The Conference Board of Canada

CASE STUDY SERIES

Building a Global Community Through the Use of Technology in the Classroom

Contact
Industry Canada's SchoolNet GrassRoots Program
http://www.schoolnet.ca/grassroots

Name of Program
SchoolNet GrassRoots Program

Skills Developed
ICT
Employability

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Canada's SchoolNet GRASSROOTS PROGRAM
Interactive Learning Projects for the Internet

Innovating and learning Together

February 26, 2001

GrassRoots Program Partners

Alberta Learning in partnership with the TELUS Learning Connection

British Columbia - Industry Canada, Pacific Region

First Nations Confederacy of Cultural Education Centres in partnership with First Nations across Canada

Manitoba Education and Training in partnership with Manitoba Education Research and Learning Information Networks (MERLIN)

New Brunswick Department of Education

Newfoundland and Labrador Department of Education in partnership with STEM~Net

Northwest Territories Department of Education, Culture and Employment

Nova Scotia Department of Education

Nunavut Ministry of Education

Ontario Ministry of Education in association with the Ontario Public Supervisory Officials' Association (OPSOA) and the Education Network of Ontario (ENO)

Prince Edward Island Department of Education

Québec - Association québécoise des utilisateurs de l'ordinateur au primaire et au secondaire (AQUOPS)

Saskatchewan Education in partnership with Saskatchewan school divisions

Yukon Department of Education

Industry Canada's SchoolNet GrassRoots Program is pleased to present case studies of four GrassRoots projects undertaken by the Conference Board of Canada.

This independent study examines the impact of GrassRoots projects in helping students and teachers become not only skilled users of Information and Communications Technology (ICT) but effective creators of pedagogically-relevant Canadian content. The study reveals that GrassRoots projects have a profound influence on teaching and learning. Through GrassRoots online learning projects, teachers guide students to collaborate, manage, own, share and publish their learning. The Conference Board makes the case that GrassRoots projects foster a culture of innovative problem-solving, entrepreneurial thinking and collaborative, creative teamwork, the kind of culture that is needed for young people to succeed in the knowledge economy.

The SchoolNet GrassRoots Program, in conjunction with its provincial/territorial, theme and corporate partners, provides funding and support to schools to integrate ICT into the learning process by carrying out Internet-based learning projects with K-12 students.

Through the SchoolNet GrassRoots National Campaign, Canada's private sector can play a key role in preparing young people for the modern workplace. The Campaign aims to raise $15 million in private sector support, to fund GrassRoots online learning projects. As of February 2001, the Campaign has secured the support of the following organizations:

Microsoft®

AOL CANADA®

Cisco Systems

Imperial Oil Esso

CN

The Conference Board of Canada

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Effective practices in developing and supporting teachers' and students' information and communications technology skills.

EXECUTIVE SUMMARY OF GRASSROOTS PROJECT CASE STUDIES

BY KURTIS KITAGAWA

February 2001

Conference Board of Canada Case Studies

In the fall of 2000, The Conference Board of Canada reviewed, in its ongoing case studies series, four projects funded by Industry Canada's *SchoolNet GrassRoots Program*. These projects represent initiatives of different sizes undertaken by schools across Canada.

Conference Board case studies focus on initiatives from education, business and government that develop the employability skills of all Canadians, whether within the publicly funded education system, within the workplace, or as part of government programs that support labour market transitions for Canadians who are outside the publicly funded education system and are not currently employed. Conference Board case studies showcase effective practices in developing skills and provide independent analyses of the challenges, benefits and keys to success of skills development activities operated on a small or large scale. Conference Board case studies are reflective templates that can be used to replicate successful programs and provide realistic commentary and observations on the "what fors" and "how tos" of developing the skills of Canadians in different environments as well as insight into the conditions under which different employability skills development programs may be replicated or adapted by others.

The Conference Board's *GrassRoots* case studies focus on the:

- Diversity of activities involved in implementing a project
- Particular Information and Communications Technology (ICT) and other skills gained by students/teachers
- Impact of integration of ICT in curriculum on learning and teaching
- Innovations by teachers in integrating ICT-based learning in the classroom
- Student/teacher team structures used to complete a big project
- Student/teacher reflections on the Internet and its uses in education
- Awards or recognition received for GrassRoots projects

SchoolNet GrassRoots Program

Industry Canada's *SchoolNet GrassRoots Program* offers funding to schools for the creation of innovative, Internet-based interactive learning projects that:

- Are designed and implemented by teachers and students;
- Are curriculum-relevant;
- Foster the acquisition of academic, employability and computer skills in Canadian youth;
- Integrate Information and Communications Technology into learning;
- Build unique and relevant Canadian content on the Internet; and
- Facilitate increased connectivity and training opportunities.

