output. </td></tr>
<tr><td>Impact on Instruction</td><td> This initiative has impacted teacher practice in a number of ways: Educator practice and pedagogy has been measured. The results have demonstrated an increase in student engagement, achievement, and well-being.
Engagement using technology has increased as the demand for technology is exceeding supply. This is evidenced by the sign-out log for the laptop cart and the booked use of the media library.
There has been an increased demand for the IT teacher Lead expertise to build teacher capacity and to maintain/repair technology. The cost of repairs has increased, demonstrating an increased use of technology. Using online classroom communication tools (i.e. Google classroom and Seesaw) evidence of learning and achievement with families is being shared among students, teachers and families. </td></tr>
<tr><td>Impact on System</td><td> The Innovation Project has been woven into other board and school directives for plans and projects as they are developed and implemented. The board has utilized the expertise of the current school leaders to give customized support to teachers to enhance the 1:1 computing confidence and capabilities. The plan will be integrated into the revision process of the Board's Multi-Year Strategic Plan and Board/School Improvement Plan. In collaboration with the school leaders, and with anticipated, continued funding support, the board has developed an instructional technology five year plan to maintain, renew and replace existing technology. </td></tr>
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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. 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 realm 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	The TLF project has gained incredible momentum at Sagonaska School during the past 3 years. We are confident that the increased staff and student confidence developed with the use of personal technology to support teaching and learning. This has allowed students deeper access to the curriculum and fostered their ability to demonstrate learning in creative and authentic ways. We have been tracking reading growth of our students throughout the project (DRA). We are seeing a steady increase in the scores our students achieve as our project has progressed. 2013-2014: 1st year students averaged a gain of 1.7 grade levels in reading, 2nd year students averaged a gain of 2.7 grade levels. 2014-2015: 1st year students averaged a gain of 2.6 grade levels in reading, 2nd year students averaged a gain of 3.5 grade levels. 2014-2016 (to date): 1st year students averaged a gain of 3.1 grade levels in reading, 2nd year students averaged a gain of 4.7 grade levels. In just 3 years, our students reading gains have almost doubled and all staff and students now use personal technology to support learning daily. It is important to understand that Sagonaska is a Provincial school for students with severe learning disabilities in the area of reading. Our students come to us

	with very low reading scores and often a number of other issues such as non-attendance, low self-esteem and attention issues. We believe that as our students develop tech "fluency", they are motivated to further develop their newly learned" reading skills. Their engagement in learning helps them to refine these skills naturally and meaningfully. The gains we are seeing in the students exit scores (WJ lll) are increasing. Our students are self-assessing their competence and fluency with technology. … it is clear that the student responses to how technology is used to support learning become more detailed and precise from the beginning to the end of the year. This supports our belief that when students can demonstrate their learning appropriately and with fewer barriers, they will see literacy as a necessary skill to allow them to deepen their learning. Our students can also articulate how their use of personal mobile technology is improving their ability to access the curriculum and complete their work. Our students have also been able to participate in a number of virtual learning sessions with artists, scientists, elders, other schools, and other community members. These sessions are active learning opportunities that are often recorded to allow our students to go back and review and to use to help consolidate learning or develop good questions. The engagement of both staff and students in these learning opportunities has been outstanding and the products our students produce after these sessions show genuine understanding.
Impact on Instruction	Our school has been partnering with the Digital Media Arts project from the Royal Conservatory of Music. Our staff has ongoing support and PD from an "in-house" artist and a number of other artists (virtually). We are learning to integrate digital media arts experiences into our day-to-day classroom instruction. Students have been demonstrating amazing creativity in their ability to show their understanding and make deeper connections to the curriculum. This year, all of our teachers where trained as "Google Educators". This training has enabled the staff to delve deeper into the possibilities of a digital classroom. We are able to ensure that our teachers, parents and residence councillors are all able to support students learning at any time of the day. Students always know where assignments, instructions, exemplars and descriptive feedback reside and they are able to easily communicate with each other. The virtual environment also has allowed our staff to communicate in a very different manner. Collaborative planning and regular support for lesson development and individual student planning are the norm and this occurs any time. Our staff has also been capturing their ideas regarding the need for students and teachers to move from "literate" users of technology to "fluent" users of technology. We have developed a matrix to help demonstrate our ideas.

Impact on System	Unfortunately, this has been a particularly tumultuous year for Provincial schools. We began with labour issues and ended with a Ministry consultation. This has delayed our focus on “scaling up” the project. We currently have proposals from a number of schools from PSB that would like to participate in the project. They are developing Collaborative Inquiry Projects that are tied to our goals and the TLF key areas. Schools have submitted lists of technology items that they feel are necessary to support their project and staff from Sagonaska School will be supporting these CI’s. It is our intention to focus on these CI projects in September 2016.

Rainbow District School Board

Project Title	Supporting Engagement, Student-Led Inquiry, and Problem-Based Learning in Applied, Compulsory Courses
Description	This project offers opportunities to enhance student engagement, particularly in Applied/College Pathway classrooms, enhance responsive teaching strategies including assessment strategies, and enhance student communication. Teachers receive support with professional learning that explores fostering 21C skills and digital citizenship skills in students. Teachers also receive school sets of iPad Minis for application in student learning, and receive support in the classroom from a teacher Learning Coach as they work toward engaging learners and collecting evidence of student achievement in a 21C classroom environment. The end goal for the project has three elements: 1) PROCESS: a deeper teacher understanding of modern classroom teaching and learning strategies; 2) PRODUCT: a repository of exemplars of teaching and assessment strategies, lessons, and other materials developed through collaboration and innovative work with students; 3) SUSTAINABILITY: broadening the network of educators working with technology in their courses, and deepening the commitment to working collaboratively with peers to share resources (hardware, as well as artefacts, exemplars, project ideas, etc.)
Context	*Number of students:* 1,500 *Number of teachers:* 22 *Number of schools:* 8 *Grades/Program:* Gr. 9-10 Applied pathway compulsory courses; Gr. 11 College pathway compulsory courses
Impact on Students	To ensure that project goals were being achieved a baseline or reference point was established through extensive data collection both pre-project and post-project. Data collection methods included various surveys. The data from these surveys provided the opportunity for analysis of the project's impact on attitudinal, achievement, and transferable skills measures of growth. Analysis of the student feedback shows that the results from round 5 are consistent with the previous findings from rounds 2-4. The student data showed that as a result of their participation in the 2015-16 TLF 21st Century Learning Initiative: • Students have improved attitudes towards their subjects • Students are more confident in their abilities and the quality of their work • Students are more comfortable using various technologies as learning tools • Students are more engaged in the classroom • Students perceived achievement levels improved as a result of the project

	In an attempt to further support anecdotal data from students (and teachers) that showed an increase in achievement, pass rate data has also been analyzed from the project starting year in 2012-13 for grade 9 and 10 mathematics (these courses have been included in every innovation project). Since 2012-13 pass rates for these classes have increased 2.2%. The quality and quantity of student work during the 2015-16 project was very high [and] show critical and creative thinking, communication, and digital citizenship.
Impact on Instruction	Throughout the project teachers received support through numerous professional learning opportunities that explored fostering 21C skills and digital citizenship skills in students. Support in the classroom from a teacher Learning Coach was provided as they worked toward engaging learners and collecting evidence of student achievement in a 21C classroom environment. Analysis of the teacher feedback shows that the results from round 5 are consistent with the positive results from rounds 2-4. Analysis of the teacher data showed that at the end of the project: • Teachers are very satisfied with the technology and all of the classroom supports provided • Teachers noticed that student engagement had increased specifically for ‘at risk’ students • Teachers are now able to improve differentiation for individual learners • Teachers noticed that their students’ confidence, abilities, engagement, and achievement was improved • Teachers are now better prepared to effectively teach with 21C technology and share their knowledge with peers at Rainbow DSB During the innovation projects teachers have created numerous resources such as engaging lesson plans that use 21C technology. Rainbow DSB recently began using Google Applications for Education (GAFE) where every student, teacher, and administrator has been given an account to access these applications. This shareable resource, which is searchable by grade and subject, will be an effective tool for increasing teacher-to-teacher learning partnerships at Rainbow DSB beyond the already strong relationships forged between project participants during the project.
Impact on System	Collaborative learning activities using 21C technology have been scaled up greatly since the starting year of the innovation project in 2012-13 when only 7 mathematics teachers and 190 students participated. Thousands of students and dozens of teachers across all compulsory teaching subjects have now been able to take part in the project. By expanding to all subject areas Rainbow DSB has helped to foster the system-wide culture change.

	To provide all students and teachers the proper technological tools to positively impact student engagement, learning, and achievement Rainbow DSB has moved towards providing a more diverse range of options of technology in its schools. Along with the core purchase iPads, Chromebooks are now being implemented across Rainbow DSB schools. This complements the significant infrastructure upgrade and the recent adoption of Google Apps for Education, which now permits more flexible, open, and reliable connectivity. This innovation project has also led to the development of leaders of teaching with 21C technology (champion teachers) in the classroom. Multiple teachers from every post-secondary school have gained knowledge and developed skills through their participation in the project. They have been able to transfer their new knowledge and skills to other teachers and administrators throughout the board. Concurrent to this innovation project Rainbow DSB has made a shift towards Google Applications for Education (GAFE). This has created an opportunity for scaling through the efficient sharing of teacher resources created during the innovation project through GAFE for all teachers in Rainbow DSB. Rainbow DSB is in the middle of a system-wide fundamental philosophy shift towards 21st Century learning and teaching. The TLF 21st Century Innovations projects have paved the way for teachers and administrators to build capacity in the board. As a result of the TLF 21st Century Learning Initiatives, Rainbow DSB has built great potential for a system-wide sustained increased in student engagement and achievement.

Rainy River District School Board

Project Title	Teaching and Learning in a Digital World
Description	The Rainy River District School Board will be focusing on all grades 1-3 teachers and students across the board to be involved in the project. These grades were strategically chosen as we know that targeting our youngest learners will have the most impact and help sustain the practice and build capacity as they progress through their schooling. We will be changing our focus from grade 10 to grade 7-8 to further embed peer-to-peer learning enabled by technology using 1:1 devices and apps such as Google Apps for Education. Teacher and student training will focus on: • School/parent communication tools such as Seesaw • Apps that foster deeper thinking such as Pic Collage, Draw and Tell • Assistive technologies such as speech-to-text and text-to-speech (Siri, Read/Write Gold) • Student collaboration and peer-to-peer learning using devices and Google Apps for Education • Assessment tools such as Flubaroo, GoFormative
Context	*Number of students:* 1,201 *Number of teachers:* 66 *Number of schools:* 11 *Grades/Program:* Gr.1-3, 7-8
Impact on Students	Using Google Classroom throughout our system has allowed students to collaborate with each other for assignments by using Google Slides, Google Docs, and other Google applications. In analyzing report card learning skills data from our marker classes, we saw an increase of 2.2% of students achieving excellent in collaboration. Being able to assess in real time and provide immediate descriptive feedback using google docs etc. Using applications such as Seesaw allows parents to be more actively engaged, see student work more readily and provide feedback and encouragement to their child throughout their learning journey. Students have demonstrated more independence and initiative through the use technology, specifically the Read and Write app. The app is available to all students throughout the Board and allows students to access curriculum who may not have otherwise had the opportunity. In analyzing report card learning skills data from our marker classes, we saw an increase of 5.2% of students achieving excellent in independent work and initiative. Creativity has improved through the use of various technologies available to student through the use of 1:1 devices. The increase in percent of students achieving excellent in self-regulation from our marker classes was 6.8%.

	Increases in student achievement in the marker classes has also been observed in the areas of Reading and Media Literacy. Reading achievement from term 1 report cards over a 3 year period showed an increase of 9.3% for students achieving level 3 or 4. Media Literacy achievement from term 1 report cards over a 3 year period showed an increase of 6.2% for students achieving level 3 or 4. Writing achievement decreased 4.4% over the same time period. Writing will be a continued focus for next year. An increase in student achievement in the primary marker classes was also evident. Math achievement in the area of number sense from term 1 report cards over a two year period showed an increase of 17% for students achieving a level 4.
Impact on Instruction	The acquisition of technology (1:1 and many-to-one) and professional development support has impacted teacher practice by creating more connections between teachers, increased professional dialogue, and communication with parents/guardians. Differences in teaching practice have been observed throughout the district. Teachers and students have more opportunity to collaborate with each other, causing them to challenge their thinking and teaching practice to create more authentic learning tasks that increase engagement for students. Bridging Ahead sessions provided on-site professional development in the areas of numeracy, literacy and technology for teachers across the Board. Google Classroom was a platform to allow continued professional development and collaboration between teachers on-line. Teachers are now able to collaborate with each other using technology such as Google Classroom, over long geographical distances. Feedback from teachers regarding professional development support specific to technology has been overwhelmingly positive. Assessment practices have evolved through the use of technology. Applications such as Flubaroo and Doctopus have allowed immediate and descriptive feedback to be provided to students. Platforms such as Seesaw have increased communication between teachers and parents/guardians.
Impact on System	Our TLF-21st Century Learning action plan clearly aligns with the goals outlined in the Director's Annual Operational Plan, including: • Develop and implement best technology practices with students, whether one-to-one, many-to-one, and/or BYOD within classrooms. • Enhance "Student Voice" throughout the system. • Further develop strengths-based learning approach throughout the District. • Continue the focus on supports for students with special needs. • Support staff in the promotion and development of 21st Century skills. • Provide personalized support for teachers.

	• Support communication with parents through the Board and school websites and other media. • Implement best practices with students that utilize technology. The funding for the 21st Century Learning Project and the Technology Learning Fund has been vital to the progress of embedding technology and best practices in the Board. Without the funding, the acquisition of technology and professional development provided to teachers on technology would be more limited.

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 two main pillars, a primary NLC with 31 teachers and a JR/INT NLC with 22 educators.
Context	*Number of students:* 1,237 *Number of teachers:* 53 *Number of schools:* 17 *Grades/Program:* Gr.1-8
Impact on Students	Although we don't have quantitative data in relation to the TLF impacting student achievement at this point, we do believe the TLF Innovation 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 (Google Docs, Slides, Sheets, Forms etc.), digital fluency and capturing and highlighting student thinking and learning through the use of pedagogical documentation. 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. One main example of evidence in growth in student learning/achievement is revealing itself through our students' ability to use the devices to capture, document, reflect on and share their learning with their peers, teachers and parents. The teachers involved in our ongoing projects continuously share artefacts from their classrooms that demonstrate that their students 21st Century learning and digital fluency skills are growing and developing at a rapid rate.
Impact on Instruction	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. Our data collection is specifically focused on the impact that the NLC community sessions are having on teacher knowledge, understanding and comfort level with the integration of technology and new pedagogies/teaching and learning strategies into their practice. Evidence gathered through using a triangulation of data (observations, conversations in products) and Survey data have indicated that teacher practice has been impacted in ways such as: • Increased comfort level integrating technology into their practice • 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 in conjunction to enhance the delivery of the curriculum • Increased confidence and 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 • Increased knowledge of ways to capture evidence of student learning • Increased ability to implement and manage student inquiry • Increased ability to promote and support student collaboration • Increased professional dialogue and reflection with other teacher • Greater understanding of Pedagogical Documentation and how it relates to *Growing Success* and assessment *for, as* and *of* learning
Impact on System	Strategies and outcomes that we are focused on achieving that scale up and build capacity include: • We are strategically using a NLC model to provide a support for our educators, and to build capacity across our system. • Our intention and goal is to have provided the necessary training and technology to every classroom teacher by the end of the 2017-2018 school year (we are on target for reaching this goal). • 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 regularly present/discuss what we are doing in our NLC sessions at regular Program Team Meetings to ensure alignment with other initiatives that our Board is focused on. Additionally, through the creation and growth of our system-wide NLCs we are able to track the number of educators that have been involved in the projects over the past few years and also the potential student impact. We are able to ensure that all schools across our system are building capacity in regards to the number of educators who are receiving the professional development and also the number of devices that have been purchased for each school site. [T]his funding is making a tremendous impact across our system. 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 really 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 as well as showing a willingness to share their learning and their passion with others at our NLCs. Without a doubt their learning is impacting both student learning and student engagement!

