



Update Report: The Malton Technology Initiative (MTi)



**Ascension of Our Lord Catholic Secondary School
7640 Anaka Drive, Mississauga, ON, Canada.**

Overview

This project involved integrating effective pedagogical strategies with technology and support to transform teaching and learning in our District's poorest achieving community, Malton. The District augmented the Grant technology to ensure that HP products and services were available to additional Ascension of our Lord Secondary School staff and students, the three intermediate level classes at Ascension's two feeder schools (Holy Cross and St. Raphael Elementary Schools), and some District Consultants who would be directly supporting the teacher initiatives . The primary objective was to improve student engagement and achievement in Mathematics and Science and to assist in developing digital age technological literacy skills.

All of Ascension's Mathematics and Science Teachers and the Grade 8 Teachers working in Ascension's two DPCDSB feeder schools were provided with technology, professional development, and training. Some teachers were directly mentored by ISTE while others were indirectly mentored through their colleagues. While the Grade 8 feeder schools were provided with the technology, the impact of this project was measured only with students at Ascension Secondary School. It is planned that the progress of a cohort of the current Grade 8 Elementary students will be tracked in future years while they study Ascension.

The educational environment at Ascension is not reflective of the Province of Ontario. In Malton, about half of the students study at the Applied level (destined for Community College or workplace experiences) while half of the students work at the Academic level (destined for University). The Province at large has a much larger proportion of the students working at the Academic level, with roughly only one-third studying at the Applied level. The HP Innovations Initiative was used to address the specific challenges of this community, with the hope that learning for our students would be transformed into one that was rich in collaboration and interdisciplinary project-based activities that reflect our students' real-world experiences.

The preliminary results are very promising. Student achievement in Academic Science and Math improved after first semester, student referrals to the office for discipline from math and science classes has decreased, student referrals to Academic Resource has decreased, and changes have been noted to teacher instruction in increased frequency of student centered learning, greater facility in developing or customizing resources and an increase in modeling and facilitating current and emerging digital tools.

The MTi project progress was documented on a wiki created by the participating team members. That wiki can be accessed at <http://dpcdsb-mti.wikispaces.com/>.

MTi Lead Teacher: Barry Carolan, Head of Science and Technology, Ascension of Our Lord Secondary School, 7640 Anaka Dr., Mississauga, ON. L4T 3H7 (905) 676 1287



MTi Lead Administrator: Alexis Galvao, Vice-Principal, Ascension of Our Lord Secondary School, 7640 Anaka Dr., Mississauga, ON. L4T 3H7 (905) 676 1287



MTi Project Leader: John Steele, Chief Information Officer, Dufferin-Peel Catholic District School Board, 40 Matheson Blvd., Mississauga, ON. L5R 1C5 (905) 890 0708 x21469



Impact on Teacher Instruction

There were three changes noted to teacher instruction: increased frequency of student centered learning, greater facility in developing or customizing resources and an increase in modeling and facilitating current and emerging digital tools.

Technology allows teachers to use more investigations and simulations that enable students to explore concepts independently and deeper. Teachers of math from grades 7 to 10 and teachers of science in grades 9 to 12 have access to Gizmos (www.explorelarning.com) which are online learning objects for a wide variety of concepts. Each Gizmo has an interactive simulation that allows students to manipulate data and easily investigate concepts in a short period of time. In science, this means that experiments can also be carried out safely in a virtual environment with deeper student learning. Follow-up questions in the Gizmo allows teachers to quickly gather assessment data to monitor student achievement and inform instruction. Examples of the usage includes: 1) The distance- time Gizmo allowed a grade 9 mathematics class to investigate rate of change and initial value for linear relations. Students watched virtual runners while simultaneously plotting d-t graphs (<http://dpcdsb-mti.wikispaces.com/ISTE2010>). The pH analysis Gizmo was used in a grade 11 chemistry class to investigate the properties of acids and bases. Students could manipulate the solutions and instantly see the accompanying accurate changes in pH (<http://www.isteonline.org/blog/index.php?userid=536&courseid=18>).

Teachers of math and science in Ontario began the implementation of a revised curriculum in September 2008 and 2009 respectively. Teachers were required to develop and customize existing resources to meet the revised expectations. Frequently, they used technology to adapt existing print resources or develop new activities using interactive whiteboards, videos and other online learning resources. Section II of NETS-T survey of the teachers showed marked increases between September and May in the indicators for developing technology enriched learning environments and customizing learning resources to meet the diverse learning needs of their students (see figure 1).