By collaborating on ICT projects, teachers and students help develop each other's ICT skills: student skill development, in other words, goes on simultaneously with teacher professional development.

GrassRoots projects are enormously powerful vehicles for engaging and focusing teachers and students in a shared learning experience centred on the use of Information and Communications Technology to accomplish curriculum objectives.

GrassRoots projects help build a culture of mentoring and peer and cross tutoring that augments and enhances the traditional culture of teaching and learning.

Visit us on the Web:
www.conferenceboard.ca/nbec

The Research Process

Conference Board researchers:

1. Conducted in-depth face-to-face and telephone interviews with teachers, students, parents and school board personnel associated with the different projects
2. Prepared drafts of case studies, which were shared with interviewees, who were encouraged to provide feedback on the accuracy of facts and on the adequacy of interpretations
3. Incorporated teachers' feedback
4. Met and shared drafts of case studies with Industry Canada
5. Incorporated Industry Canada's feedback
6. Prepared executive summary of case studies

Chief Findings

Based on the research The Conference Board conducted for the four case studies on projects completed under the *SchoolNet GrassRoots Program*, the Board is able to summarize its key findings as follows:

The Board found that *GrassRoots* projects are enormously powerful vehicles for engaging and focusing teachers and students in a shared learning experience centred on the use of Information and Communications Technology to accomplish curriculum objectives. **This has begun to effect a "paradigm shift" for participating students and teachers.**

Under the traditional model, teachers are required to deliver mandated curriculum objectives using a chalk and talk approach, with students relying on textbooks and teacher generated handouts. Under this approach, subject matter lines are rather rigidly preserved and students are assessed on their ability to demonstrate subject matter knowledge and relevant skills proficiency in discrete subject areas. Teachers are expected to play the role of "sages on the stage", while students are mere blank slates, taking impressions from their instructors.

On the new model that has come to sight with *GrassRoots,* by contrast, the traditional instructional model tends to be overhauled in a number of exciting ways.

Firstly, teachers have access to modest sums of money that they can use directly to enrich their students' learning experience in an area that is naturally appealing to them, i.e., Information and Communications Technology. Secondly, in the course of operating their *GrassRoots* projects, teachers tend to consult with each other across subject matter or disciplinary lines. The result of this sort of collaboration is that teachers better integrate their teaching and deliberately help students connect their learnings from one class with what they are called upon to do in other classroom learning situations.

Thirdly, teachers and students develop ICT skills through practical applications that they themselves devise to support their teaching and learning objectives. ICT is therefore not taught and learned as an abstract concept or a separate subject, but unfolded by doing in a way and at a pace that makes sense to teachers and students alike, according to their needs in relation to their *GrassRoots* project. ICT is therefore not perceived as an "add on" to teachers' already full workload, but rather as an option for delivering curriculum outcomes.

Fourthly, by collaborating on ICT projects, teachers and students help develop each other's ICT skills: **student skill development, in other words, goes on simultaneously with teacher professional development**. Teachers coach students; students help teachers; and older students coach and assist younger students, so that *GrassRoots* projects help build a culture of mentoring and peer and cross tutoring that augments and enhances the traditional culture of teaching and learning. Teachers, and students as well, become "guides on the side".

Implicit in the preceding four characteristics of the new teaching and learning model engendered and spurred on by the *SchoolNet GrassRoots Program* is a fifth aspect brought out when teachers and students participate in GrassRoots projects. Students "graduate" from being mere passive recipients of information or sponges into active learners, who are engaged with the subjects they are studying and design and drive processes

Students "graduate" from being mere passive recipients of information or sponges into active learners, who are engaged with the subjects they are studying and design and drive processes that build their skills and knowledge and lead to the outcomes they and their teachers desire.

that build their skills and knowledge and lead to the outcomes they and their teachers desire. In other words, GrassRoots projects encourage students to own, and in a very real way, co-manage, their education with their teachers, who provide curriculum continuity and planning support. This is in no way a criticism of traditional teaching; it is, emphatically, however, an affirmation of how the power of Information and Communications Technology can be harnessed to enhance the teaching and learning experience and directly empower learners while they are learning.

Sixthly, teachers, by participating in case studies relating to their GrassRoots projects, reflect on what they have done. This is an important step in developing teachers' pedagogical practice, because the learnings that derive from what they have done become, through the act of reflection, a resource they can apply in the future to integrate ICT skills development into the delivery of other curriculum objectives.