Renfrew County District School Board

Project Title	Technology Enabled Learning Review
Description	Through its current Information Communication Technology Plan ("ICT Plan 2013-2016"), the RCDSB has made substantial changes to its support services and infrastructure as well as adding coaching support for teachers in effective technology enabled teaching practices to support student learning. The RCDSB is currently reviewing the structure and services of the IT Department and how they support the delivery of the curriculum and effective pedagogy as well as the use of technology within the classroom. On August 11, 2015 an RFI (Request for Information) was issued to collect information from relevant organizations about the services that could potentially be offered to the RCDSB and on September 25, 2015 an RFP (Request for Proposal) was issued. On October 15, 2015 a contract was awarded to IBM Canada K-12 Education to assist the RCDSB in an extensive review of the following: • Educational Assessment- Review technology enabled teaching practices. • IT Infrastructure Assessment • IT Organizational Review As a part of this assessment, stakeholder feedback sessions as well as surveys are currently being conducted with relevant groups. The objective of the external review is to use the information provided in the creation of the RCDSB's next ICT Plan and future Strategic Planning.
Context	*Number of students:* 9,115 *Number of teachers:* 608 *Number of schools:* 30 *Grades/Program:* K-12
Impact on Students	The "Learning Plan Leveraging Digital" (LPLD) and corresponding survey provided insight into students in grades 4 to 12 in order to inform understanding around student engagement and guide future decisions in regards to student learning and achievement. Student voice was evident in the feedback provided by students in the survey showing the progress that has been made as a district in terms of technology integration when reflecting on the past 3 years. 89% of the students who responded to the survey indicated that they are more engaged in learning when teachers use technology. There is also a clear indication by students that they are comfortable with using basic technology. GAFE is being accessed regularly by students as a tool that supports their daily class work. Students indicated that BYOD is an underused resource. The student respondents strongly agree that

	BYOD can support their learning, but they do not bring their own device as they are concerned about damage. While students indicated that they had regular access to technology, they also stated that its primary use was for research, to access information and that using technology for collaboration occurred on a less frequent basis. The student survey also showed that students are strong users of social media at home, but did not report using these same tools at school. With this information, technology can greatly impact student engagement and learning by "changing the shape of civic education in the 21st Century" (21st Century Competencies).
Impact on Instruction	As part of the research project, the LPLD and corresponding teacher survey provided a tool to reflect upon and gauge teacher use of technology and their pedagogical practices that are associated with technology integration. The survey results from teachers indicated that student BYOD is underused however, teachers believe that a BYOD model would engage students and allow them greater access to information. 96% of teachers indicated that they are comfortable with integrating technology into their programming; however, teachers are generally involved in "substitution" on the SAMR model when designing learning tasks. To help support this belief, teachers in our schools will engage students in a variety of instructional strategies (such as inquiry-based learning) following a 1:3 students: technology ratio model. In the time where technology is used, ⅓ of this time will be spent working collaboratively, ⅓ working with their teacher, ⅓ working with technology. As a result of these findings, teachers will require ongoing professional learning to support the pedagogical changes that are needed for meaningful technology integration, how to utilize technology for all areas of assessment (for/as/of learning), and how to leverage technology in task design. In addition to professional learning, all teachers will be issued a device that will allow access to tools and resources that are used for deep pedagogical practices. Professional learning will be given to support the use of these devices.
Impact on System	The LPLD process enabled the RCDSB to create a plan for moving forward that clearly outlines responsibilities and governance structures, timelines, communication and monitoring strategies for the purpose of scaling and sustaining technology-enabled learning and teaching. As a result of the Innovation Research Project a comprehensive plan has been developed that sets strategic direction related to student learning needs. Several areas of focus have been established. For example, a list of educational priorities has been created which will serve as the focus for the next three years. The RCDSB has also established a 'Why' statement, clearly outlining the role that technology will play in the learning process to create clarity and vision of purpose.

	"RCDSB will leverage technology to support student achievement and enrich the learning experience. This will spark imagination and innovation as we guide our students to become effective communicators, collaborators, critical thinkers, problem solvers, creators and global citizens." The research also uncovered areas for improvements that will be required for the infrastructure to continue to support the learning plan. IT staff training will be also be required to support this infrastructure. A technology access model for students has been established which includes mobile devices at the point of learning as well as a supported BYOD program. This will mean a move of student devices from the current deployment model of carts to deployment in classrooms at a ratio of 3:1. Similarly, a teacher access model will be implemented using mobile devices that will allow teachers to perform a variety of teaching and administrative tasks. Supporting the educational priorities and technology access outlined in the plan will require comprehensive PD for teachers, administrators and district staff. This should include, but may not be limited to, 50 hours of professional learning that connects the right technology to support the professional learning goals. In order to achieve these goals, high levels of organizational commitment and plans for sustainability are required. Comprehensive financial planning is currently being developed with a utility-like budget, forecasting for the next 6 years, what will be required to support both infrastructure and professional development. Part of a system-wide plan for scaling involves a detailed communication plan. Teachers and system staff need to understand the purpose of the technology access models and the digital resources and PD that will support the plan. A monitoring plan will be developed for measuring success, and ongoing updates on progress and successes will be communicated to the system.

Simcoe County District School Board

Project Title	Transforming Learning: STEAM; Assessment; Leveraging Digital Tools; Visible Learning
Description	Our TLF theories of action for 2015-16 are focused on STEAM and leveraging digital tools to enhance student learning. Our first system-wide inquiry, Transforming Assessment through Technology, educators and students will authentically leverage digital tools (more specifically, iPads) to support the collection and analysis of triangulated assessment data. *If educators and students authentically leverage digital tools to support the collection and analysis of triangulated assessment data then;* • *Teachers will have valid and reliable evidence to support individual learners with customized pathways and to provide meaningful feedback to students and their families;* • *Students will become more autonomous learners and make their learning visible beyond the school walls;* • *Parents will have improved access to their child's daily learning and become true partners in the learning process.* Our second system-wide inquiry, Leveraging Digital Tools for Deep Learning, will investigate the use of digital tools and resources in helping students develop 21st Century learning skills including; collaboration, creativity, critical thinking, citizenship, character and communication. *If educators and students authentically leverage digital tools and resources to engage in deep learning experiences then;* • *Teachers will develop cross-curricular links and connections to the local and global communities;* • *Teachers will integrate curricula into meaningful, hands-on activities for students;* • *Students will develop 21st Century learning skills including; collaboration, creativity, critical thinking, citizenship, character and communication;* • *Parents, students and educators will become active partners in promoting and supporting digital and global citizenship.* In our third system inquiry, staff elementary and secondary 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 7 or 8 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. , STEAM supports inquiry-based, hands-on learning that builds students' competence and confidence in the creative process, technological problem-solving, and scientific inquiry. Participants have opportunities to explore STEAM based on a theory of action that addresses urgent staff and student learning needs, connections to makerspaces, tech renewal, Science Fair, and community partners [and] strategies for assessing the creative process through conversations, observations and products. Evidence of learning is being captured in our Digital Learning Stories which are open and transparent documents: Each learning story is accessible to the system to view and comment. All SCDSB employees can view these learning stories and can engage in the learning by making comments, asking questions, offering support or suggesting strategies and/or resources.
Context	*Number of students:* 10,500 *Number of teachers:* 450 *Number of schools:* 103 *Grades/Program:* K-12
Impact on Students	Our work in STEAM provides opportunities for students and teachers to develop and demonstrate 21st Century competencies. Results of student surveys found that there were small, but non-significant differences between STEAM classrooms and regular classrooms. However, these results may be a direct result of student identified classroom type and no baseline data to measure direct student level improvements within STEAM classrooms. The vast majority (91%) of teachers either Strongly Agreed or Agreed that their students are more engaged when they use technology in the classroom. The STEAM initiatives have provided students with opportunities to go beyond engagement to empowerment. Many of the STEAM challenges called upon students to discover their own questions, then look for tools, strategies and resources to solve them. Our work in STEAM, assessment and leveraging digital tools has complimented and supported our learning with NPDL which has refocused our attention on the importance of connecting to our local and global community in a meaningful way. For example, students participated in an inquiry that involved using skills from Math, Science, and the Arts to design and build a structure to help someone living in a refugee camp. Students started this inquiry after having conferenced digitally with a UN support worker, and their ability to use a primary source to collect this information engaged them in the inquiry in a way that a text alone could not have done.

	Reflection plays an important role in the context of hands-on, integrated learning. Students participating in STEAM inquiries shared their personalized learning journeys through blogs, journals and teacher conferences. Having a genuine purpose and authentic audiences gave meaning to their work, motivating students to perform at a high level. Students are building an understanding that their learning process is iterative, and that the path to success is paved with risk-taking, failure, and feedback. Our STEAM training sessions introduced teachers to the engineering design process as a framework for collaborative problem solving, and teachers worked through design challenges with curriculum connections. These challenges encourage students to think in a divergent manner as they look for solutions to unique problems. Collaborative problem solving and continuous feedback from peers and teachers are an inherent part of the design process. Students are asked to provide honest, meaningful feedback to one another throughout the learning process. This creates a culture of knowledge-building in the classroom. Students who were in STEAM classes more often reported that they were at or above a Level 3, with 73% of STEAM students reporting versus 71% of regular classroom students reporting. This difference was not found to be significant. Improved critical thinking and problem solving was identified as an area of focus in 77% of the STEAM inquiries.
Impact on Instruction	*Technology-enabled Instruction:* The vast majority (91%) of teachers either Strongly Agreed or Agreed they were confident in their ability to learn how to use new digital technologies. Over the course of the year we observed an increase in the number of teachers in our inquiries using technology to collect evidence of student learning (80% do this weekly or several times per week), support student learning, and inform their instruction (88% at least several times each week). *Learning partnerships (teacher-to-teacher, teacher-to-student):* Through collaborative work including co-planning, co-teaching and reflection, teachers developed their own emerging knowledge of STEAM, 21st Century competencies and enhancing learning through the integration of technology. A contributing factor to the success of their inquiries was the opportunity for educators to differentiate their focus by selecting one or more goals that was the most appropriate fit for implementation of curriculum expectations and the learning needs of their students. [P}articipants were able to learn from each other's experiences while developing a precise plan for advancing student learning. The integration of technology further supported the development of new learning partnerships between and amongst students and teachers that focused on the process of learning. In addition to face-to-face professional learning, Teacher-to-teacher relationships were enhanced through the use of cloud based

	collaboration tools such as Google Docs, Google Classroom and Google Hangouts. Our STEAM collaborative learning was embedded in the classroom. As students and teachers worked together as co-learners, they became engaged in collaborative problem solving. Students gave an average rating of 3.8 out of 5 stating that they agree with the statement, "When I'm stuck on something at school, my teacher works with me to get unstuck"; however, students in regular classrooms reported similar results. The vast majority of teachers (89%) felt their students were more engaged when they integrated concepts from other subject areas in their lessons, and only 26% felt that their students engage in deeper learning when they focused on only one subject area at a time.
Impact on System	Although the bulk of new educator learning happens in classrooms alongside our students, our shift in culture has been focused on whole system learning rather than limiting new learning to classroom teachers. The idea of learning and modeling from the classroom to the boardroom has helped us deepen our new learning. As with all of our collaborative inquiry work this year, our *Learning Stories*, which document the learning achieved through our TLF work, are digital, co-authored, transparent and visible/accessible to all staff. This visible learning allows everyone to benefit from the learning of others. The connected nature of our inclusive Board Learning Plan for Student Achievement and Well-Being (BLPSA-WB) provides sustainability but, it also provides agility. Our model of the professional learning and the opportunities available allow for collaborative inquiries to meet the diverse and changing needs of students and educators. This "sustain-agility" keeps us relevant and responsive. We continue to shift our new learning model (students and staff) away from isolated or disconnected learning to purposeful, learner chosen and authentic learning experiences that take place on site. Teachers have choice and voice with regards to professional learning opportunities. Staff from the Program and Innovation, Special Education, First Nations, Metis and Inuit Education and Student Success departments facilitate these inquiries.

Simcoe Muskoka Catholic District School Board

Project Title	Engage and Transform
Description	Phase 5 or our TLP project is a by-product of the success found in the first four phases. In early spring 2015 our Director announced that the board would adopt Google Apps for Education (GAFE) as the primary productivity and communication tool for both the classroom and administration. The plan also included a laptop for every teacher and the expansion of our Phase 4 pilots to all our Junior classrooms, Grade 9 Religious education classrooms and Grade 9 Applied Math classrooms. All Junior classrooms are now equipped with iPads at a 3:1 ratio and HDMI Projector; Grade 9 Religion classrooms are now equipped with 10 Chromebooks and HDMI Projector; and all Grade 9/10 applied Math Classrooms are equipped with a mix of Chromebook, iPad and Dell Venue technology at a 3:1 ratio and include a HDMI Projector. Screen Casting technology is planned for all these classrooms. The focus now is on providing Professional Development to support: • The use of board provided technology to transform and enhance the use of technology to support student, and teacher, learning • The use of technology to support student confidence and success in mathematics • The use of technology to re-energize and re-invigorate the Religious Education program
Context	*Number of students:* 5,800 *Number of teachers:* 240 *Number of schools:* 51 *Grades/Program:* Gr.4-6, Gr.9 Applied Math, Gr.9 Religious Education
Impact on Students	Survey evidence shows a high degree of impact on student engagement, learning and achievement. Teachers believe that students who have access to technology show much improved ability to demonstrate creativity (93%), and think critically about information presented to them (75%). Teachers believe that their ability to communicate with students has significantly improved (90%). Teachers believe collaboration among students has improved (90%) as well as the student's engagement with their work (86%). Overall, the results from the teacher survey showed that the availability of technology to support learning showed a high degree of impact on all the 21C Competencies and learning partnerships Anecdotal feedback from students in the junior grades seems to be that a majority want a device with a keyboard to do most of their school "work" beyond video and image capture/production. Some students pointed out that they can use their phones for much of what the iPad does, but need a keyboard device to do the more involved school "work".

