

Using ICT to Promote Equity and Collaboration at Spencer Public School

Overview

An example of Spencer Public School's innovation in action:

*Unit: All About Me, Pictures from a Digital World
Created and designed by the technology coordinator*

In this multimedia project designed for 6-10 year olds, students record personal information and add a digitized photograph of themselves into a computer template. Students have the opportunity to mix a traditional textual document with a digitized image.

Students are required to:

- *Conduct personal research*
- *State opinions on a number of topics*
- *Enter information into a pre-designed, Claris-Works computer template*
- *Import a digitized image of themselves into their file*
- *Sketch a portrait of themselves using the digital image as a model*

The Teacher Activity Guide provides detailed information about how to add text to a computer document and transfer an image to the document, as well as a list of required materials. Student follow up activities are suggested, such as: import sound or clip art, develop questions about likes and dislikes for other students, bring in photos from home to produce a detailed photo montage, compare and contrast differences between digitized image and hand-sketched one). Curriculum extensions are also suggested, such as: take a digital camera on a field trip, create a summary of the trip; study photographic principles; import digital images into HyperCard stack or website; take photos around school for school newspaper.

The principal at Spencer Public School has a clear vision of how ICT can be used to benefit both teachers and students, and she actively promotes this vision. She believes that ICT can be used to ensure that students have equitable opportunities to be successful in the larger community. She says:

I think you've got to get a vision that you strongly believe in, and you've got to convince teachers that something in it is worthwhile. Once they see that (it's successful), and in fact, if they are doing the kinds of things you want them to do in the classroom, it's going to benefit them and their students. I think you have got them on your side.

Spencer Public School has focussed on technology since 1994. Due to the special needs of the mainly ESL/ESD school population, equity principles such as inclusive curriculum and global perspective are central to all aspects of the student-centred program. Students are comfortable with technological innovation as it is provided in context and with purpose.

The school's ICT infrastructure has recently had a massive influx as a result of being chosen to be part of the Innovative Models of Learning Project, funded by the Ministry of Education. In this project, Spencer will serve as a demonstration school for others in the province, showing how technology can be integrated into all aspects of the curriculum.

In the Spencer innovation, students work on collaborative projects using ICT. Teachers use cooperative learning strategies to enable students with a wide range of abilities and experiences to develop talents and skills in marketing and sales, public speaking, drawing and design, layout and technology, administration, entrepreneurialship, writing and editing.

Staff members at Spencer have developed a School Technology Plan (STP) as well as a Technology Use Plan (TUP) to support the school-wide focus on ICT. The STP consists of school-based goals for teachers and students, objective strategies, and timelines for implementation. The TUP outlines the various skills that will be taught at each grade level, and includes which application software will be used.

The Past

The innovation at Spencer was originated to meet the needs of the school's increasing enrollment of children from third world countries. The administrative team created a framework to ensure success for all students by looking at innovative ways to develop ICT as a tool for learning. Equity principles such as inclusive curriculum and global perspective guided the development of the framework. The technology coordinator, the principal, a number of teachers and the former vice-principal all played key roles in originating the innovation. As the technology coordinator says, (other teachers) have been very open to using technology in the classroom...it's really important to have teachers who have an affinity for this.

A number of barriers were overcome to reach where the school is now. Many of these barriers were technical in nature, such as computers and printers not working properly. These problems have been overwhelming for some teachers. The technology coordinator explains:

We have teachers who just have not had an opportunity to see how to integrate ICT... they've sort of been overwhelmed with software or hardware glitches that have shown up. I wouldn't categorize them as resisters.

As part of the Ministry project, technicians have been hired to deal with these technical problems. Another barrier mentioned by the principal is the time lines provided by the Ministry for the project: The problem has been the time lines, which were very short for the Ministry demonstration project, and I don't know how much we can really demonstrate in three months.

A final barrier mentioned by the principal is administrative in nature. The school has had some difficulties dealing with the school board and the contracts provided by the board to order ICT resources. Dealing with the Purchasing Department, and resources not arriving when scheduled are also issues that had to be dealt with.

The Present

Spencer Public School's vision is to:

promote a dynamic and equitable learning environment, to enhance student achievement and to prepare students to be responsible citizens in the Canadian and global society through the implementation of Information and Computer Technology.