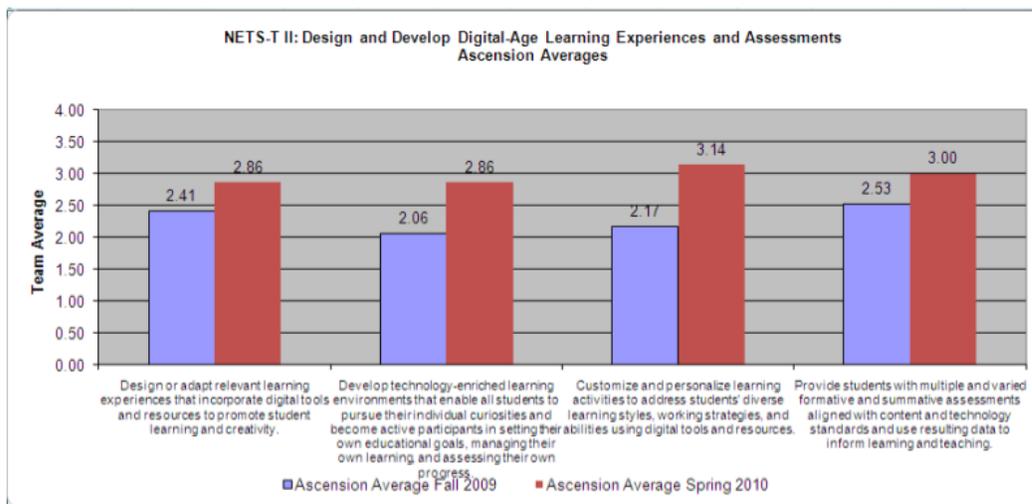


Figure 1

A grade 10 math teacher developed lessons to determine, through investigation (e.g., using dynamic geometry software, by paper folding), some characteristics and properties of geometric figures. Students used the HP Mini-notes and Geometers Sketchpad to successfully complete this activity. It was noted that enthusiasm while doing the activity was more palpable than doing low-end activities (ie. paper folding) and that students were more successful with higher order thinking problems associated with the activities (<http://www.isteonline.org/blog/index.php?userid=538&courseid=18>). Grade 11 Physics students engaged in a differentiated activity modeled on the TV show The Amazing Race show where students chose appropriate technology to solve problems or chose which problem to solve. Increases in achievement, engagement and student interest were noted and students overwhelmingly chose to use the HP mini-notes as opposed to using Pasco probeware when given a choice (<http://www.isteonline.org/blog/index.php?userid=48&courseid=18> or <http://dpcdsb-mti.wikispaces.com/ISTE2010>). Other examples of usage are provided on the MTi wikispace, including usage of the technology in the grade 7/8 classes (<http://dpcdsb-mti.wikispaces.com/ISTE2010>).



Undoubtedly, teachers and students know that using the technology, be it teacher- or student-centered, results in a higher level of cognition of students of the concepts of math and science. Having the ability to expand teachable moments with the Internet (games, searches, wiki information, youtube) makes everyday learning more exciting for these students. In addition, reporting their information for analysis and/or assessment in a variety of different manners using the technology removes them from the regular paper and pen tasks that they find mundane. Thus, their motivation and engagement is higher, and the students enjoy navigating their studies using the digital-age tools that they encounter so often in “non-school” life.

Section III of the NETS-T survey showed a dramatic increase (2.11 to 3.00) between September and May of modeling how current and emerging technology locates, analyze and use information to support research and learning (Figure 2).