Impact on Instruction	83% of teachers felt that the availability of technology had a positive impact on their ability to incorporate more assessment for and as learning. Comments include: *“I can monitor/observe/ and provide feedback on student work in a more timely fashion often right when the work is happening”* *“I am able to differentiate assessment and take advantage of electronic portfolios for the first time”* 87% of teachers felt that access to technology has changed the way they prepare for lessons and/or activities. *“Lessons are prepared and shared via the Google classroom – can included videos, links to relevant websites. Lessons are more engaging for students … differentiations is much easier with tools like Read&Write for Google”* From a teacher perspective their ability to improve the range of instruction was limited by the device (iPads). Anecdotal conversations our lead consultant had with many teachers indicated their frustrations with not having a voice in the selection of the device and not having a mix of devices.
Impact on System	Our project, known as ICAN (Improved Confidence and Achievement in Numeracy) is a GLS1O course designed for grade 9 students who are going into Applied Mathematics. These course helps students build relations and confidence in numeracy. The goal is that with improved learning skills and work habits. As the data shows in “ICAN_Results1516” those schools that fully participated in the programme showed significant retention and success results from the mid-term grades reported in the GLS1O program, through the mid-term mark reported in their MFM1P course. Those schools not fully participating in the program did not show improved results. ICAN will continue next year. From the feedback gathered from participating teachers and critical friends, the focus on staff development next year will be to improve content knowledge among ICAN / Applied Math teachers. Building on the success of the Junior grades “Engage and Transform” rollout, the second phase of project will begin in 2016-17. This phase will involve the infusion of technology into the intermediate grades (7 & 8). Key learnings from the Junior rollout included a re-visit on the type of device deployed to support student learning and teacher instruction. Another systematic change has been the creation of a central iPad “App” catalogue from which teachers / students can install pre-approved applications. A mechanism has also been created for teachers to request the addition of Apps to the catalogue.

St. Clair Catholic District School Board

Project Title	21st Century Learning For All
Description	The purpose of this project is to improve the student engagement and achievement of applied and college level students through effective pedagogy and technology. We are investigating Learning for All /Universal Design so that teachers see the benefits of how what is necessary for some is good for all. We hope to continue to build the capacity of teachers in applied and college level courses by connecting the learning from previous rounds of TLF. Our hope is that through collaborative inquiry, professional development, and enhanced technology (Chromebooks and IPads) that teachers will become more effective at addressing the learning needs of all applied and college level students with an emphasis on those with an IEP. We are very interested at how we can use technology effectively to more deeply engage students in the learning process. Using technology and an inquiry approach to learning, we hope to see an increase in student attendance and intellectual engagement. We hope to see classrooms where students create instead of consume knowledge and where students can use technology to solve problems, make their thinking visible, and capitalize on local and global resources. We anticipate that doing so will result in motivated and engaged students and teachers where students show increased performance on standardized tests and in report card data in addition to more visibly demonstrate 21 Century skills.
Context	*Number of students:* 675 *Number of teachers:* 27 *Number of schools:* 2 *Grades/Program:* Gr.9-11
Impact on Students	We are finishing the second year of 21st Century Learning for all. Key indicator data from across the system indicates that our applied and college level students have shown increasing success in attaining compulsory credits in the applied and college stream. In addition, the SCCDSB 4 and 5-year graduation rate has increased for two consecutive years. As teachers are continuing to learn how to embed technology effectively, students are modeling an increase in their willingness to learn with increased stamina and resilience. We are also seeing evidence that when students have a deep, meaningful personal connection to what they are learning, they are more likely to give their best effort at making their best thinking visible. [A]s many teachers continue bring a deeper understanding 21st competences in the classroom, we are seeing continued increase in collaboration, communication, creativity and critical thinking.

Impact on Instruction	Teachers with sustained work with the project (over two years) have shown a continued increase in their willingness to model “radical incrementalism” (Breakespeare). Here teachers openly take risks to be innovative with their students and they are showing increased desire and responsiveness to work with teachers in different departments, schools and the central office curriculum support team. Modeling a Growth Mindset for students, teachers in this project continue to model an appreciation for 21st Century competencies. In doing so we are seeing increased examples of inquiry tasks where students become creators rather than consumers of knowledge. Reflecting on the tasks created within the group, we see a need for continued growth in creating tasks that foster deep and meaningful partnerships, both in personal and via digital technology.
Impact on System	Our project has allowed the opportunity for 6 schools across the system to participate in a collaborative inquiry (NPDL) with each other. This inquiry involved meeting in large group, small group and digitally over the course of the year, to investigate how our system and leverage technology to improve engagement and student achievement. We have seen evidence of spread in schools when teachers are asked to de-privatize and share their practice with other staff during staff meetings, PD days and school based and system based collaborative inquiries. Our team recognizes there is much work to do in this regard. Our goal for next year is to scale much of our learning in 21st Century competencies across the system by involving a few staff across division from every school in the system in the TLF project. Our efforts will focus on: • Creating teacher-student partnerships that leverages technology • Providing in school experiences enabled by technology • Addressing assessment practices that enable deep learning • Fostering teacher to teacher partnerships, leveraged by technology, that encourages collaboration, critical thinking, communication and creativity.

Sudbury Catholic District School Board

Project Title	Creating a Culture of Collaboration
Description	The Sudbury Catholic District School Board will be enhancing and deepening colleague- colleague, teacher-student and student-student collaboration using technology by providing all stakeholders with access to collaborative technological tools (Microsoft Office365) in tandem with the transformation of Secondary School Libraries into Learning Commons to allow for equitable access to a variety of technological devices and tools by students. This research initiative is seeking to improve collaboration amongst and between administrators, educators, support staff and students through the use of digital tools (Microsoft Office 365) as well as a variety of technologies (iPads and Lenovo Laptops in the Learning Commons).
Context	*Number of students:* 300 *Number of teachers:* 365 *Number of schools:* 7 *Grades/Program:* JK-12
Impact on Students	We have started to see an impact on student engagement and learning through this project, however it is not the focus for our project. Our focus has been the roll out of the O365 tools for teachers; however, we are ABLE to report that all students grade 7-12 have now been issued their own email address and teachers are beginning to use the O365 tools with students. Elementary students will be set up with accounts by the end of the year, so that teachers can begin using the O365 tools with students in September (2016). We have also included a question on our end of year survey asking about the perception of the impact on student learning and engagement. The survey revealed that 6% indicated a very positive impact, 24% some positive impact, 16% little impact and 24% no impact. This indicates that there may be a need for some additional focused professional development on how the O365 tools can be used to increase the collaboration and communication between learning partnerships.
Impact on Instruction	Teachers have become much more familiar with the O365 tools with a trend towards using cloud based storage. Approximately 25% more teachers have attempted to use one drive when compared to the survey from the year before. We have also seen a spike in teachers using One Note or One Noteclass Notebook. 24% more people are familiar with the tool this year when compared to last year. There has not be a significant increase in the number of teachers who are making use of the Sharepoint sites for communication between colleagues. Last year there were approximately 60% of people who had never accessed a Sharepoint

	School Staff Site. This year there were still 56% of staff who had never accessed a Sharepoint School Staff Site. Part of the issue is that we have had difficulty setting up all of the staff sites. Last year only 14% of respondents indicated that they had used a shared document to collaborate with colleagues. This year that number has risen to 31%. Teachers have slowly begun to use some of the O365 tools to collaborate and communicate with their colleagues electronically. This shift towards electronic communication has already started and the hope is that it will begin to translate to an increase in electronic communication not only between teachers but between teachers and students and between students.
Impact on System	SCDSB began by providing 'early adopters' with training in O365 to begin capacity in early 2015 by bringing in out-of-board experts to conduct training. SCDSB next created a Steering Committee/Training Team. Two members of the Steering/Training Committee were trained as Microsoft Innovative Educators and Expert Trainers (capacity building). The Steering Committee held a variety of training sessions and support materials to groups of teachers and support staff. The Steering Committee/Training Team continues to work with classroom teachers and students and staff to build capacity in the use of O365 for instruction, assessment and learning using a variety of O365 tools. At the end of the 2015-2016 school year two Technology Integration Teachers were hired (one at secondary and one at elementary). Their job was to provide any technology related professional development requested. The TLF Project is directly tied to the Board's Technology Goal: "To increase student engagement and achievement by providing more opportunities to demonstrate knowledge, skill and understanding through the use of technology." Microsoft Office 365 provides students with increased equitable access to a variety of learning and productivity tools that will provide more opportunities for student to demonstrate knowledge and skills, and to collaborate with their peers and teachers, and to receive feedback from their teachers in new ways.

Superior-Greenstone District School Board

Project Title	Technology Enabled Learning and Teaching in Superior-Greenstone District School Board
Description	Superior-Greenstone District School Board has invested in leadership development and technology enabled learning and teaching opportunities for all learners with the launch of the Technology Champions program. 13 of our 16 schools will have access to a face to face technology contact to support at the elbow PD and modelling of 21st Century learning for all staff members and students. The Technology Champions have been supplied with a laptop to support their ongoing PD. As well, they will have several opportunities to attend virtual and face-to-face PD hosted by the SGDSB TELTC, as well as PD opportunities outside of the Board to support their learning. The Technology Champions will access Twitter to build community amongst the team, as well as to develop an online PLN to support their individual PD needs and to connect with educators, experts and resources outside of SGDSB. Technology Champions will learn: • How to create, organize, collaborate and share with GAFE • How to access to SmartBoard technology to enhance teaching practice • How to access, modify, communicate, assess and provide feedback effectively in the vLE • How to use Twitter to create community with the Technology Champions, develop a PLN and flatten the walls of our schools by connecting virtually outside of our classrooms • How to support all learners with various technology enabled learning and teaching entry points
Context	*Number of students:* *Number of teachers:* 13 *Number of schools:* 13 *Grades/Program:*
Impact on Students	While we do not have systematic evidence of impact of technology on students, teachers, and the system, we do have a few pockets of success. Therefore, in this report we highlight and describe preliminary outcomes based on a sample of anecdotes and observations. *"My students have become more engaged and are sharing their ideas more regularly with myself, their peers and their parents. Students are constantly asking to try new things and they are demonstrating more risk taking and grit."*

	"My students are beginning to realize that using technology is more than just opening up a document to type an essay. The students in my classrooms are blogging to share and reflect, using Kahoot to review learning, watching videos to research and problem solve, interacting and connecting with others using Google Hangout and Twitter. Student impact has been immense and there has been more accountability with the use of Google Classroom and even social media groups on Facebook and Twitter. The walls are starting to come down and student awareness and competency in 21C learning has started to increase."
Impact on Instruction	The initiative with the highest perceived impact on teaching practice was Technology Champions. The outcomes of the technology champions initiative are as follows: • An educational technology learning community was built with professional development and maintained using social media, e.g., Twitter. Twitter was used to encourage, document, share learning regarding using technology in classrooms and build community and capacity among the Technology Champions. • Teachers did self-directed professional development in schools. • The needs and questions of teachers were addressed quickly by the technology champion in the school. Support is responsive to learner needs.
Impact on System	• Continue to move through the phases of implementation with troubleshooting and problem solving as needed. • Begin to collect systematic evidence of the impact of technology-enabled classrooms have on students, teachers, and the system. • Build on the success of the Technology Champions. e.g., Initiate a program for student Technology Ambassadors (TAs) at each school. The objective of the alliance would be to enhance the use of technology for learning. This will also provide leadership opportunities for students within our Board and honour student voice which will assist in informing our planning. • A researcher from Lakehead University will assist in the development of a valid and reliable measure of the 21st Century competency: collaboration. The intended use of this measurement tool is to use it as the dependent variable in future research studies looking at the impact of educational technology on collaboration.

Superior North Catholic District School Board

Project Title	Building Relationships through Collaboration and Communication
Description	<u>Purpose</u>: Behind effective collaboration and communication is strong relationships. Our ultimate goal is to use technologies to increase relationships between and among our schools, students, teachers, principals, administrators, and communities. <u>Focus</u>: Improving Collaboration and Communication through: 1. Google Apps for Education 2. Social Media (specifically Twitter) 3. Problem-Based Learning (Genius Hour and 20 Time) 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 teachers, principals, and students in their respective schools. <u>Outcomes</u>: 1. Teachers, Principals, and Administrators will be connecting and collaborating using Twitter. The collaboration will result in highlighting ways to help students develop 21st Century Competencies. 2. Our Grade 5-8 students will be using theirs to support problem-based learning. 3. Students and educators will work together using GAFE. 4. The Digital Learning Volunteers will become leaders within the Board. They will form a network that will share ideas and help spread and support deep learning through technology.
Context	*Number of students:* *Number of teachers:* 9 *Number of schools:* *Grades/Program:*
Impact on Students	<u>Google Apps for Education (GAFE)</u> Digital Learning Volunteers (DLVs) have observed GAFE having a positive impact on student engagement. DLVs have observed GAFE having a positive impact on student learning. Teachers noticed an increase in independent work. For example, students who struggle with decoding are able to have texts read aloud to them by using the Google Read and Write extension. Students who have difficulty with writing, are able to use the speech to text features. The DLVs have also noted that access to GAFE enables students to receive timely

	feedback from their teachers and peers. Students in a grade 5/6 class used the comment feature in Google Docs to provide peer feedback. The DLV observed that the students were “excited” to be able to provide next steps based on their co-created success criteria. Another benefit of GAFE is that the collaborative nature of the tools allows students to better share their learning with one another. For example, students have used Google Docs to generate group notes for studying. In addition to increasing collaboration within our classrooms, GAFE have also allowed our students to communicate with people outside our classrooms. For instance, a Grade 7/8 class arranged a Google Hangout with our local Member of Parliament. The students were able to ask her questions about what it was like to be an MP. In the Fall, we held our second Google Apps for Education Student Summit. Some of our students have become so proficient in using the Google tools, that they facilitated breakout sessions where they taught their peers and other teachers how to navigate the apps. Other DLVs mentioned that the summit also lead to some great in-school collaboration between classes. For example, one school has established a student “Tech Team.” This group of students goes into younger classes and helps the students and teachers learn new technologies. *Social Media*: DLVs have observed Twitter having a positive impact on student engagement. The use of social media has helped move learning from teacher-based to audience-based. Students are more engaged because their learning involves an authentic audience. For example, on Family Literacy Day, students from one school were encouraged to tweet out their favourite books. Not only did others (including teachers from other school districts, our Director, and parents) begin tweeting out their favourite books, but the authors of the children’s books began to comment and like the students’ tweets. A few teachers have created classroom twitter accounts, where they share what is happening in their classroom with followers. The students are more engaged in their learning because they now see it as something that is shared with others; it is no longer isolated to the classroom. “Their excitement for learning is fueled by the fact that they can not only share it with their peers and family, but with others all over the world.” *Problem-Based Learning*: Digital Learning Volunteers have observed that problem-based learning has a positive impact on both student engagement and student learning. One teacher commented that, “we saw student engagement skyrocket!” Students began asking to work on their genius hour projects when they had free time and others would choose to bring their Chromebooks home in the evening so that they could continue working. One student decided to initiate a community project to get their local swimming pool re-opened.