The principal's vision for ICT in the school includes improving teacher effectiveness, improving outcomes for students, and increasing access to technology not only for the student, but for the community and for parents as well. She specifically wants to see a total integration of ICT with the curriculum, saying:

We feel that this is going to give our student life chances in the 21st century that they might not ordinarily have had... But what we wanted to see really with the project was more integration so it's not just looked at as a tool and a toy which is fascinating...

Staff at Spencer believe that the implementation of ICT will benefit students, meet the needs of the community, and allow them to achieve the identified outcomes for students more effectively. A school goal is to ensure that students have equitable opportunities to be successful in the larger community, and staff use ICT to achieve this goal. For example, all students visit the school's Information Technology Centre on a weekly basis, where computer skills related to the classroom program are taught. The classroom teacher meets with the technology coordinator to ensure lessons are integrated and designed with an ICT focus.

ICT is used in language, social and environmental science, visual arts, technology, mathematics, science, music. Students use a variety of multimedia applications (e.g., digital camera, scanner, HyperCard, HyperStudio, etc.) to complete a range of projects that match the provincial curriculum. Using these applications, students design stacks, slideshows or presentations. Students also have access to e-mail accounts, and visit the school's Internet on the school board's Bulletin Board System (BBS).

According to the Principal's Survey, ICT is used to prepare students for future jobs, improve student achievement, promote active learning strategies, individualize student learning experience, encourage cooperative and project-based learning, develop student independence, and make the learning process more interesting.

Most teachers rate their ability to use a computer as fair. On the other hand, the technology coordinator is very skilled at computer use, has taken many computer courses (mostly on his own time), uses technology in his teaching and teaches others how to use it.

The school's ICT infrastructure has had a massive influx as a result of being chosen to be part of the Innovative Models of Learning Project, funded by the Ontario Ministry of Education. The ICT resources include:

- 40 WWW-accessible computers in the Learning Resource Centre (Imac, Digital machines), at least 4 in each classroom;
- 1 scanner, 1 external floppy drive in each classroom;
- digital cameras (3), data/video LCD projector access (3);
- additional drops in the classrooms, library and music room;
- 45-50 laptop computers for teachers, students and parents with access to wireless sources using Airport Wireless Technology;
- Software: internet and email, web site design, word processing, database, spreadsheet, HyperStudio, Wiggle Works, Print Publishing, Keyboarding; Language Arts, Social Sciences, Web Design, Mathematics/ Problem Solving, Science software.

The technology coordinator and a part-time technician on staff (funded through the Ministry project) provide most of the technical support. If they are unavailable, teachers contact Board technicians and wait for assistance. Most staff members expressed frustration at the lack of available technical assistance. The technology coordinator spends so much time on computer support that I can't get to a particular teacher that day and maybe 2 days...I feel it's a bit of a strain. Another teacher agrees, stating:

The technology coordinator has to run a library, run a computer lab, deliver prep and manage his own classroom. I did it every lunchtime, every recess, report card time, before school, after school, on weekends. They (the Ministry) are quick to say people have resistance, but they don't realize what's going on in the schools. Why wouldn't you have resistance?

Additional staff training will be provided through the Innovative Models of Learning Project, including:

- workshops with consultants for teachers with release time (School ICT Conference, software, hardware, web design, curriculum planner, multi-media equipment);
- grade 1, 2 and 5 teachers spend 30 minutes a week learning new skills to connect technology to the Ontario Music Curriculum;
- release time for teachers to visit other schools to view exemplary practices; 6 teachers will attend external PD sessions related to ICT.

Main Hypotheses

Role of technology in educational innovation and improvement

Evidence shows that the staff at Spencer view computers as a critical tool contributing to educational innovation and improvement. The principal feels that the goal is to use whatever works to support student learning, and computers play a huge role in achieving this goal. She says:

Our eventual goal is: does it enhance learning for students? Does it engage them in a way that we want them to be engaged? Does it allow them to do the kinds of manipulation of data that's going to support them in the long run? I don't look at it as something separate to my having access to a lot of textual materials. We hope that whatever we put into the classrooms, whatever infrastructure we have in place, it's going to support student learning and it's going to make teachers more effective in what they do.