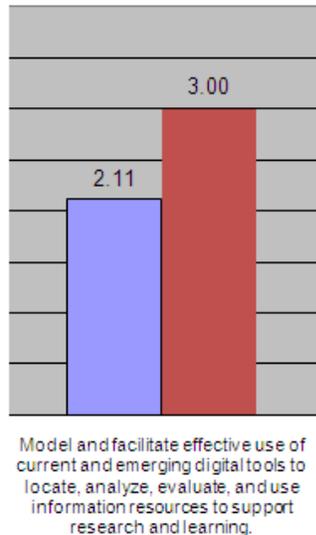


Figure 2

One of the best examples of this would be with Grade 10 science teachers at Ascension who developed a unit on body systems that used mini-notes and online resources. This unit was theme-based and incorporated differentiated instruction with the technology provided by HP. The unit was created using a constructivist approach where the students were in charge of their own learning needs, and worked cooperatively to learn and explore new concepts. Students thrived in this environment and seemed to understand the material on a much deeper level than if just presented the material in a regular setting. Resources for this unit can be accessed at <http://www.isteonline.org/blog/index.php?userid=583&courseid=18> or <http://dpcdsb-mti.wikispaces.com/ISTE2010>. Additionally, the Math Department was able to utilize interactive web-based resources provided by OERB (Ontario Educational Resource Bank) to augment learning of math concepts. This is a Government of Ontario Ministry of Education funded educational site that is password protected yet accessible by teachers and students in Ontario. It was created to support E-Learning for students and teachers, and has been used extensively by Ascension's math teachers. An example of its usage was in Grade 11 Math with Quadratic Functions and can be viewed on the MTi wiki (<http://dpcdsb-mti.wikispaces.com/ISTE2010>). However, since the OERB information is proprietary, the extent and possible breadth of usage could not be adequately posted.

Impact on Student Learning

Current students are immersed in a digital world outside of school. Personal electronic devices and access to online resources like social networking are an integral part of their lives and identity. By allowing students to use technology in math and science classes has resulted in a shift from dependent learners to independent learners, a positive impact on student engagement and a noticeable impact on student achievement in math and science.

Students in the Malton community are frequently passive learners who need continuous support from teachers in order to have success. As captured in the Mti video, the case of Latasha, a typical grade Applied level student at Ascension, illustrates a student who has become more independent, motivated and engaged in learning by using technology in her science and math classes at Ascension. "I didn't do so well in science or other subjects before. I always felt that I got bored or if I didn't get something, then by the time the teacher got to me, I didn't care anymore. Now, I am in control of what I learn. I go at my own pace and use the computer and the guidelines from the teacher, and when I don't get something, she is there to help me because she is always able to hover while we are on the computers". She went on to say that "I used to hate science. Now I love coming to class, because I know I'm not stupid and I know I am going to learn something that is going to be important to me each class". It has been noted that because of their ability to self-advocate in this environment, students are able to gain self-confidence and make the learning more applicable to their lives.

Use of the technology and the motivation of students may have other related benefits. According to Alexis Galvao, vice-principal of Ascension, student engagement has been an ongoing challenge at the school. In the past, math and science classes student referrals to the office for discipline and absenteeism have been higher than other subject areas. She noted that since technology has been used on an ongoing basis this year, there has been a decrease in the number of student discipline referrals and student absences.

The Ministry of Education provides schools in Ontario with indicators of student achievement so they can identify students at risk and plan supports. In Ontario, students take 8 courses and can earn 8 credits per school year. At Ascension, course pass rates and credit accumulation for grade 9 and grade 10 students have shown improvements between 2008-09 and the first semester of 2009-10. Students in academic science and math courses all had increases in course pass rates of between 2% and 6%. In addition, 100% of the grade 9 academic math students in semester 1 successfully passed the course, for the first time ever! There was no statistically significant change in applied pass rates in math and science but improved student engagement has been observed and a longer period of time may be necessary to note improvements for this cohort.

There was an increase of 5% in the percent of students in grade 9 who accumulated 8 credits and over 10% of the grade 10 students who accumulated 16 credits between 2008-9 and semester 1 (see Figure 3). Both increases would not be possible unless there were improvements for the both Academic and Applied students in attaining 8 or 16 credits. Typically, it is the math and science credits that are frequently missed.