	Leadership: During our Google Apps for Education Student Summit students spent the day learning about how they can use the various Google Apps. Some of our students have become so proficient in using the Google tools, that they facilitated breakout sessions where they taught their peers and other teachers how to navigate the apps. Not only does this give our students the opportunity to be leaders in their schools, it also sends a clear message that even educators are learners! The summit also lead to some great in-school collaboration between classes. For example, one school has established a student "Tech Team." This group of students goes into younger classes and helps the students and teachers learn new technologies.
Impact on Instruction	At the beginning of the school year, the DLVs completed a baseline survey. The data guided the focus for the DLV Meetings; it gave a snapshot of what tools and resources the DLVs needed to learn about in order to support technology enabled learning and teaching in their schools. There was clear and significant increase in the use of GAFE, Twitter, and Genius Hour by the DLVs. DLVs need to have a solid understanding of these tools to promote them, model their use, and support others in order for project scaling up. Overall, our DLVs created a network of collaboration. When they weren't collaborating during our meetings, we used a Google App called Google Hangouts to continue the communication. DLVs asked questions and shared resources with one another. 100% of the DLVs felt that the meetings had a positive impact on their understanding of instruction and assessment in their roles. Having in-school support for GAFE has helped our system move forward with these tools. DLVs have noted that they were able to help move the staff in their schools from simply having an awareness of GAFE, to actually using the tools in their daily practice. There has also been an increase in social media use across the system. At the beginning of the school year, three people were using our board hashtag in Tweets. We now have multiple educators (teachers and principals) from every school sharing their learning online.
Impact on System	This year's innovation project has had a significant impact on system plans. In order to continue our goal of using GAFE to foster collaboration and communication skills among staff and students, SNCDSB has already committed to a one-day, custom Google Summit for all employees of the board. SNCDSB has also begun to look at how the physical layout of our schools impacts collaboration and communication. We will begin by looking at transforming our libraries from traditional library spaces into student-centered learning commons. With respect to organizational processes, there have been many changes that are a result of the innovation project. For example, as a system we now use Google

	Hangouts to video chat with individuals who cannot physically be in meetings. Groups of educators have also been using Google Hangouts to communicate with one another. As far as leadership development is concerned, 100% of the DLVs believe we should continue to have Digital Learning Volunteers next year. Not only are the DLVs become leaders within our system, but their knowledge and expertise is providing them with leadership opportunities outside of the system as well.

Thames Valley District School Board

Project Title	The Library Learning Commons
Description	Our project centers on the transition of the Library space in schools to the Library Learning Commons model. Central to this transition, we have broken the project into four different topics. The physical layout of the Library Learning Commons discusses pedagogy and the use of technology in the SOLE model (Self-Organized Learning Environment). This involves a shift from the use of desktop computers to the use of more mobile technology (Chromebooks and iPads). The Makerspace session highlights the technology options that can be used for circuitry, coding and programming. The third topic, Creative Spaces, utilizes technology for digital storytelling, conductive art, green screen apps and music creation. Finally, the virtual spaces in the Library Learning Commons utilize technology to extend the learning beyond the walls of the school through opportunities such as Digital Field Trips. Outcomes include the identification and implementation of the areas that define a Library Learning Commons, along with a shift in pedagogy that is driving the learning in that location (i.e. collaborative inquiry-based learning).
Context	*Number of students:* *Number of teachers:* 459 *Number of schools:* 153 *Grades/Program:* FDK-12
Impact on Students	*Assessing achievement via engagement* Within our project, we elected to utilize engagement as a measure of achievement due to the complexities of inferring causation and isolating academic achievement both within such a short timeframe and with so many other confounding variables. We asked students how the LLC was enhancing their learning in specific subject areas or in general. Two main themes emerged. First, that students were making the observation that they were now able to demonstrate their understanding in a variety of ways given the technology that was available to them. Second, that they could, and were, making links between these new learnings and skills needed to accomplish curricular tasks such as math and sciences. *Increased 21st C skills - Collaboration, Creativity & Global Citizenship* We observed that the incorporation of emerging technologies (such as MakeyMakeys, Ozobots, Spheros, littleBits, robotics, etc.) fostered student creativity, and supported numerous learning partnerships through both guided and open-ended collaborative inquiry activities. Students described how the new physical layout of the space has increased the opportunities for them to

	collaborate with peers. Students also spoke about the way that the activities within the LLC had enhanced their sense of community and improved their awareness of the world around them. For example, high school students have been exposed to community partners and researchers who have given talks on topics ranging from financial literacy to criminology at their LLC. *Increased autonomy and problem solving through experiential learning* One of our notable findings from the project was the idea that teachers were hesitant to introduce a technology into their classrooms that they had little or no experience with. To allay these concerns, we highlighted the idea that students could be given access to these technologies to explore and learn in a self-guided way. Due to the fact that this technology was available in the library learning commons, many teachers noted that groups of students in different grades who would otherwise have no reason to interact found common ground and began to work together with a sense of purpose. Many high school students also talked about the strong partnership they had developed with the Teacher-Librarians who have the key role of connecting them to resources beyond their school thus helping them to prepare for postsecondary learning and life beyond the walls of their school. Students also spoke about the way that the activities within the LLC had enhanced their sense of community and improved their awareness of the world around them.
Impact on Instruction	One of the pedagogical elements that was carried through from previous projects was the use of the inquiry model with students. In the current version of the project, we again modeled a Collaborative Inquiry centered around what learning looks like in the Library Learning Commons such that school teams could participate in the active learning that inquiry provides. We also modeled the use of different online tools which help to facilitate collaborative inquiry. While we have not collected specific data on the number of teachers in the systems who are using the inquiry model in their classrooms, we have talked to a number of schools during and after the project who have embraced the idea at a school level. Since the creation of our board's GAFE domain in September 2014, we have seen a steady and rapid growth in the number of users to the point that in the last week of May we had 31,471 different active GAFE accounts. Given that our board has approximately ~73,000 students and ~10,000 employees, this accounts for 38% of the combined total being active cloud users. The exponential growth that we have seen in the past four months has demonstrated that cloud-based computing is very much gathering momentum in our board. Teachers provided a wide variety of partnership examples that they had

	experienced with their students. The anecdotal conversations in the professional development sessions indicated that teachers were becoming more comfortable with the idea that they could be co-learners with their students when beginning with creative and maker technology. Our key reason for making the Teacher-Librarian the central member of each school's Library Learning Commons team was the idea that because of their teaching placement and their often flexible schedule, they have the opportunity to work with each student and staff member in the school in a way that no other teacher does. It was outlined that the Teacher-Librarian would be in attendance at every session, which was done for the purpose of ensuring that they were exposed to all of the technology being discussed and had a cohesive understanding of the Library Learning Commons model. Within this project, there was a deliberate attempt to help teachers understand how the technology that was being introduced through the project could be integrated into the curriculum in meaningful and authentic ways. Our analysis of an exit survey from the PD session centering on Makerspaces highlights that teachers were indeed making curriculum connections between the technology that was showcased and the different subject areas.
Impact on System	Thames Valley District School Board staff engaged in professional learning to understand how the pedagogical and physical elements of the Library Learning Commons enhance the programming and learning within our schools. Increased use of mobile and cloud-based technologies is a key priority under TVDSB's Information and Communications Technology Strategic Plan for 2015 – 2018. This project has supported this initiative by increasing the availability of mobile devices within schools as well as supporting the pedagogical integration of these devices into teaching and learning. Over 660 more Chromebooks and 180 iPads were purchased through this project which increased student access to mobile learning devices. In addition, schools had the autonomy to select maker and creative technology to purchase that supported their current learning needs. The current version of this project is very much a scaled model of what we have worked on in previous years. Past projects have centred on cloud based computing and the Collaborative Inquiry Model, and in this most recent version we have extended both of these ideas within the physical space of the Library Learning Commons as this is a space that is accessible to all members of the learning community. This decision was made for reasons of capacity building. Student achievement is first a product of capacity building and engagement for teachers. Making this a priority helps to support student engagement and well-being, which in turn leads to improved student achievement. In our work this year, we have been able to address the first two pieces on

	teacher capacity and engagement as well as creating more opportunities for student engagement. In the next phase of this project, it will be possible to purposefully evaluate student achievement by looking at how the activities within the LLC lead to improved student grades as well as demonstrating growth in their learning skills and work habits.

Thunder Bay Catholic District School Board

Project Title	Learning with Technology
Description	The purpose of this project to leverage technology for teaching and learning in support of the TBCDSB Collective Commitments: • High Expectations & Academic Optimism for All (believing that all students can achieve high standards, given the right conditions) • Closing the Gap (meeting the needs of vulnerable students with proven best practises and student/parent involvement) • Relevant and Complex Learning Designing (lessons that are based on real-world situations, to foster multiple problem-solving strategies and many possible solutions) • 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 setting in academic programming) Project Inquiry Question: How are 21st Century skills and innovative instructional practices enabled through access to a cloud based learning environment?
Context	*Number of students:* 45 *Number of teachers:* 45 *Number of schools:* 8 *Grades/Program:* Gr.3-12
Impact on Students	Teachers commented that the primary impacts on students' learning with the integration of GAFE have been intellectual and emotional. It appears that the integration of pedagogy (inquiry-based, project-based, team-based) that supports 21st Century skill development with the selection of GAFE tool appropriate to the learning activity is the key to impacting student learning. Intentional design of learning activities and assignments supported by the affordances of GAFE (sharing, collaboration) serve as a supportive learning environment. Teachers noticed that students are more engaged – with the learning content and resources, with other students, and with their teachers. Teachers (90%) reported that using GAFE had a positive impact on their communication with students, 83% reported a positive impact on collaboration, and 82% reported a positive impact on engagement with students. Teachers reported that using Google Classroom allowed communication with

	students and parents, as well as any-time access to materials. This mitigated any issues of falling behind that arose in the event of student absences.
Impact on Instruction	Teachers reported that the most frequently used tools were Google Classroom and Gmail. Given that these serve an important function in classroom management, the primary purpose reported for using these tools was to communicate (Google Classroom 86%; Gmail 88%) and share information (Google Classroom 73%). Google Classroom was the also most frequently used to provide feedback to students and to grade assignments and tests (50%). Teachers reported that the use of GAFE, particularly that access is 24x7 and transparent, has shifted the responsibility for learning from teacher-centered to a more balanced partnership between teacher and student. It is interesting to note that while collaboration was not a predominant choice in connection to a particular GAFE tool, it is a clearly dominant theme when they share the impact of their pedagogical approaches supported by the GAFE tools. Teachers (90%) reported that using GAFE had a positive impact on their ongoing professional development and 86% reported a positive impact on their ability to respond to individual student needs. 54% of teachers reported working with another colleague as one of their top two preferences … may have implications for system-level professional development strategies that foster more teacher-teacher partnerships. We are providing teachers with more opportunities to engage in deep learning focused on technology-enabled learning and teaching by supporting collaborative inquiry as a vehicle for professional learning. We are taking a multi-pronged approach to professional learning that includes: on-site, embedded support for teachers provided by technology resource teachers and teacher-librarians; sustained learning opportunities through collaborative inquiry; school-based professional learning opportunities led by principals; support for self-directed learning (for example, releasing teachers to complete online modules and certify as GAFE Educators); opportunities to learn from expert teachers (classroom visits, workshops, GAFE Summit). Thirty teachers and administrators from across the system were afforded the opportunity to certify as Google Educators. These 'early adopters' are catalysts for implementation in their schools. They have incorporated GAFE tools and resources into their practice and their passion for GAFE is inspiring colleagues. Many are sharing their knowledge and expertise (staffroom conversations, classroom visits, informational items during staff meetings).
Impact on System	In the preamble to the TBCDSB BIPSA literacy goal, we note that literacy involves the capacity access, manage and evaluate information, to think imaginatively and analytically and communicate thoughts and ideas effectively. GAFE tools provide

	support for these activities. Our students are using GAFE tools to: • Articulate their learning • Recognize how to improve their work • Engage in inquiry-based learning • Think critically, make deep connections • Reason and communicate effectively The TBCDSB BIPSA also highlights the importance of 21st Century knowledge, skills and competencies and the implementation plan for this this project was designed to support this priority. We recognize that principal learning is key to the success of our innovation project. We are provided opportunities for principals to develop technical fluency with system tools by offering a series of professional learning sessions focused on GAFE tools and resources and we are supporting principals in developing leadership capacity for technology-enabled learning and teaching, including the capacity to monitor technology-enabled learning and teaching by focusing on this area during principal learning sessions. The IT department has been instrumental supporting the implementation of GAFE within TBCDSB. Significant network upgrades ensure reliability and connectivity within our schools. Our IT department has also committed to the Ontario GAFE consortium; we are collaborating with IT departments from other boards who are implementing GAFE, we are also sharing best practices in respect to technical administration and engaging in collaborative problem-solving around technical issues.