The teachers on staff agree that computers are a crucial part of the educational process. One teacher states: I think that (technology) is critical for the children in the future...it's critical to understand how to use it, to get information, to understand how to evaluate it so they can be informed learners. So if it (technology) can make it clearer, easier, can increase children's confidence, I will learn it and I will do whatever I can to do that.

Another teacher agrees with the view of computers as a tool, saying:

We are big believers of integration, of covering many parts of the curriculum ...for the kids to make the links between the curriculum and understanding...I see the computer as a tool to deliver these things provided you have the software and hardware to do it.

The principal feels that the recognition Spencer P.S. has received is due to its successful use of ICT. This

recognition includes:

- Canada Award for Excellence Quality Education
- Reader s Digest Leadership in Education Awards National Leader (principal)
- Claude Watson Award for Teaching Excellence (several staff members)
- A number of awards recognizing exemplary school projects and the school s service to students and families
- Student presentations at equity and technology conferences
- Staff presentations to other educators (effective schools, equity, school improvement, ICT, etc.)
- Extensive media and public exposure (quality education, exemplary teaching practices, ICT, entrepreneurial partnerships, etc.)

Diffusion of the innovation

The innovation at Spencer appears to follow the traditional diffusion pattern for innovations, with a small number of early adopters, institutionalization of the innovation with the majority on board and a small number of laggards who are late adopting the innovation. However, staff at Spencer feel that if teachers are provided with sufficient support to address fears of technology as well as technical problems, resistance to technology is not an issue they see resistance as fear and frustration, rather than attitude. As one teacher says:

I would not say there is resistance. I think that some teachers are really genuinely scared of technology...so as a technology leader in the school you sort of have to be a psychologist as well and support these teachers that don t have the experience and have some fear about it. There is a belief that teachers don t believe in technology, and I don t feel that anyone has said that. I think that they are just afraid because there hasn t been the PD...resistance is a genuine fear, not an attitudinal thing.

Another teacher adds:

I think resistance to technology has occurred because of frustration of the effectiveness of the machines. And I think that s probably what has caused the most resistance...half the computers don t work or the printers don t work. After that occurs numerous times, people stop using. They can only tolerate so much of that.

The technology coordinator supports the view of the teachers on staff. He feels that with the appropriate training and technical support, resistance to technology will be a non-issue. He states:

We really don t (have any resisters). I think that we have teachers who just have not had an opportunity to see how to integrate it and perhaps it was not shown developmentally what skills or what tools or sub-skills they need to have. They ve sort of been overwhelmed with software or hardware glitches that have shown up.

The principal also agrees that the innovation at Spencer has followed the traditional diffusion pattern: On a staff there are people who are familiar with technology...and then you do have the ones that are a little more hesitant about getting on board. I can t say that we had a major problem, people are very honest and open about their comfort level and will go to the people who are more comfortable with it without feeling that they are inadequate in any way.

The principal also feels that she has served as a role model for reluctant teachers, since she herself is not very familiar with technology:

I am not a techie , and certainly they had a role model here who was in many ways at the beginning stages of learning how to use it. So I think they felt more comfortable because they had me also at the other end of

the spectrum.

ICT implementation outcomes

At Spencer, evidence shows that implementation of the innovation had depended both on staff competence and on the school's technological infrastructure. The principal feels that the amount and quality of available technology necessarily affects successful implementation of ICT. She says:

When you have limited resources you can do very limited things. Now that we have access to a fair amount of pretty advanced technology, we got into discussions with the staff...that there has to be some very definite correlation with aspects of either outreach into the community or certainly with the curriculum expectations as set up by the ministry...they have got to really focus on using the computer not just as something that the kids going through drills and practices, but I want to see some evidence of some connection with a unit of study...

She also feels that technical support and staff competence play crucial roles, adding:

I think you have to have the infrastructure in place so that people don't get frustrated. For example, technical support, software support. Certainly PD is going to be critical and providing teachers with the kind of release time that allows them to participate in the PD. If you don't get that, it's going to do nothing, it's going to remain at that superficial level...

The teachers at Spencer feel that their competence in integrating ICT into instruction and learning is crucial to the success of their students. One teacher explains that she teaches students how to use computers as she uses them, saying:

I use computers for word processing, I use a lot of spreadsheets and occasionally databases. I focus on these major applications in teaching kids, because I thought, well, that's what I use, and then more recently, using them more for telecommunications and the Internet.