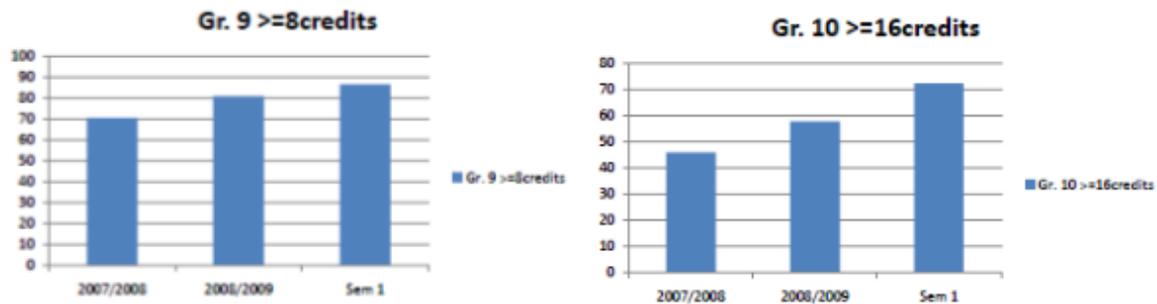


Figure 3

Additionally, academic resource teachers noted that student with identified exceptionalities in math and science classes had fewer requests for withdrawn support this academic year compared to previous years. It has been discussed that there may be a need next year to keep hard data on the Academic Resource referrals since it postulated that effective use of technology leads to differentiated instruction techniques that are better suited to meet the needs of these diverse learners.

One of the more interesting outcomes of the year may be in the shift of teachers towards the acceptance of a wider variety of electronic assignments used for formal evaluation. Of note, two very successful tools have been: 1) The use of Bitstrips to replace lab reports and assignments (www.bitstripsforschools.com). This has impacted student learning greatly since student find it way more fun to create a cartoon strip with themselves and classmates as avatars while explaining what they have accomplished in a science laboratory. 2) Visual essays are a graphical expression of what can traditionally be reported in an essay. Students in grade 12 Biology classes loved creating them, and welcomed the change in format from pen and paper to electronic reporting. They expressed that the visual essays required them to concentrate more fully on the concepts, allowed them have a deeper understanding of the concepts, and allowed themselves to express themselves creatively without the constraints of traditional essay guidelines. Examples and Ascension student exemplars of these devices can be found at <http://dpcdsb-mti.wikispaces.com/ISTE2010>.

Impact on Systemic Support

From the onset of the Grant, the ICT department in the District has been outstanding in giving support. The genesis of the project and initial proposal was spearheaded by the Chief Information Officer at the District, John Steele. From the onset and with John Steele's leadership, it was clear that ICT had dedicated staff and resources to support the initiative. The project has had technical issues as it progressed and, as depicted in Figure 4, confidence among teachers in the technical support and support policies of the ICT department grew as the year moved forward.