Toronto Catholic District School Board

Project Title	iPad Integration in the Grade 9 Applied Math Classroom
Description	The “iPad Integration in the Grade 9 Applied Math Classroom” initiative was the result of collaboration between the TCDSB Math and 21st Century Learning Departments, who planned and delivered 6 sessions to TCDSB grade 9 applied math teachers. Through this project, we encouraged teachers to explore the use of the iPad to engage and support students in the learning of Mathematics. The focus of this project is on engagement and EQAO scores. The sessions were always facilitated by the program coordinator of 21C and resource teachers from the Math and 21C departments. System identified needs in EQAO were shared as were individual school data. Exit survey results informed the planning team in designing each learning session. The planning team consisted of the program coordinator II of 21C, two 21C and four Math resource teachers, and eight classroom teachers. As part of each session, a survey was conducted to gather information on technology use by teachers, and the type of technology used. The planning team collaborated with our research department to create and make available a student engagement survey that attempts to gather perceptual data from students on math and technology use. We asked that students complete this survey at the start and end of each course. The Math resource teachers also provided a template on how to estimate EQAO scores, and teachers were invited to share their predictions. Each session hosted breakout sessions, led by classroom teachers that provided them with leadership opportunities. These teachers also shared resources, and worked closely with other teachers to build capacity.
Context	*Number of students:* 2,000 *Number of teachers:* 90 *Number of schools:* 40 *Grades/Program:* Gr.9 Applied Math
Impact on Students	Each teacher attended three professional learning sessions focused on iPad integration in the grade nine applied math classroom. To understand the impact of our learning sessions on student engagement, learning and achievement, we gathered perceptual data directly from students. We also collected data on students indirectly from teachers. Teachers are invited to use a diagnostic assessment to understand their students’ needs and assist with an approximate prediction in EQAO scoring. Repeating this process mid-way and towards the end informs lesson design and instructional strategies. An add-on to this assessment process, both at the start and end of a

	course, is the Student Engagement Survey, which is administered by our Research Department. We were able to gather a reasonable snapshot of student data around the timeframes that session one (November) and session two (February) had taken place. Overall, students had indicated increased levels of comfort and engagement. The follow up survey on learning and achievement with teachers reported that student-to-student learning partnerships ranged from collaborating and sharing during class to after class on a variety of tasks. Also, that students have shared their work with their entire class as they had the ability to display their work over a projector for all to deconstruct and discuss. Teacher-to-student partnerships are evident as teachers also reported that students are communicating more frequently and effectively, by using technology to share with others, create, access, and store their work easily in the cloud while using a shared device and or their own device. Overall, these teacher accounts identify that technology integration led to a change in student mindset, improvement in engagement, and achievement.
Impact on Instruction	When we compare each session's data we noticed that the frequency of usage increased by approximately 20%. The number of teachers that reported as never using iPads dropped by approximately 50%. These statistics were indicative of the fact that the level of comfort with iPad integration was improving. Teachers participated in breakout sessions that were led by teachers. Each breakout session was focused on one or two apps that demonstrated learning activities that addressed specific curriculum strands and expectations. During session three, teachers had volunteered to share their learning and resources as well as lead a breakout session. This was evidence of the capacity building that had taken place over the course of this initiative. As further evidence of teacher-to-teacher partnerships, teachers had collaborated on designing learning activities throughout the period of time these three sessions were taking place. Some teachers had co-planned breakout sessions, and most teachers had also shared resources as part of a repository for every math teacher in our system to use. To capture evidence of teacher-to-student partnerships, each grouping of teachers by school, shared evidence of how they addressed specific student learning needs by explaining how iPads and apps were used. Teachers also reported that some apps were able to impact on their practice because they collected data that made it possible to identify the specific difficulties students were having. This information informed the instructional strategies, learning activities, and evaluations teachers used. As a result, many teachers reported an appreciation of what was possible when technology was effectively integrated with instructional strategies.

Impact on System	The importance of this initiative was grounded in research that uncovered that our students entering grade nine applied math over time had demonstrated gaps in understanding. This initiative was an opportunity to model effective professional learning that was driven by student, teacher, and system needs. This initiative was planned centrally by the 21st Century Learning, Mathematics, and Research Departments. This collaboration involved a synergy between specialists in teaching and learning, technology, mathematics, and research. Each member reported as having learned and grown in the areas of communication, collaboration, use of ICT for learning, organization, data gathering techniques, and facilitation of professional learning in a variety of formats. Our organizational process involved determining a focus, establishing how impact can be measured, and understanding how to design and implement data gathering tools so that specific variables can be measured and impact on students, teachers, and system can be realized. All members of the planning team demonstrated leadership, as they developed many relationships that will sustain the impact of this initiative beyond its completion and into each school community. Participating teachers demonstrated leadership as they took back their learning and shared with their school community as part of sustaining the impacts from this initiative.

Toronto District School Board

Project Title	STEM Teaching and Learning in Toronto District School Board (TDSB): Towards a Strong Theoretical Foundation and Scaling Up From Initial Implementation of the K-12 STEM Strategy
Description	TDSB research has been focusing on "a number of pedagogical approaches grounded in an inquiry-based" teaching and learning framework including: discipline-based, inter-disciplinary based and trans-disciplinary based inquiries, project-based learning, problem-based learning and design-based learning. "[T]hese models vary in certain aspects from one another… [but in general] they share an emphasis on collaboration, creativity, citizenship, self-regulation, technological literacy, and fostering deep understanding." In 2015-16 it is our vision to continue to: • Provide STEM education for all students. • Link real world issues to classroom teaching and learning. • Promote problem-based learning and STEM skills to allow students to stay current, inquire and engage in relevant issues of the world around them. • Encourage scientific discovery and *technological innovation* to shape how future citizens work collaboratively to provide creative and viable solutions to today's and tomorrows' real-life problems. Our goals through K-12 STEM Strategy that are directing our research includes: • Prepare our students to be **global learners** and leaders in **creating solutions** for emerging complexities. • Move public education forward - continue to improve on **culturally relevant** and responsive practices. • Use **problem-based** learning that instills **creativity** and **innovation**, in order to transform teaching & learning. • Develop **creative and innovative thinking** in and across all disciplines. • Increase all students' **confidence** and **engagement** in mathematics, science and technology.
Context	*Number of students:* 1,800 *Number of teachers:* 90 *Number of schools:* 60 *Grades/Program:* JK-12
Impact on Students	TDSB research examined student learning and development of Science, Technology, Engineering and Mathematics (STEM) skills and global competencies as well as growth in achievement and engagement in relation to the TDSB STEM strategy. As an overt display of improvement, students engaged directly in STEM pedagogy showed higher achievement in EQAO Grade 9 Mathematics in both

	Academic (87% versus 80%) and Applied Courses (38% versus 27%) compared to the other students in the same schools with no engagement in STEM pedagogy. Students in Grades 3-12 and their teachers and school administrators from 60 STEM pilot schools in the TDSB participated in a survey on the TDSB STEM strategy. *Student Engagement:* Based on the results of the initial year of implementation of the TDSB K-12 STEM strategy, student engagement in STEM education continues to be strengthened. Seventy-eight percent of secondary students strongly agreed, agreed, or somewhat agreed that STEM education is relevant and meaningful to their lives. Moreover, the results demonstrate that students are very interested in STEM careers. Additionally, students showed very high agreement with STEM skills and competencies, such as collaboration, creativity, critical thinking, and citizenship. *Student Learning and Achievement*: 21st Century competencies have been identified as essential for work in society. Overall, students at the elementary and secondary levels showed very high agreement with the statements on 21st Century skills and competencies. For elementary students, overall agreement ranged from 84%-93% among the eleven statements, and for secondary students, overall agreement ranged from 79%-95%. These findings indicate that students expressed confidence about the 21st Century learning skills. However, students also revealed that they sometimes struggle with time management. The majority of elementary and secondary students indicated that the teachers in their school engaged them in inquiry-based learning; project-based learning, collaboration, practices fostering creativity, and technology use. These findings suggest that the elementary and secondary school teachers who participated in the TDSB STEM professional learning were becoming more comfortable with the role of teacher as facilitator of learning and were using strategies to promote independent student thinking. Research shows that when elementary students learn science through inquiry-based curriculum modules where teachers received professional learning sessions and access to coaches throughout the year, there were significant increases in students' science knowledge and achievement.
Impact on Instruction	At the end of the year 1 STEM implementation, over 90% of teachers strongly believed in the value of STEM for improving student learning. Teachers believe STEM education can help with preparing students skills and competencies, enhance student learning, solve real-world problems and engage in inquiry or problem-based learning. A majority of teachers (87%) believed that STEM education will improve their teaching practice. Teachers feel that they have the necessary understanding STEM pedagogy and resources. Most TDSB teachers in the study reported that they have tried to a great or

	moderate extent to develop students' STEM skills, and that the students have in turn learned the STEM skills. However, about one third of the teachers reported that they have not been able to effectively assess students' STEM skills. Teachers reported that the most common practices they used to support STEM learning to develop STEM competencies were enabling students to use technology to share information, take initiative when confronted with a difficult question and use technology to support team work and collaboration. Overall, the study findings indicated that there are a few areas that can be further development, which include: providing more opportunities for students to choose their own topic or questions, more examples of activities that require analysis of competing perspectives and fostering global connections. The results of the TDSB study showed that majority of teachers networked and collaborated with colleagues suggesting that collaborating in teams was a preferred teacher strategy for STEM planning and implementation.
Impact on System	The findings from initial implementation suggests that the coaching model is a highly viable model to promote STEM professional learning in schools and that it needs to be improved in certain areas to enhance its effectiveness. Such improvements will also be needed to scale up the STEM implementation across the board. This includes: • Hire more STEM coaches to support smaller groups of teachers in the same school or clusters of schools • Hire STEM coaches who are preferably teaching at a participating school to provide for frequent and consistent onsite presence • Designate coaches to a group of schools in the same area as their home school to facilitate consistent onsite access • Provide comprehensive STEM training for coaches that includes criteria and metrics for assessing STEM programs, STEM assessment and evaluation strategies, and STEM career information. TDSB has recently renewed its innovative vision for learning focusing on global competencies and digital fluency as the central elements of its learning vision. Our TLF innovation project aligned fully with TDSB vision for learning as well as Ontario's renewed vision, Achieving Excellence. Through our TLF innovation project we will provide research based evidence informing practices across the board in setting achievement goals that will involve deep learning and educational technology. Current trends of declining numeracy results across the province as measured by EQAO and Ontario's renewed Math Strategy released on April 4, 2016 aligned with our focus on improving numeracy achievement of our students through transdisciplinary STEM pedagogy and deep learning integrating meaningful

	educational technology in teaching and learning. Coding and robotics will remain a focus as we go deeper with specific curriculum connections that envelope the use of robotics and computational thinking. Our goal will be to go further and include technology enhanced improved in numeracy achievement through a STEM pedagogy. To this end we will be including specific Mathematics focused actions which will continue our technology and STEM focus but also emphasize mathematics and numeracy. We will expand the DLL (Digital Lead Learner) model.

Trillium Lakelands District School Board

Project Title	Technology Enabled Learning at Trillium Lakelands District School Board
Description	**Earn a Device** This will be the sixth year of our Earn a Device Program. This program involves teachers taking 8, 2 hour courses outside of the school day in order to earn a device of their choice to use in their classroom. The sessions D2L, Assistive Technology, and Built-In Features of the iPad are compulsory. Over the past 6 years, the total number of sessions attended has been 6202. This program has been completed by 628 teachers. **Coding** A new initiative in the 2015/2016 school year is the coding project. This project is engaging predominantly junior grade teachers and students in computer block-coding/programming. The job embedded professional development sessions provide teachers with teaching strategies, and develop teacher confidence to implement coding within curricular activities. **Digital Learning Classroom (DLC)** The Digital Learning Classroom program has evolved over the past 10 years in our elementary schools. These classroom teachers receive job embedded professional learning to embrace technology-enabled educational practices in their classrooms. This year we have added 10 Digital Learning Classrooms across our 7 secondary schools providing enough technology to support a 1:1 device ratio in these classrooms. Our focus in this program has been on the impact of readily available technology on student learning and achievement. **Secondary Champions** The Secondary Champion role is filled by one teacher from each of our secondary schools, one representative from our Alternative Education and Training Centres, and one representative from our Virtual Learning Centre. Secondary Champions use communication and collaboration to support their colleagues. **Musical Futures** Musical Futures allows students to explore different instruments over time. Classes follow a number of cooperative learning formats that allow students to collaborate in a meaningful way. The students are using drums, bass, guitars, keyboards and vocals at this early stage to create music. When the piece is ready they perform as amazing rock bands! They are still learning traditional skills like reading musical notation while integrating 21st Century learning skills and contemporary technology. **Dedicated Early Childhood Educator (DECE) Pedagogical Documentation** The DECE Pedagogical Documentation project will focus on supporting our DECE's

	in documenting the learning in our FDK classrooms. Teachers will be provided with an iPad to use within the classroom. They will also be provided with a full day of Professional Learning focusing on the pedagogical documentary. **Job Embedded Professional Learning** Consultants are supporting teaching staff in their classrooms by providing job-embedded professional learning through co-planning and co-teaching with classroom teachers. We hired an additional full time consultant for the last three and one half months of the 2015-16 school year. Through this decision, the team was able to provide more opportunities for teacher-to-student and teacher-to-teacher learning.
Context	*Number of students:* 6,118 *Number of teachers:* 180 *Number of schools:* 48 *Grades/Program:* K-12
Impact on Students	The following highlights the impact on students through some of the identified project elements: **Junior Coding Project** One of the goals of this project was to increase computational thinking skills. Since a huge part of computational thinking is being able to take large complex problems and break them down to smaller 'solvable' problems, we asked students specifically about their problem solving skills. Before learning how to code, only 55% of the students would rate themselves at level 3 & 4 on their ability to problem solve. After learning how to code, 87% of students rated themselves as level 3 & 4 on their ability to problem solve. **Musical Futures** Musical Futures has had a significant impact on student engagement, learning and achievement in its pilot year. Student engagement has risen significantly. Students feel empowered and in control of the music learning trajectory and multiple supports ensure that all students feel a sense of achievement and accomplishment. At the end of a teaching sequence, all students are able to perform pieces which "sound" like something to be proud of. Students are better able to apply knowledge and understandings to new and novel situations. They are developing self-regulation, collaboration and communication skills in tandem with music skills. There has been a significant reduction in discipline concerns from all music classes and no reluctance to attend class even from traditionally hard to serve students. **Digital Learning Classrooms** Teacher voice is essential when evaluating our work. Here is what some teachers

	had to say about their Digital Learning Classroom. *"My students have been able to research in real time events happening around the world involving the Syrian refugees and also geography topics affecting our world today."* *"I feel that I have been learning as much from them [students] as they have from me. Their ability to explore various Google Chrome programs in a hands-on manner has yielded amazing results."* *"Students taking more responsibility for their learning. Totally engaged in assignments through Google classroom and some of them are even working at home on their projects."*
Impact on Instruction	**Junior Coding Project** Pre and post data was collected at all four meetings of teachers who participated in the project. With one of the goals of the project being to increase the overall understanding of coding and confidence coding, it was a key measurement. The purpose of this collection of data was to observe over time the teachers' perceived confidence and understanding of coding. At the start of the project, 50% of all teachers participating in the project reported that "I do not understand coding/programming". By the fourth meeting, 3.8% of teachers reported that "I do not understand coding/programming". Other significant gains in perceived comfort were made. When ranking comfort, a large shift can be seen with respondents moving from the 'scared' end of the scale at the first meeting, towards "confident" by the fourth meeting. **Musical Futures** Teacher practice has been significantly impacted by the Musical Futures pilot. The music program has shifted dramatically from traditional band instruments to technology-enabled instruments. While there is still a place for traditional instruments in universal design and balanced music programs, technology-enabled instruments and resources such as tablets, iPods and laptops have completely stretched the boundaries of teacher practice.
Impact on System	**Junior Coding** Research tells us that despite low employment rates in various fields, there is an increasing number of jobs in the field of technology. We are committed to helping our students achieve success. We feel that teaching students how to code and improve their computational thinking skills in one way of achieving this. Computational thinking can be summarized as the process of decomposing complex problems into smaller manageable problems. By teaching students to code, we are indirectly teaching them computational thinking. Our teachers had no problem making the curriculum connections. Our teachers were also making connections to the learning skills which are so essential for our students.

	Digital Learning Classrooms The scope of this initiative has been extended into each of our secondary schools. In our secondary sites we have increased technology to a 1:1 student to device ratio within the various DLC classrooms. Teachers chose their technology and ratio from Chromebooks and iPads or a combination of the two. This choice allowed teachers to address student needs by customizing their technology needs. This was accomplished by assessing the intended needs and outcomes based on the specific strengths of each device (for example touchscreen or keyboard).