Another teacher stresses that her skills will lead to positive academic value for her students, stating:

I'm excited to learn new skills and I think it will help me in that way and it will hopefully motivate them (students).

The technology coordinator supports the view that staff competence in integrating ICT determines successful implementation of ICT. He feels:

Learning begins with teachers, with people, and ends with people. If it's part of their input, it's part of their stimulus and then how effectively it becomes part of their stimulus and reality will determine how well they learn to access information, use information, communicate information, and reflect on it.

He also adds:

I have a feeling that it will make a difference and improve the teaching as well as the learning if teachers are committed and use the technology, and can prove to themselves that it makes a difference and they will use it.

Student academic performance

One of the principal's goals is to give students opportunities that they might not ordinarily have as a result of their disadvantages. The belief at Spencer is that access to ICT ensures equity, and reduces the gap between advantaged and disadvantaged students. As a result, the school takes on a very important role in the lives of

the students.

The principal explains:

This is a community where the income levels are not very high, and access to technology is very limited, a lot of them are new immigrants. So they are still getting used to coming in and living in Canada. When we first got started on this venture to look at accessibility of technology, we thought that this was definitely an equity issue. The kids tend not to have access to technology or other life experiences. The school then became the focus for this community. So if it happened at the school, the kids would get it. If it didn't happen at the school they would not get it anywhere.

The former vice-principal at Spencer also feels that the ICT focus at the school will help close the gaps between high and low poverty students. She says:

You have bigger gaps between students who come from a school that does not have a strong ICT program and students who do not have computers at home. You are going to have a big gap between those, and schools that do have a strong program, and students who go home to computers...schools in lower socio-economic areas are disadvantaged.

Academic standards

The principal is unable to say whether successful implementation of ICT will lead to the same or higher academic standards in spite of the quality of many ICT materials. The influx of technology and the support for the technology at the school is a recent development. She says:

If you come back 5 or 6 months from now, I think I would be able to answer (if technology has had an impact on academic rigor). Because there are limitations: if the server is down, or the computers break or the printer doesn't work...if you want me to respond to that for the past two or three years, I would have to say no...The frustration is so high because people would get excited about something and the printer would get jammed...and there was no one to help...I saw them using it in a very superficial way word processing and that kind of thing, rather than anything that was academically rigorous.

To ensure that students learn how to evaluate the quality of materials on the web, the technology coordinator teaches students critical thinking skills. Once these skills are developed, the variance in quality of materials on the web may not be as critical an issue. The technology coordinator says the following to his students: Go to the website, and get more information. Is it all true? Maybe yes, maybe no. You have to think all the time about whether the information matches what you know about people and the world. If you're not sure about what you see on the Internet, ask a friend, or go to the library and check a book.

Projection to the Future

Sustainability

The ICT innovation has been in place at Spencer since 1994. The innovation was originated to meet the needs of the school's increasing enrollment of children from third world countries. The administrative team created a framework to ensure success for all students by looking at innovative ways to develop ICT as a tool for learning. Equity principles such as inclusive curriculum and global perspective guided the development of the framework. All staff members interviewed feel the innovation will continue into the future.

The goals of the innovation are well-articulated and incorporated into the school's culture. The School Technology Plan guides school-wide decisions about ICT and includes goals for teachers and students, strategies and time lines for implementation. The Technology Use Plan is used to determine how technology will support school-based curriculum for students. These Plans are updated regularly, and are incorporated into all aspects of the school. In addition, teachers are committed to the innovation, and new teachers choose the school specifically for its technology focus. As the principal states, The culture of the school supports innovation and enables people to take that lesson. And that's why the innovation works in this school.

The benefits to the innovation at Spencer are numerous. Technology allows teachers to be more organized, take leadership roles, become more empowered. It allows students to gain access to technology that they otherwise would have no access to (equity issue), develop leadership skills and learn a variety of useful computer skills. For example, through collaborative projects, students develop talents and skills in a range of areas, including marketing and sales, public speaking, drawing and design, layout and technology, writing, editing, and cooperative skills.

Transferability

Professional development for teachers is essential to ensure the innovation is transferred effectively to other schools. The school leadership has to have a vision for the school, and must convince the staff to share that vision. As the principal says,

Your leadership has to be able to convince the staff that there is something in it for them...if you don't have the vision, it's not going to work. I think you have to be very focused in terms of exactly what you want to do.