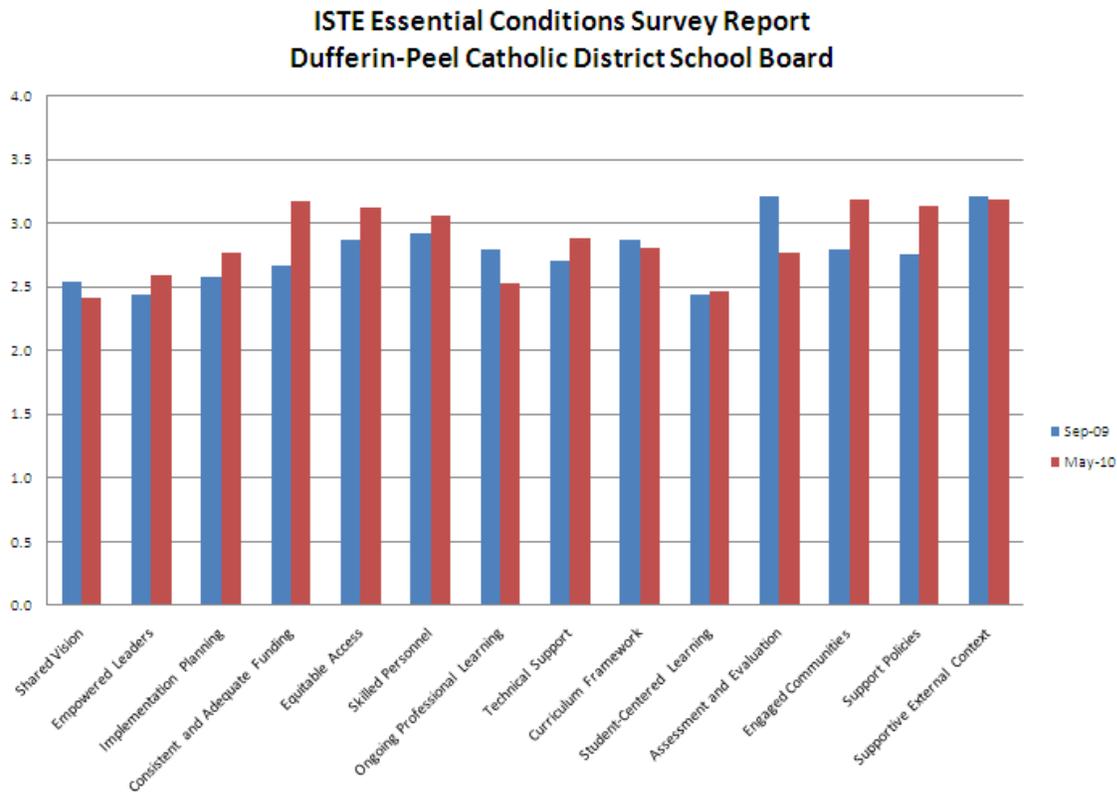


Figure 4

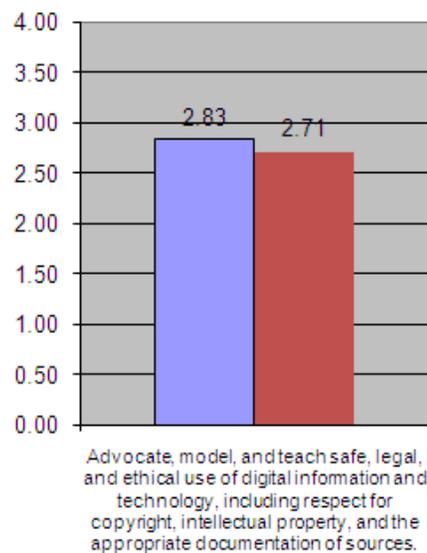
It was also evident that it was necessary for a school administrator to play a strong role in the leadership of the project. Alexis Galvao became the chief vehicle for information sharing between the MTi partners that allowed teachers to spend more time learning, doing PD and planning lessons. The Vice-Principal was also able to lead regular meetings with the department heads of math and science and lead meetings of the entire group (<http://www.isteonline.org/blog/index.php?userid=543&courseid=18>).

It is a goal for all leaders on the team to create more opportunities to support Professional Learning/Development for the group next year (Figure 4). While many of the members regularly met for planning within a department and participated in online tutelage (ex. eSchool News, ISTE Webinars), greater frequency for small group planning is necessary under more formal arrangements. Our team seems to work better with face-to-face contact for Professional Learning. This was abundantly displayed when it came time for DyKnow training – the group as a whole seemed much more receptive to having Brian Naas visit the school rather than doing the training virtually. Since this training happened relatively late in the year (mid-April), the team has a goal to implement the usage of DyKnow to a greater degree next year.

Team members have also requested greater involvement of mentors, be it through ISTE or with other local HP Grant recipients from previous years. It would be great to form a Southern Ontario HP Grant Recipient Association (SOHPGRA?) with presentations or school visits by exemplary teachers in the program. This would also generate more face-to-face contact with other successful teachers and classrooms.

Unexpected Outcomes

Analysis of the NETS-T report shows that in some instances there were lower scores after completing one school year of technological infusion compared to the original scores in September. One such surprise was in advocating, modeling and teaching safe, legal and ethical use of digital information (Figure 5).



How could the team be worse at this? Upon reflection, it was decided that teachers may have been naïve when taking the original survey as to their ability to keep students completely on task when using the technology, especially use of the Internet (inappropriate use of Facebook, email, Twitter, etc. while in class). Additionally, more frequent use of the Internet also means that students have access to more proprietary information, and it was found that they did not always reference intellectual property

appropriately. So while one may be able to model and teach safe usage, the reality is that students will go off task occasionally, and they lack the discipline to cite properly. Thus, it was concluded that teachers felt they had somewhat failed in this category after a semester of exposure to the technology, as evidenced in the teacher survey (Figure 5).

An anecdotal unexpected outcome from most teachers was their swift reliance on the technology. It was initially estimated that teachers would gradually move from traditional teaching to one using the HP Tablet PCs and interactive white boards. In reality, it was instantaneous for most. The immediate impact on motivation and meta-cognition of students was unbelievable! Furthermore, there has not seemed to be a “honey-moon” period, likely due to the fact that teachers and students continue to grow and learn more about how to use the technology in a variety of ways to enhance learning. This transformation will clearly last for a number of years. Most of the participating teachers are still somewhat reticent to let go of the “sage” mentality, and thus are still somewhere on the continuum towards being the “guide on the side”. And there are still some teachers in the program who are not comfortable with usage. However, their progress has been remarkable. For example, a teacher in the program did not even check board emails last year because it was beyond their comfort zone – students in that teacher’s class this year are now using the HP Mini-notes for research and presenting results of projects using the interactive white boards as the school.