Upper Canada District School Board

Project Title	Tech Coach Project 2015-2016 (Round 5)
Description	**Purpose:** Our Tech Coach Project in Round 5 is a continuation and expansion of our Round 4 project founded on the following IF/THEN statement: IF 21st Century competencies are leveraged through the use of technology in a student- teacher co-planning/co-facilitating model in the classroom, THEN teacher comfort level with the aforementioned will result in a change in pedagogy that will positively impact student learning. **Focus:** We are scaling-up the Tech Coach project in Round 5 in the following manner: In Round 4 our Tech Coach project involved 4 secondary schools, 142 participating classroom students and 8 participating classroom teachers. There were also 4 Tech Coach teachers and 26 Tech Coach students. In Round 5, we are scaling up the project to include 24 participating classroom teachers (3 at the secondary level and 21 at the elementary level), 575 participating classroom students (57 secondary students and 518 elementary students). The classroom teacher, Learning Partner (a centrally assigned Learning Partner Teacher from [the] Program Department), the school's Learning Resource Coach and 2-3 students (chosen as Tech Coaches) from each class are co-planning/co-facilitating lessons. **Outcomes:** The classroom teacher's role will shift to one of co-learner – learning alongside the students. The teacher's comfort level with technology will bring about a change in pedagogy that will positively impact student learning as measured by our research. Specific teacher outcomes include the following: Improved comfort level related to: • The use of 21st Century technology and associated shift in pedagogy • Students co-planning/co-facilitating lessons enabled by technology • Students demonstrating curriculum expectations in a way of their choosing (not prescribed by the teacher) Specific student outcomes include the following: • Increased student interest/engagement in the subject matter • Improved comfort level associated with peer-to peer collaboration • The positive impact that student choice has on learning

<table>
<tr><td>Context</td><td>Number of students: 575
Number of teachers: 24
Number of schools: 22
Grades/Program: Gr.3-10</td></tr>
<tr><td>Impact on Students</td><td>Student engagement was measured by pre and post project surveys, where students self-assessed their engagement levels based on questions about participation, motivation and gratification. A random sample of the students involved in the project participated in post project interviews. Common themes related to student engagement that emerged from student interview data were:
Students indicated that collaboration amongst peers not only increased student engagement and motivation, but increased understanding of content.
Students felt that they were more comfortable and willing to participate by learning alongside teachers and in collaboration with their peers than solely learning from the teacher.
Common themes related to student engagement which emerged from teacher interview data were:
Teachers felt that embedding technology into their instruction and utilizing Tech Coaches increased student confidence and student-guided learning in such a way that it became a motivating factor.
Teachers observed a direct correlation between student voice and student engagement. By leveraging student voice during planning and implementation, student engagement was significantly enhanced.
Impact on student learning was also measured by pre and post-surveys, and students involved in the project participated in post project interviews. Common themes related to student learning that emerged from student interview data were:
Students indicated learning from their peers had a positive impact on their understanding of content and concepts being taught.
The added layer of student Tech Coaches available in the classroom allowed for differentiated approaches to learning and raised comfort levels when students asked for clarification.
Common themes related to student learning that emerged from teacher interview data were:
Teachers believed there was a direct correlation between student choice and student learning. By leveraging the Tech Coach collaborative model, allowing student choice, student learning was positively enhanced.
Teachers felt that through the aid of technology, the TCP enabled high-needs students to fully participate in a comfortable environment.
Impact on student achievement was measured by pre and post-surveys as well as</td></tr>
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	post project interviews. Common themes related to student achievement that emerged from student interview data: • Students remarked that feedback was more instantaneous and working with peers on problem solving developed critical thinking and communication. The Tech Coach model allowed for differentiated instruction as well as differentiated demonstration of learning. Since student voice and choice increased, it gave students more ownership over what and how they learned. Teachers felt there was a clear correlation between this model and student achievement. Common themes related to student achievement which emerged from teacher interview data were: • Teachers felt that the TCP gave them the opportunity to alter their assessment approaches which positively impacted student achievement. • Many teachers expressed that they are further committed to pedagogical documentation as part of their assessment practices.
Impact on Instruction	The common themes related to technology-enable instruction (TEI) which emerged from teacher interview data were: • Teachers became more open to the concept of TEI, and in some cases, to regularly using technology as part of their daily lesson planning. • Teachers felt that participating in the TCP allowed them to observe how technology can be used to enhance their teaching practice in a way that positively impacts student learning. • Many teachers became more aware of how technology gave students choice in how they demonstrated their learning. The impact of learning partnerships was measured by pre and post-surveys and post project interviews. The survey results indicated that teachers see the benefit Tech Coach model because of its positive impact on enhancing teacher-to-student and teacher-to-teacher learning partnerships. However, because Tech Coach model is a relatively new practice it requires additional time on behalf of the teacher to implement. 87% of teachers in the post-survey overwhelmingly agreed that the Tech Coach model enabled them to teach in a way that they aspired to teach and 93% agreed that the model supported their curricular goals. Many of the participating teachers reported that they experienced a shifting role from teacher to co-learner, a change they were now committed to incorporating into their practice. Common themes which emerged from teacher interview data were: • In most cases, teachers indicated that their role shifted more frequently to that of co-learner alongside their students. Teachers reported being quite comfortable with their role shifting once they observed students collaborating

	to problem solve and complete tasks. • Teachers observed many instances where students developed learning partnerships with each other in order to problem solve and explore new technologies. Because the Tech Coach model is an innovative instructional approach, teachers felt that they sometimes lacked the knowledge needed about some technologies and thus felt unprepared in implementing the lessons. Most teachers also felt that the workload of trying innovative techniques during the TCP was an obstacle for them. For some, giving control over to students was a novel approach and their comfort level decreased. Common themes related to the connection between curriculum implementation and assessment which emerged from teacher interview data were: • Many teachers felt that their approach to sharing information with their students, and how students shared information with each other, was positively enhanced by technology and the Tech Coach model. They felt that when students were given the opportunity to choose what and how they learned, student "buy-in" was remarkably improved. • Teachers reported that they were still able to assess student learning even though students demonstrated their learning in unconventional ways (through technology). Some teachers commented that when students knew they would be showing their work to their peers, they produced work of higher quality. They sought out partners that they felt would give them an academic benefit, rather than just a social benefit. This in turn, had a positive effect on their achievement.
Impact on System	Our ability to "scale-up" the TCP from 182 participants in 2014-15 to 675 participants in 2015-16 was not dependent on additional staffing resources, but that our model is easily replicated and sustainable. In a few cases, we found that the Tech Coach model is growing "organically" across the district as some schools who were not involved with the project are establishing their own student tech clubs to support teacher adoption of technology enabled learning and teaching. By leveraging Learning Partners' knowledge and presence in the schools, we were able to offer job-embedded support and professional development to the participating classroom teachers. Technology was then integrated into the implementation of the lessons by using the knowledge and voice brought forth by the Tech Coach students. We are continuing to experience shifts in teacher practice and positive gains with student achievement. We are also experiencing shifts with some of our district policies and procedures, as evidenced by our new BYOD policy for students to bring their own devices to school, called "Use of Personal Electronic Devices in the Classroom and School"– Policy 303, adopted June 2013.

Upper Grand District School Board

Project Title	Using Adaptive Learning Technology to Engage Students in Mathematics
Description	The main focus of this project is to improve teacher's use of technology to inform instruction. Our project is built around a specific technology. DreamBox, a cloud-based Mathematics program. DreamBox provides timely feedback to both students and teachers. This project makes two assumptions: First, immediate feedback and a personalized mathematics program available both at school and home will result in improved students' mathematical knowledge. Second, access to timely data on student progress will inform teacher practice. Our investment in DreamBox has provided teachers with unprecedented access to information about their students' mathematical understanding. The program collects 44,000 data points on students for every hour they are on the program. One of the pillars of training is the use of this information to form small instructional groups. We anticipate needing to provide ongoing messaging around this practice. We will be pulling regular reports about how many teachers are accessing this information and how often. We will also be working with the company to determine how best to put the information in teachers' hands, if it is not being accessed independently. Additionally, we are in the process of integrating data from the DreamBox program with other data points collected throughout the Board. This information includes absences, report card marks, IEP's, EQAO results, etc. This information, when combined together will help provide clear indicators of At Risk students. We expect that this will also have a great impact on student learning.
Context	*Number of students:* 7,000 *Number of teachers:* 600 *Number of schools:* 65 *Grades/Program:* Gr.2-8
Impact on Students	We know that this initiative has had a significant impact on student engagement. Anecdotally, we constantly hear from teachers that their students love using DreamBox. This level of engagement is also echoed by our parents, some of whom are our trustees, who indicate that they have to tell their children to stop doing math and go to bed. These anecdotal comments about engagement are backed up by the numbers provided by DreamBox. On average, across our entire system, students using DreamBox have spent 42 minutes each week using DreamBox this school year. As additional evidence of its engagement level, our growth in usage has continued to grow since the inception of this initiative. At the beginning of this school year we had approximately 5000 students using DreamBox. This has climbed substantially throughout the year to more than 9000 students.

	We also know that this initiative is having a significant impact on learning. Anecdotally, teachers are saying that they see their students learning from this program. They hear DreamBox referenced in their Number Talks and during Collaborative Problem Solving. They also see a change in the perseverance of their students when it comes to math, and this is attributed to the program. Small numbers of teachers are logging into DreamBox regularly to identify learning needs and support those students with small group instruction. Teachers are also connecting DreamBox to home, so that parents are engaged in the learning that is happening at school. The Upper Grand DSB is using a number of methods to evaluate the effectiveness of DreamBox to improve student understanding of mathematics. Our preliminary results have shown a correlation between the amount of time a student spends on DreamBox and their increase in understanding of Mathematical concepts. To evaluate the impact of DreamBox we considered a number of different data sets including: report card data, DreamBox's own diagnostic evaluations and EQAO results. This spring we examined report card data to DreamBox. Our analysis showed no significant correlations between improvement in report card marks and usage of DreamBox by student. Research by DreamBox found students mathematical understanding increased by 3-5% in grade level for every hour of use. Our analysis based on the results of 2,067 grade 3 students from September 2015 to February 2016, reached a similar conclusion. Students who spent more than 1000 minutes using DreamBox achieved almost a full year of growth in five months. In the same time period, students who spent between 500 and 999 minutes in the program achieved a little over half a year's worth of growth. Students who used DreamBox for less than 500 mins achieved 25% growth. Our results also confirmed DreamBox's research that for every 12 minutes of engagement students' grade level increases by 1%. Interestingly, the more minutes a student is engaged in using DreamBox the longer the time period to increase in grade level understanding suggesting that students are increasingly challenged by the material.
Impact on Instruction	One of the main goals for this initiative is the change in practice that DreamBox can make possible. DreamBox collects over 44,000 data points on a child's understanding for every hour they use the program. DreamBox has the potential to provide an extra set of eyes in the classroom and to provide the teacher with more information about a child's level of understanding than they had before. The challenge to this is changing practice and getting teachers to log in to DreamBox to seek this information. We know that this is happening, but the

	change is slower than what we would like. About 20% of our teachers are logging into DreamBox once every week. We have seen examples throughout our Board of teachers who are using this information to conference with students, plan their whole-group lessons and create small instructional groups. We know, however, that 80% of our teachers are not using this data regularly. Our next step to promote change will be to offer licenses to teachers who will commit to seeking out the information in DreamBox and reassigning licenses to other teachers after a few months of ineffective use.
Impact on System	This initiative has continued to expand since its inception. Early positive feedback from participants in the pilot led to a rapid expansion in the Spring of 2015 from 750 licenses to 2,500. In the fall of 2015 we expanded again to 5,000 licenses. Word of mouth in the schools led to a grass-roots movement resulting in school purchasing of another 2,500. The Board then acquired another 1,500 licenses in January 2016. We are awaiting the results of the 2016 EQAO results to determine future purchases. The positive preliminary results were shared at System meetings of schools to support the effective use of data. Principals and staff from each school dug into their own DreamBox data to better understand their needs. Staff and administrators used the data to support changes in practice. Currently the Board's MISA Lead is working to ensure that data from DreamBox is accessible from the District's data warehouse. We are working to ensure that all systems are integrated to provide teachers with comprehensive access to timely data about student learning.

Waterloo Catholic District School Board

Project Title	Evolving Educational Practice Through 21st Century Communication & Collaboration
Description	Through the professional learning opportunities provided via collaborative inquiry, teachers examine the changes in instruction that are required and the 21st Century tools that can be used in order to shift their teaching practice from substitution (where technology is a tool that involves no functional change) to modification and redefinition (where technology allows for the significant redesign of tasks that were previously inconceivable) using the SAMR model. Teachers use Chromebooks and the tools of the Google Apps for Education suite to facilitate their own learning as they design activities and collaborate digitally on projects with their students and colleagues (Google docs, slides, forms etc.). Participants examine research-based instructional strategies to inform the educational approaches they will be adopting. Part of their reflection involves an analysis of the physical and virtual environment for learning and how it shapes the nature and quality of teacher-student and student-student relationships. Educators use the artifacts of student learning they collect to evaluate the effect of their interventions and to determine what kinds of interactions had the greatest impact on student engagement and achievement.
Context	*Number of students:* 1,904 *Number of teachers:* 86 *Number of schools:* 44 *Grades/Program:* JK-8
Impact on Students	We have been able to collect both quantitative as well as qualitative evidence to measure improvement in student achievement. A project about a grade 6 math unit on measurement provides a good example of how this initiative has impacted student engagement, learning, and achievement. Students used digital media and other learning environments to communicate and become collaborative contributors – including at a distance, to support individual learning, and to contribute to the learning of others. Students also drew on critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students used Chromebooks, and a variety of web-based apps to develop and demonstrate their thinking about the relationships among units and measurable attributes, including the area of a parallelogram and the area of a triangle. Google Maps were used to locate specific buildings and students were taught how to use the built-in distance measuring tool to measure sides, bases and heights as needed. Students were given the opportunity to use virtual manipulatives

	(Glencoe, Bennett or Geogebra) to assist with consolidating and proving their thinking. The teacher used Google forms to conduct diagnostic and summative evaluations for this unit and to analyze the area of difficulty for the students. Of the 4 questions related to rectangles, students scored on average 67%. In the summative, it was clear that the understanding of how to determine the area of rectangles increased - average correct = 78.7%. Diagnostic Test Average for the Class = 44.78% and Summative Test Average for the Class = 79.12% Teachers that participated in PD this year were asked: What was the impact of implementing your 21st Century learning project on student achievement, engagement & accountability? No impact (2%), minimal impact (16.3%), moderate impact (34.7%), significant impact (46.9%). Comments included: *"During this project, my students have shown that the use of technology is significant to their thinking and achievement. The opportunity to have technology allows my students to accomplish their learning tasks whereas they would not have even attempted the tasks before. With the availability of applications and extensions in this project my students who have learning difficulties have accessibility to tools that allow them to be successful in their learning. It also allows for students to learn at their own pace as they can develop their learning at home."* *"Students were very engaged in the learning topics. They took teacher feedback (e.g., in the comments section) to bump up their learning. Many took initiative to extend their learning at home (e.g., write stories on Google Docs, make PowerPoints on Google Slides). Students were motivated to improve their own work when visually seeing the work of their peers. It allowed for unique opportunities for collaboration (e.g., document sharing, etc.)."*
Impact on Instruction	One of the objectives of our multi-year strategic plan is that students are achieving at their highest potential in a 21st Century world. In order to support this goal, teachers need to able to confidently assess learning skills and be able to articulate "look-fors" in relation to 21st Century competencies, in particular: critical thinking and problem solving, creativity and collaboration. Teachers that participated in PD were asked to complete a survey about the frequency of their teaching and assessment practices related to the development of 21st Century competencies. Two different groups were surveyed; our early adopter group from 2015 and our mainstream group from 2016. We were interested in conducting these surveys to determine the frequency of developing 21st Century competencies because in previous research studies, teachers who were strong on project-based learning (PBL) use reported more teaching and assessment of 21st Century skills than a comparison group.