The technology coordinator suggests:

The staff needs to determine what their needs are and what their strengths are and then work towards finding the resources to meet those needs and strengths...I think teachers teaching teachers is an ideal way. Teachers showing how a classroom teacher can deliver the curriculum expectations using ICT... Once the modelling is there some teachers will take it and run with it whereas others you really have to hold their hand to get them through the process.

Money for the massive influx of technology present at Spencer is not readily available for other schools. However, if the school leadership has a vision for the use of technology, and can get staff to share that vision, the innovation can be carried out with available technology. Technical and software support is essential.

Certainly the hardware is transportable, so is the software. But whether the actual outcomes at the end of it will be the ones that you are looking for, I think is not entirely dependent on hardware and software. If you don't have the thinking, and you don't have the vision...it's not going to work.

Finally, ICT technical support is essential to the innovation:

You need to have the infrastructure in place so people don't get frustrated, for example, technical and software support.

Appendix A

Methodology

" 3 researchers spent 5 days at Park

Amounts and types of data

Classroom observations

- 3 classrooms (1 hour each)
- completed Classroom Observation Guidelines
- collected documentation related to observations

School observations (atmosphere)

- 1 morning

Photographs

- school
- classrooms

Documentation

- Technology Projects binder
- Permission forms
- Student Agenda book
- School web site information
- School profiles
- School newsletters
- Partnership documentation
- Board-wide testing program information
- Report card samples
- Map/school layout
- Sample communications from principal to teachers (e-mail)
- Census information for township
- Performance Appraisal Program documentation (teachers)
- Strategic Planning Process Action Plan documentation
- Staff Handbook

Surveys

- Principal Questionnaire
- Technical Questionnaire (2)
- ICT Practices Survey for Teachers
- Your Teaching Philosophy Survey

Interviews

Two teacher groups, two student groups, parents and the school principal were interviewed.

Appendix B

ICT Practices Survey for Teachers 7 surveys returned

How comfortable are you with using a computer to do each of the following? (1=very comfortable, 2=comfortable, 3=somewhat comfortable, 4=not at all comfortable)

1 2 3 4

Write a paper	5	2		
Search for information on the WWW	1	6		
Create and maintain web pages				7
Use a data base			3	3
Send and receive e-mail	3	3	1	
Programming				7
Draw a picture or diagram	1	1	2	3
Present information		1		6

During the past year, how often did your students on average do the following for the work you assigned?
(1=several times each week; 2=several times each month; 3=a few times; 4=never)

1 2 3 4

Use the WWW	2	1	2	2
Create web pages				7
Send or receive e-mail	1	1	2	3
Use a word processing program	2	1	2	2
Use a computer to play games	3	3		1
Use a spreadsheet			2	5
Use a graphics program		1	3	3
Join in an on-line forum or chat room			1	6
Use a presentation program				7
Use an instructional program			1	6
Other computer uses				4

How would you rate your ability to use a computer?

Good Fair 6 Poor

Was student computer use every evaluated for grading?

Yes 3 No 2

If you assigned WWW searching, how much freedom did you allow students in locating sites to visit?

No restrictions Some restrictions 1 Designated sites only 2

Did you create or modify a Web site with any of the classes that you taught?

Yes No 5

What portion of the computer use in your classes was directly related to the course content?

All Most 1 Some 4 Very little

What portion of the computer use that you assigned was done by students individually?

All Most 2 Some 2 Very little 1

How often did you use a computer at home for preparing for teaching?

Several times a week 3 Several times a month 1 A few times 1 Never 1

Did you participate as a student or instructor in a virtual course through the Internet/ WWW?

Yes No 6

Did you involve your students in collaborative learning over the Internet/WWW?

Yes No 6

Are you currently using technology to collaborate with other teachers?

Yes 2 No 4

How many e-mail messages total do you send each day on average?

>12 6-11 1-5 5 None 2

How many of the following have you ever done? (0-5 or more times)

0 1 2 3 4 5

Made changes to a computer s hardware	6	1				
Updated an application program	6				1	
Recovered a damaged file	6			1		
Created a web site	6					
Developed a data base	4	1	2			