Initiative Challenges

One of the initiative challenges surrounded the timing of the release of the technology and the accompanying support from ISTE. It is recommended that the program start at the beginning of the summer, rather than having deployment at the beginning of the school year. This would allow all teachers to have the ability to get familiar with their HP Tablet PC and lessen their learning curve stress as the school year begins. If the Kick-Off was at the beginning of the summer, Team Leads could return and hold informal professional learning and give exposure to the initiative earlier. Additionally, the surveys need to be completed at the beginning of September so that baseline results really are reliable.

There also is a challenge with difference in teaching and with the teaching profession in Ontario compared to some of our American colleagues. For example, our school year ends later than many American Districts, so it is difficult to get hard data on student success comparisons for the year-end update. There also seems to be fundamental differences surrounding professional learning that may need addressed. In Ontario, many teachers take Additional Qualification courses through Ontario Universities because this is the only vehicle for promotion in their pay scale. Thus, professional learning through ISTE is not recognized and can encroach upon the time required by teachers to complete local Professional Courses. Using the ISTE funding for local courses would be welcomed in the future.

Other words of wisdom include not getting too stressed in the transformation. It must be recognized by all stakeholders that this process is a marathon, and like all marathons is going to need time at a decent pace and help from others (support teams) so that one does not get burned out.

Initiative Visibility

Exposure to this program occurred through a number of forums. First, there was a media release by the District (Appendix A). Second, the school promoted the initiative in its school newsletters home to parents (Appendix A) and hosted an information evening on the Parent-Teacher evening in November (<http://dpcdsb-mti.wikispaces.com/>). Third, update of the progress of the program was shared at regular staff meetings with non-science/math teachers (they eagerly await the possibility of expansion of the initiative!). Finally, the HP Grant and its rewards was shared with colleagues at District Principal Meetings, Math Subject Council Meetings, and Subject Science Council Meetings.

APPENDIX A

News Release

October 6, 2009

For Immediate Release

Dufferin-Peel Catholic District School Board

selected to receive prestigious HP Innovations in Education Grant

US\$100,000 grant aims to improve student interest and achievement in math and science

The Dufferin-Peel Catholic District School Board was selected as one of eight school systems in Canada to receive a highly competitive 2009 HP Innovations in Education grant. Targeted at school systems serving students in grades 8 through 12, the grant program is designed to help educators address the need for raising student achievement in math and science, and increase student awareness in high-tech college and career opportunities.

Ascension of Our Lord Secondary School will receive an HP Innovations in Education award package of HP technology, cash and professional services, valued at more than US\$100,000. Technologies such as SMART Boards, wireless HP Tablet PCs, mini-notebook computers and LaserJet and wide-format DesignJet printers will be used in innovative ways to fundamentally redesign the student learning experience.

The project involves integrating effective pedagogical strategies with technology and support to transform teaching and learning at Ascension of Our Lord Secondary School. The gifts provided by the Grant will be used by key stakeholders in the school as well as selected school board personnel. The board will augment the grant technology to ensure that similar products and services are available to additional Ascension of Our Lord staff and students, as well as the three Grade 8 classes at Ascension's two elementary feeder schools: Holy Cross and St. Raphael.

This will ensure a seamless transition for the Grade 8 students in these schools who choose to attend Ascension, starting in Grade 9. The primary objective is to significantly improve student achievement in mathematics and science. The instructional strategies used in this project will also assist in developing 21st Century literacy skills.

All of Ascension's mathematics and science teachers and all Grade 8 teachers in its two feeder schools will be provided with technology, professional development, and training. The impact of this project will be measured for all students at Ascension, and the progress of a cohort of Grade 8 students will be tracked for the duration of their time at this secondary school. The educational environment will be transformed into one that is rich in collaboration and interdisciplinary project-based activities that reflect our students' real-world experiences.

Teachers will shift from instructor-led to instructor-facilitated pedagogy. Students will be engaged as active learners, and will be intrinsically motivated to study mathematics and science. One objective is to build leadership capacity so that the teachers can share their experiences and expertise with their colleagues.