	For our 2015 early adopter cohort, the 3 most frequent aspects of creativity and innovation that our students were engaged is recorded below. • Using idea creation techniques such as brainstorming or concept mapping. (1-3 times per week, 40%) • Generating their own ideas about how to confront a problem or question. (1-3 times per week, 38.8%) • Inventing a solution to a complex, open-ended question or problem. (1-3 times per week, 30%) • 68% of teachers indicated that they were able to effectively assess students' creativity and innovation skills to a moderate or minimal degree or not really. For our 2016 mainstream cohort, the 3 most frequent aspects of creativity and innovation that our students were engaged is recorded below. • Using idea creation techniques such as brainstorming or concept mapping. (1-3 times per week, 42.1%) • Generating their own ideas about how to confront a problem or question. (1-3 times per week, 42.1%) • Testing out different ideas and working to improve them. (1-3 times per month, 38.1%) • 72.3% of teachers indicated that they were able to effectively assess students' creativity and innovation skills to a moderate or minimal degree or not really.
Impact on System	In order to create a culture to optimize the conditions for instructional leadership in 21st Century teaching and learning, the Board hosted its first Education Innovation Conference. We used the open space conference format to permit the 100 participants to engage in hands-on, self-directed professional learning related to the use of 21st Century learning tools and approaches. By adopting a shared leadership model, we were able to leverage the expertise and experience of a large number of our teachers who are committed to transforming learning and teaching. The focus of these sessions was to facilitate the competencies in our 21st Century Teaching and Learning Blueprint (creativity, innovation, communication, collaboration, critical thinking, problem solving, digital stewardship, information fluency) and our Board Improvement Plan for Student Achievement (develop engaging tasks for learners, provide feedback to guide the learning process, communicate criteria to inform learners, and to differentiate instruction). Another example which illustrates the spread of this initiative and how our educators are taking ownership for building capacity with innovative instructional

	leadership was, the 30 independently led workshops that had a 21st Century learning theme related to Google Apps for Education or Chromebooks, on our association professional development day. In our new BIPSA, under the strategies and actions section for building capacity, we have identified that teachers will participate in professional learning cycles through collaborative inquiry on how to use digital technologies to gather and analyze timely assessment information about student learning to guide their instructional approach. This year, we continued with our professional learning cycle to provide opportunities for our teachers to design activities and collaborate on 21st Century learning projects with their students and colleagues. Through the professional learning opportunities provided via collaborative inquiry, teachers identified a problem of practice for their project and used the artefacts of student learning they collected to analyze the effect of their interventions and to determine what kinds of interactions had the greatest impact on student engagement and achievement. In order to measure the capacity of staff to sustain innovation in pedagogical practices for deeper learning, participants completed a PD impact survey.

Waterloo Region District School Board

Project Title	WRDSB Digital Learning Project: An Inquiry into Learning through the Change Process
Description	The purpose of the project is to deepen our understanding of system change by utilizing technology as a disrupter in an effort to build professional capital and create a culture of collaborative professionalism. There is a precise focus on collaboration (teacher-teacher, student-student), creativity, and identifying the factors and conditions for scaling change that improves learning and teaching, as enabled by technology. The intent of the work in this project is to disrupt thinking to build decisional capital (i.e., ability to make judgements wisely based on research and experience), develop shared leadership (co-learners/co-leaders) and accountability through collaborative work (i.e., social capital), and increase teacher capacity with regards to collaboration (i.e., personal capital). The project is also framed around the Geoffery Moore's model of innovation and Prochaska/DiClementi's research on stages of change. Tools are being developed to determine an individual's stage of change, with regards to collaboration, and identify the factors needed to move the innovation across the "chasm". This is a multi-year project which began in 2009 with an overall goal to envision the future of education as affected by technology. It focused on identifying the factors and process to change teacher practice to realize a vision of a future state. Throughout the many iterations of the Digital Learning Projects, technology has been the common catalyst for changing teaching and assessment practices; our hypothesis being that technology provides disruption and permission for teachers to change their teaching to include more student-student collaboration (along with explicitly teaching of collaboration), opportunities for student voice and choice to support differentiated instruction, and changing assessment practices to include more formative and engaging assessments with descriptive feedback to promote deeper learning.
Context	*Number of students:* 1,227 *Number of teachers:* 56 *Number of schools:* 14 *Grades/Program:* Gr.9-12
Impact on Students	The implementation of digital learning projects has greatly impacted student engagement, learning, and achievement. Teachers reported greater student engagement as a result of their changes in practice related to instruction and assessment, by utilizing technology. During interviews with Futures Forum Project students, the students indicated more engagement because of the opportunities

	technology provide for cross-school collaboration, access to authentic audiences, and more choice in learning materials. There was evidence through teacher reflections to support a strong relationship between the depth of the technology integration into teachers' instructional and assessment practices to an increase in the amount of student engagement, learning, and achievement. The more a teacher embraced technology as a tool to assist with their classroom work and the more seamlessly they took advantage of the features of technology, the more the students seemed to engage. There was increase in achievement due to the focus on 21st Century Competencies (e.g., collaboration), utilization of technology, and student inquiry (e.g., choice). Technology impacted student engagement by supporting learning at anytime from anywhere. Teachers reported using cloud-based learning management systems to provide students with information and assignments, facilitate discussions, share calendar notifications, and provide descriptive feedback. The availability to access a website during class, after class, in school, or at home has made learning available to students 24 hours a day from any location. This convenience made it easier for the students to participate in learning, provided more flexibility to respond to student voice and choice which resulted in increased engagement. Students are seeing the activities of the classroom, in other words the learning process, as part of their everyday life. Teacher to student learning partnerships became more innovative and creative as well with the use of technology. For example, teachers could communicate with students by typing messages directly onto the student work or leave audio messages. The greatest growth has been in the way in which technology has enriched communication. Students communicated synchronously or asynchronously using blogs, chat tools like Todays Meet, Twitter, Facebook, and Google Hangouts. They used these communication tools to work with other students in their class, in other classes within their school, with other classes within the board, and with students across Canada and the world. The impact of technology has been its ability to bring authentic purposes and audiences to the students' work, which they find extremely engaging. Student learning has increased with the use of technology in the digital learning projects. During the formative stage, the ability to provide continuous feedback to students working digitally increased engagement, but teachers also reported that this has increased student resiliency. Student learning has increased because technology allows for more choice and differentiation learning opportunities in classrooms. Learning by students occurred through accessing texts, audio files, and videos, as well as experts through the Internet. Teachers reported that

	student achievement had increased, in part, because technology allowed for students to create final projects that were more complex in nature due to the availability of more resources and alternative thinking.
Impact on Instruction	Common across all of the digital learning projects involved in the research was the impetus that the teachers go back to the curriculum to build their instructional and assessment plans; the overall expectations were more carefully reviewed and clustered. With a focus on more student collaboration and offering students more opportunities for choice, teachers collaborated to revisit and revise how their courses were taught. The projects caused teachers to plan more collaboratively. A reason the teachers were open to planning more collaboratively and including more student collaboration and choice was that they had access to more technology in their classrooms. The technology served as a disruption to their normal way of teaching and so when they began to revisit past practice in light of new technology, the opportunity was presented to insert collaboration and choice into their practice. The impact was to have teachers become more facilitators of learning rather than controllers of it. We also found that board wide initiatives with monthly professional learning sessions helped to develop system wide teacher collaboration (i.e., teacher-teacher learning partnership) whereas without these projects teachers would work in their schools usually in isolation. The support created system wide conversations and sharing of best practice not normally the culture. One of the significant impacts of technology has been on the ability to support learning to be differentiated spontaneously. If something comes up in class where students want to look up information regarding an area of interest, create or communicate on social media; they no longer have to wait two weeks until they get booked into the computer lab. With mobile technology in the classroom, when learning wants to happen the teachers take advantage of it. Teachers also reported that technology has impacted their work with more vulnerable students. Students who have a habit of losing their work can find it when it's worked on using cloud based technology (no lost papers). The impact on student – teacher communication partnership has been significant. Teachers can better access student learning and provide students with feedback; meaning more vulnerable students are getting more timely and precise support.
Impact on System	The Digital Learning Projects undertaken by the board over the last 6 years have been as measured and scalable as they have been innovative and creative. From the onset of the work we have been guided by the concept of scalability. BIPSA targeted collaboration this year and the projects all focused on collaboration as a central tenet for engaging students and causing change in instruction and assessment practices enabled by technology.

	Besides increasing student engagement through the use of collaboration, the teachers involved in the research are also became school and system leaders allowing us to develop trainers that could speak to using collaboration as a teaching strategy in staff meetings and department offices. The research project began in Round 1 with 7 teachers in 7 schools. From that small start we now have plans to roll out mobile technology (Chromebooks) to every grade 9 student in the fall of 2016. To get to this point where we can plan to roll out devices on such a large scale, the initiative carefully monitored the successes and challenges, after each iteration of the research project, and adjustments were made as required. When integrating multiple subjects together, for the Futures Forum Project, into a timetable became too challenging for many schools, targeted sections of non-integrated courses in English and Geography were pursued. When Wi-Fi proved to be an effective tool to support learning, it was expanded to all schools. Very early in the research participants started to identify the 4Cs (21st Century Competencies) of collaboration, communication, creativity, and critical thinking as contemporary skills for a student living in the digital age. Following the lead of research and informed by the digital research project the board adopted the 4Cs into the BIPSA which has morphed into 6Cs (adding positive character and contributing citizen). Along the way the progress of the students has been monitored, whether it be through online surveys, interviews, data on credit accumulation, or teacher observations. Through the work of the research project there have been opportunities to ensure engagement, learning, and achievement were key centre pieces to the work. In the past few years the work has focused on the challenges of providing supports for teachers with a range of experiences and skill sets. This year, each digital learning project completed a collaborative professional learning cycle of inquiry into some aspect of student need. Centrally facilitated, these cycles walked teachers very deliberately through the Learning Cycle of plan, act, access, and reflect. The teachers were provided with technology to support the work in class to enhance student engagement. The learning cycles for the English teachers, for example, showed that students improved in their ability to infer while reading. The Geography teacher learning cycle showed that students improved their geographic thinking. The processes this year showed that technology supported learning cycles worked successfully because of the focus on student work and technology-enabled learning and teaching.

Wellington Catholic District School Board

Project Title	Broadening Professional Learning Cycles with Technology-Enabled Learning
Description	<u>Overall Inquiry Statement:</u> If students are introduced to a blended learning environment supplemented by meaningful use of tablets (FDK-Gr 2) or Chromebooks (4-10) then student engagement, collaboration, and oral communication (FDK-Gr 2 only) will be enhanced. <u>Project Focus:</u> Students and teachers will be introduced to Google Apps for Education, Chrome Extensions such as Read and Write for Google, and the vLe as a way to enhance the blended learning experience in their classroom. <u>Projected Outcomes:</u> Once look-fors are developed by teachers for collaboration, student engagement and oral language development (FDK-Gr 2 only) then teachers and students will be speaking the "same language" and teachers will be able to monitor learning goals, target success criteria and there should be an improvement in student learning skills if there is an enhancement achieved.
Context	*Number of students:* 790 *Number of teachers:* 27 *Number of schools:* 10 *Grades/Program:* FDK-2, Gr.4-8, Gr.9-10
Impact on Students	*Secondary Project (Gr 9/10):* The evidence of enhanced communication and collaboration between student and teacher within D2L and Google Apps for Education was highly visible with the use of Google Docs, Padlet, Google Slides, Newsfeed within D2L, Google Forms, Mindomo, D2L discussion forums, Kahoot and Read & Write tools. Critical thinking was addressed, but in smaller pockets and this will continue to be an area of greater emphasis in future projects. *Elementary Project (Gr 4-8)*: The evidence of enhanced communication and collaboration between student and teacher within D2L and Google Apps for Education was highly visible with the use of Google Docs, Padlet, Google Slides, Newsfeed within D2L, Google Forms, Mindomo, D2L discussion forums, Kahoot and Read & Write tools. There was more student to student communication and collaboration with evidence of Padlet being used in a differentiated manner among student groups. This ensured student learning needs were met using universal design and differentiated instruction with the goal of improving meta-cognition skills in literacy. Student engagement was highly visible in this project based on creative task redesign by the teacher with a greater focus on student to student collaboration and communication.

	Primary Project (FDK-Gr 2): The two clearest indicators of success were student engagement and collaboration. This was evident in post survey feedback from teachers in which 76% of the group indicated a change in at least two target students in the area of engagement and collaboration. Common criteria were generated by teachers at the beginning of the project to ensure the measurement of these indicators was consistent. Students were able to problem solve tablet and academic tasks in small groups with limited teacher input and the exposure to tools such as We Video and Explain Everything gave students an opportunity to enhance their oral language skills.
Impact on Instruction	*Secondary Project (Gr 9/10):* After a professional learning session on building a lesson around success criteria and learning goals in a digital format, teachers produced lessons that aligned with curriculum expectations and impacted assessment practices. This was evidenced by their production of a lesson created in HTML format which was created in D2L. In future projects there will be a focus on moving educators from teacher-centred learning approaches to a student-centred learning approach. *Elementary Project (Gr 4-8):* Teachers delivered activities with integration of technology. Technology was used on a regular basis; however, not as frequently as in secondary. Utilization of the tools was naturally embedded with curriculum and assessment practices without the need for focused professional learning days that focused on instructional practice. Teachers were not as comfortable using as many tools on a personal level; however, these teachers were much more comfortable introducing unfamiliar or novel tools to their students to explore and gain expertise on their own. In future projects these teachers will be encouraged to select tools which are specific to learning goals/success criteria that support student learning and achievement. *Primary Project (FDK-Gr 2):* Teachers reported that tablets would only be used when there was a purposeful task that the tablet would add value to. Teachers indicated that they needed to become familiar with the tools before they were able to see the link to existing curriculum and assessment practices. Common anecdotal comments indicated teachers needed approximately 1-2 weeks to “digest” a new tool functions before they could see how it could be used meaningfully in the classroom. Once this was accomplished, tools were integrated into existing curriculum. Teachers found the sharing of ideas with colleagues regularly to be helpful in expanding use of tools.
Impact on System	Digital initiatives have generated interest from K-12 with teachers volunteering to be part of the project. Our program coordinators will be linked with members of the digital team on all projects for next year. This is the first year that this has happened. This ensures there is knowledge of research-based instructional and

	assessment practices as well as a wealth of technology proficiency in each project. Significant growth in use of the virtual learning environment was seen with usage increasing to approximately 62% of our student population. Technology-enabled learning has taken a greater focus on our BIPSA. Our Special Education team continues to work closely with our Digital Learning Coach to support all learning needs in the classroom creating a de-stigmatized approach to personalized digital tools such as: text-to-speech, speech-to-text and editing tools.

Windsor-Essex Catholic District School Board

Project Title	Using Technology to Increase Student Engagement in Mathematics by Doing Mathematical Tasks – *"Math Talk"*
Description	In grade 7-10 math classes we are using iPads to try to get more student engagement in mathematics. When students show a high degree of attention, curiosity, interest, optimism, and passion in a topic they will be perform better in learning the topic. We use technology to get students doing math tasks and increase student engagement. With greater student engagement we are hoping our students will think about math concepts more deeply and learn them better than before. Through the use of several iPad apps, like Nearpod, SmartNotebook, Explain Everything and Virtual Manipulatives, we have found ways to focus on conceptual learning while providing formative assessment in mathematics.
Context	*Number of students:* 480 *Number of teachers:* 20 *Number of schools:* 10 *Grades/Program:* Gr.7-10 Math
Impact on Students	Technology was used to increase student engagement and get students doing more meaningful math tasks. Ultimately, greater student engagement should reshape student thinking surrounding mathematics and lead to improved learning. Teachers and students were given pre and post project survey questions to assess the impact. 20% of Grade 7 & 8 students claimed to use technology most of the time prior to receiving the iPads. After receiving the iPads, the percentage increased to 35%. In some pilot classes, there were enough iPads to have a 1 to 1 environment. In these classes, the overall impact of technology was more pronounced. 60% of Grade 9 & 10 students claimed they rarely used technology before receiving the iPads. This dropped to 31% after getting the iPads. Students claimed that the iPads made concepts easier to understand, more interesting and allowed for greater experimentation. When students were asked if math concepts were easier to understand with the use of iPads, 53.5% of the students responded "Much" easier with only 16.8% stating the iPad did not make it easier. 59.4% of students responded that learning math concepts was "Much" more interesting than without iPads. 86.5% of students responded they felt the use of the iPad allowed them to experiment with math concepts and allowed them to learn, understand and apply the concept as opposed to memorizing it. The Board compared responses from the beginning of the class prior to the introduction of the iPad Math Program and found that there was a 13.8%

	increase in students thinking about math concepts outside of class. Students also responded 52.5% really enjoyed their math class which was a 12.7% increase from their last experience. Although this enjoyment is a by-product of good teaching and understanding of concepts, the Board is also seeing an improvement in EQAO scores with schools in the program. The Board performed an analysis of combined EQAO data from all the classes involved and compared the 2013-14 data to the 2014-15 data. The analysis revealed that the overall average increased from 63% to 67%. The two most striking findings were failure rates dropped from 20% to 11% and the % of students that achieved over 80% went from 23% to 28%.
Impact on Instruction	A number of highly motivated teachers stepped forward to embrace the learning and as a result a new grass roots approach to teaching Math Concepts has evolved. The use of technology has made concepts a reality with practical examples. Less preparation time is required for difficult lesson planning. Teachers have more time for student support and program development. 91% of teachers responded that they used a LCD display to show what they were doing in math class at the beginning of this project. At the conclusion of this project, LCD use went down to 41.7% for a difference of 49.3%. Teachers were no longer substituting the LCD for a chalkboard but began modifying and redefining assignments with the iPad and the associated apps. Teachers are spending more time facilitating instruction rather than just delivering instruction. 66.7% of teachers reported they are “quite a bit” more comfortable using the iPad to teach math concepts. 66.7% of teachers reported they never or rarely used technology in their classes at the beginning and now 50% of teachers are using the iPad to assist learning on a daily basis. Most teachers have moved very quickly from the substitution level of iPad tasks such as, watching a Math Video or using it as a calculator to much more robust activities. After integrating the iPads into their lessons teachers found that the largest use of the iPads and greatest benefit focused on conceptual understanding, investigation and use of virtual manipulatives. Continuing with this grass roots effort, our teachers have formed a Google Plus community called “LSA Math with iPads”. Teachers use this community to share ideas on technology use for teaching math concepts. Teachers also support themselves by posting demos, pictures of the activities occurring in their classes and problems that have occurred.
Impact on System	This project is still very new and just starting to take hold and flourish. A significant impact has been made with students in the program after only two years of piloting. EQAO data for test schools is extremely encouraging.

	The Principals involved in the project are very enthusiastic with the results so far and are spreading the word and creating an increased demand for the *“Math Talk”* program and the resources that have been created. Future funding will guarantee program expansion and will provide other students with the opportunity to conceptualize their thinking and lead to enhancing overall achievement scores. The increased use of technology has helped in the development of new Information Technology Policies and continues to put pressure to improve overall infrastructure across the system. The Ministry has also given the Windsor-Essex Catholic District School Board a grant to host a South Western Technology Symposium in the fall and the Board looks forward to working with all the regional Boards to make this day a huge success.

York Catholic District School Board

Project Title	Board-Wide Implementation of ePortfolio in Support of Creating Pathways to Success: An Education, Career/Life Planning Program
Description	This Round 5 Innovation Research Initiative builds on "lessons learned" and seeks to introduce and scale *ePortfolio* to every teacher and every student from Grades K-8. To facilitate the creation and curation of student ePortfolios, teachers will be provided with resources and support, including training on how to create "a collection" within the context of the four inquiry questions as listed in *Creating Pathways to Success*. Additionally, they will learn how to use the iPad app to curate the material. This Round 5 Innovation Research Initiative seeks to test the effectiveness of a model for board-wide implementation of a single application in pursuit of policy goals. It also seeks to measure student learning with respect to one specific goal within Creating Pathways to Success; namely, the extent to which *ePortfolio* helps students from Grades K-8 develop the knowledge and skills to make informed education and career/life choices.
Context	*Number of students:* 6,497 *Number of teachers:* 267 *Number of schools:* 89 *Grades/Program:* K-8
Impact on Students	The primary focus of this Round 5 Innovation Research Project was to test a professional learning model aimed at "spreading" the use of a specific "app" (i.e., *ePortfolio*) to support pathways goals from K-8 and the implementation of *Creating Pathways to Success*. As such, our findings focus mostly on the "spread" element among teachers (i.e., system scaling) and the impact on teacher practice. To the extent that our data helps us understand the impact on student engagement, learning and achievement, the data is not conclusive, but it is promising. Teachers were asked, *"To what extent are your students able to make more informed decisions because of their use of ePortfolio this year?"* 33.3% of respondents answered "To a Moderate Extent" and 5.6% answered "To a Large Extent". 29.6% answered "To a Small Extent" while 31.5% answered "To a Very Small Extent". Many respondents expressed a sense of optimism for "next year". Teachers were also asked, *"To what extent were your students engaged in the collection, selection and reflection process?"* 41.0% of respondents answered "To a Moderate Extent", 13.3% answered "To a Large Extent", and 2.9% answered "To a Very Large Extent". 24.8% answered "To a Small Extent" and 18.1% answered "To a Very Small Extent". There was a noticeable sense of optimism for future impact on student achievement.

Impact on Instruction	The principle policy focus was implementation of *Creating Pathways to Success*. To that end, the teacher training had a healthy amount of policy, pedagogy and technology, and proceeded in that order. In terms of teacher knowledge and practice, we saw significant shift.
	Following are the "pre" and "post" comparisons to a series of questions:
	• *How aware are you of the four inquiry questions that form the foundation of our Education and Career/Life Planning program?* "Not at all familiar" went down to 1% from 38%. "Somewhat to Moderately Aware" went down to 51% from 56%. Significantly, "Extremely Aware" went up to 48% from a starting level of 5%.
	• *To what extent can you identify existing lessons, activities or learning tasks in your teaching practice that provide opportunities for students to explore each of the four inquiry questions?* When we analyzed the number that answered "To a Very Great Extent", positive shifts were observed with respect to each of the four inquiry questions:
	  ○ Who Am I? – 52%, up from 33%
	  ○ Who Do I Want to Become? – 36%, up from 20%
	  ○ What Are My Opportunities? – 24%, up from 14%
	  ○ What is My Plan for Achieving My Goals? – 27%, up from 17%
	• In the "pre" and "post" surveys, teachers were asked a series of questions around their use of digital tools with students to capture evidence of learning and thinking as follows:
	  ○ *I am helping students capture evidence of their learning and thinking through digital images – 83%, up from 58%*
	  ○ *I am helping students capture evidence of their learning and thinking through videos– 56%, up from 31%*
	• Teachers were asked *"What is your level of comfort using technology (e.g., digital cameras, iPads, computers/laptops, Chromebooks, smartphones) to capture evidence of student learning and thinking?"* The proportion that responded "Comfortable" increased to 87% from a starting level of 67%.

Impact on System	In many regards, the project was an initiative focused mostly on the "spread" element within school communities as a major contributor to system scaling. To that end, each elementary school had a team of three teachers – one each for Primary, Junior and Intermediate - who received direct training on the use of *ePortfolio* within their division as a tool to capture evidence of student thinking and learning in contexts that are relevant to the division. These same teachers then worked with an administrator to develop a school-wide implementation and training plan that responded to the needs and circumstances of the school, with a

	view to scale and spread to every teacher and student in the school. Schools were also provided with I-Pads to enable the work. This innovative research project sought to create teams of "champions" in each school as catalysts for spread. To that end, teachers were asked *"What is your current level of knowledge about ePortfolio (i.e., the "App") and its potential as a web-based tool to collect and store evidence of student learning and thinking?"* The proportion that answered "I know a fair amount about *ePortfolio* and understand how to use it" rose to 33% from 5%. Those who answered "I know a lot about *ePortfolio* and can explain to others how to use it" rose to 29% from 2%.

York Region District School Board – Project #1

Project Title	Modern Learning Math Focus
Description	Leveraging new research from Stanford University, the DLRT and Math Teams created a collaborative inquiry based initiative working with 16 elementary schools (3 teachers plus one administrator from each). The structure of the learning was that staff were introduced to a “new” approach to teaching math (focused more on identifying patterns and leveraging students’ natural curiosity), engaging in a version of the actual learning activity and then implementing it in a classroom. The purpose of this learning is to create learning communities where students are investigating and exploring mathematical concepts in real world contexts and providing teachers with strategies and purposeful instruction resources to help alleviate student anxiety associated with math. Participants are asked to reflect on their learning, and make explicit connections their previously held beliefs, regarding math instruction, and their new insights, as a result of participations in this course. The delivery method, provided by the DLRT and Math teams is blended in that course material is provided via online instruction, with opportunities for face-to-face investigation and application.
Context	*Number of students:* 240 *Number of teachers:* 48 *Number of schools:* 16 *Grades/Program:* K-8
Impact on Students	This learning experience was an opportunity to explore the new research ideas on mathematics learning and student mindsets that can transform students' experiences with math. • Students were impacted by the mathematical lessons, strategies and techniques learned from the Mathematical Mindsets Stanford online course. • Teachers were also asked to use portions of other activities with students. Teachers reported that these activities were engaging and purposeful.
Impact on Instruction	• Teachers engaged in peer-to-peer, on-demand learning that modelled effective strategies for online learning. • Teachers were engaged in real world solutions/scenarios which helped reinforce their learning. • Teachers visited classrooms, as part of teams, to implement what they had just learned.
Impact on System	• Teachers and school leaders reported that because of their excitement with the work, that the buildings, as a whole became engaged in adopting the best practices investigated.

	• Administrators reported that staff development and learning opportunities provided to staff were well received and implemented back in classrooms. • By working closely with school administrators, math teachers felt that they were able to identify that best ways to scale up the implementation across the schools.

York Region District School Board – Project #2

Project Title	Modern Learning Assessment Literacy Think Tank
Description	The Modern Learning Assessment Think Tank brought together 20 educators, from both panels, all divisions and a variety of subject areas to begin to examine and assess assessment methods and techniques that accurately reflect modern learning assessments that educators are using in their class. Each participant was encouraged to engage with others, across panels, divisions and subjects areas, to identify specific areas of focus, including leveraging technology to provide feedback more effectively, using technology to provide opportunities for Assessment as Learning and facilitating communication regarding assessment with all stakeholders. Each participant is asked to keep a running log of their observances, wonderings and new learning as well as document their journey through assessment artefacts that will be shared back with the larger group. The hope of this work is to identify best practices to support student learning, through the use of technology.
Context	*Number of students:* 600 *Number of teachers:* 20 *Number of schools:* 20 *Grades/Program:* K-12
Impact on Students	The impact on student learning was demonstrated through: • Having students participate actively in the assessment process, and build an environment where students are truly co-learners • Student voice, creating authentic tasks which allow students to be engaged and demonstrate their learning in real-world ways • Students receiving instant / timely feedback via Google Forms • Follow up with students using the Google Apps environment and supporting students where needed right away
Impact on Instruction	For this project the impact was reflected by: • Better understanding of digital tools to use for effective assessment practices • Collaboration between teachers across YRDSB co-planning assessment practices • Better understanding of the “observation” aspect of the assessment practice (triangulation of data - conversation, observation, product) • Promotion of self-reflection and metacognition within teachers, to foster refinement of teaching practices to support student achievement.

Impact on System	The feedback from this project indicated teachers: • Increased collaboration between teachers across the board • Developed recommendations to the system to support “modern” assessment practices which allow students to demonstrate inquiry learning, foster collaborative learning and engage in real world learning activities • Fostered discussion of assessment practices across divisions, panels and subject areas

York Region District School Board – Project #3

Project Title	Technology Enabled Assessment As Learning
Description	Modern learning is authentic, relevant, deep learning that enables learners to create, to connect, to communicate and to share their learning with the world and to be future-ready. Professional learning communities within and across schools will be formed to create a shared understanding of the definition and the elements of YRDSB's Modern Learning Frame, with specific attention to the role of Assessment AS Learning.
Context	*Number of students:* 660 *Number of teachers:* 33 *Number of schools:* 8 *Grades/Program:* K-12
Impact on Students	• 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. • 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.
Impact on Instruction	Participants were asked to self-assess based on the following parameters: • Familiarity with assessment as learning • Frequency of use of assessment as learning strategies • Comfort level with integrating technology in support of assessment This same survey was used again at the project conclusion and the data demonstrates a significant increase for all three parameters.
Impact on System	This learning was shared back with the system through the collaborative development of criteria (look fors) that educators can use to recognize and support assessment as learning in the classroom.