John Steele, Chief Information Officer at Dufferin-Peel, is very optimistic that the project will be highly successful. "I feel privileged to be involved in this initiative. All of the teachers and support staff are excited about their opportunities to use technology effectively to assist in developing a classroom ambience that is highly conducive to learning. Through our collective efforts, our students will be engaged as active learners and highly motivated to succeed. The impact will be transformational, as the primary role of the teacher changes to that of learning facilitator, rather than a deliverer of content."

"The HP Grant provides students and teachers with the capacity to engage in the learning process in an entirely new way," said Marianne Mazzorato, Dufferin-Peel's Superintendent of Program. "In many cases, the development of student learning will be conducted using real-time resources, databases and activities not available in the more traditional classroom setting. This clearly has implications for teachers to further develop their practice of differentiated instruction based on readiness, preferences and interests."

"Supporting the teachers at the three schools involved in the Malton Technology Initiative (MTi) to shift their instructional practices to engage the visual and kinesthetic learners in their classes is

one of the primary goals,” said Dwight Stead, Dufferin-Peel Mathematical Literacy Consultant, Grades 7-12. “Once teachers begin to effectively use the technology in their classrooms, we should see lasting improvements in student engagement in mathematics and science.”

“The students in Malton are thrilled to receive this technology”, said Barry Carolan, Science and Technology Department Head at Ascension of Our Lord Secondary School. “But, once the veneer wears off, it will be the shift in the teaching that will have enduring effects on students in math and science. It means that the teachers in this community have bought into re-thinking and re-tooling their delivery of lessons. For some, it means that they are catching up to the digital age that the students already have embraced, while for others it involves incorporating the technology in ways that elevate the level of understanding for students. Early observations already show that students are way more engaged in their learning processes in math and science by using the technology provided by the grant”.

Worldwide, HP is investing more than \$17 million in mobile technology, cash and professional development as part of the global 2009 HP Innovations in Education grant initiative. This initiative follows HP’s five-year, \$60M investment in HP Technology for Teaching grants to more than 1,000 schools and universities in 41 countries. During the past 20 years, HP has contributed more than \$1 billion in cash and equipment to schools, universities, community organizations and other non-profit organizations around the world.

“Innovation is key to expanding education opportunity – and HP is privileged to collaborate with educators around the world who are committed to exploring the exciting possibilities that exist at the intersection of teaching, learning, and technology,” said Leyland Brown, Vice President, Personal Systems Group, Commercial Business. “Emerging evidence from the last five years is very positive – excellent instruction combined with the right technologies is measurably improving student academic success.”

More information about the 2009 HP Innovations in Education initiative and other Canadian social investments is available at www.hp.ca.

The Dufferin-Peel Catholic District School Board is one of the largest and most diverse school boards in Ontario. It serves approximately 88,000 students in 145 schools located throughout Mississauga, Brampton, Caledon and Orangeville. With over 10,000 employees, the board is also

one of the largest employers in the region. More information about the Dufferin-Peel Catholic District School Board is available at www.dpcdsb.org.

- 30 -

For information contact:

Bruce Campbell, General Manager, Communications & Community Relations

(905) 890-0708, ext. 24466 or (905) 609-1480

John Steele, Chief Information Officer

(905) 890-0708, ext. 24169

ASCENSION OF OUR LORD NEWSLETTER RELEASE

The Malton Technology Initiative (MTI)

NEW TECHNOLOGY !!! The Dufferin-Peel Schools in Malton have been blessed with a generous donation from Hewlett-Packard (HP International). The math and science teachers at Ascension of Our Lord S.S. and the grade 8 teachers at Holy Cross Elementary and St. Rapael Elementary schools received HP Tablet PC's in order to deliver math and science curriculum in a new and exciting way. Later in the semester, students in math and science will be able to use wireless HP Netbooks in class as they become interactive with the lessons. Additionally, math and science classrooms have been outfitted with SmartBoards provided by our school board, and parents are going to have to ask their children how these work! The total grant is in the order of \$300,000. The goal of the initiative is to help motivate students in math and science and ultimately improve student performance ... and it seems to be working! Parents can view how the technology is being used at the upcoming Parent-Teacher Night. Thank-you HP and DPCDSB!