Directly through GrassRoots, students are extending their use of computers beyond the playing of games to conducting research, sharing information and publishing their work to an audience as big as the world.

Seventhly, by using computers to complete school projects, students are exposed to the many uses of this technology as an aid to learning and communicating. Directly through GrassRoots, therefore, students are extending their use of computers beyond the playing of games to conducting research, sharing information and publishing their work to an audience as big as the world. **This closely simulates what students will use computers for in the world of work.**

By participating in GrassRoots projects, students, with the support of their teachers, prepare themselves for transitions into the world of work by designing their own virtual co-op experience.

Eighthly, teachers and students exploit the unique features and properties of Information and Communications Technology to design and complete classroom relevant activities, showcase their achievements and communicate their successes. In other words, the work students and their teachers do on GrassRoots projects is not intended for a single use by one class at one time, but may be drawn upon by anyone at any time. This converts some of the tangible outcomes of education into living products that become dynamic quantities in the teaching and learning cycle for interested teachers and students everywhere.

Ninthly, when teachers and students carry out GrassRoots projects, they connect with each other in ways that empower individuals, build community capacity and lay the groundwork for a global community. GrassRoots projects enhance students' and teachers' connectedness in the knowledge economy in all of its various forms, including connections between physically present and long distance project team members, connections between information sources and connections between real life events and the electronic recording of those events. Such high touch / high tech connectedness greatly expands teaching and learning horizons because the whole world becomes a potential resource for gathering and interpreting data, sharing and processing information, growing knowledge, building collaborative alliances and generating useful and broadly applicable insights. **This is the stuff of innovation.**

Finally, and by way of summary of the foregoing, by participating in GrassRoots projects, students, with the support of their teachers, prepare themselves for transitions into the world of work by designing their own virtual co-op experience. Students drive their own learning by developing real products (their GrassRoots projects) for real markets (e.g., current and future generations of students and teachers in other schools), which effectively simulate the performance skills and standards of the world of work. Having this knowledge and using these skills is essential to contributing, and realizing one's full potential, in today's world of work. **ICT skills are crucial to meeting the challenges of building and leveraging innovative capacity in the knowledge economy, and students and teachers participating in GrassRoots projects are helping Canada meet those challenges and turn them into opportunities for competitiveness and growth.**

The Conference Board of Canada

CASE STUDY 34

Building a Global Community Through the Use of Technology in the Classroom

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http://www.schoolnet.ca/grassroots

Name of Program
SchoolNet GrassRoots Program

Skills Developed
ICT
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Prepared for Industry Canada by The Conference Board of Canada

Effective practices in developing and supporting teachers' and students' information and communications technology skills

Imagine the Challenge

Building Community Capacity Through Developing Teachers' and Students' Information and Communications Technology Skills

A SCHOOLNET GRASSROOTS PROJECT

BY KURTIS KITAGAWA AND DOUGLAS WATT

December 2000

Teachers and students who participate in Imagine the Challenge design and complete learning projects that build their Information and Communications Technology (ICT) skills. But participation has done far more than merely develop community capacity. It has also helped to empower individuals and build a global community. The project was supported by Industry Canada's SchoolNet Program in partnership with Alberta Learning.

Overview

Between September 1999 and January 2000, and as part of the internationally recognized Steps 2 Peace project, a Canadian runner, David Adie, ran over 5,000 km between the east and the west coasts of Australia. His run provided the inspiration for the Imagine the Challenge project carried out at four Calgary schools (Fish Creek, Hawkwood, Riverbend and Sam Livingston). Students and teachers from these schools collaborated on a number of activities, researching information on Australian political and physical geography, society and culture and posting the results on their project Web site. Canadian and Australian students corresponded with David Adie via e-mail as he travelled across Australia. Children's hospitals were the beneficiary of this fund-raising event.

Project Details

- Grade levels: K–3, 4–6, 7–9
- Number of schools: four
- Number of classes: 15 (approx.)
- Number of participants: 400 students (approx.) and 15 educators
- Initial development: June 1999–June 2000
- GrassRoots funding: Block 1 Optional Funding Model, $7,200
- Project scope: global
- Language: English
- ICT resources: e-mail accounts, Internet access, bandwidth, digital cameras, video cameras/scanners, PCs, supporting software, conference-call-capable telephones
- Project Web site: http://projects.cbe.ab.ca/hawkwood/HTML/index2.html

Groups Served

- ✔ Students (K–3, 4–6, 7–9)
- ✔ Teachers
- ✔ Business
- ✔ Community (including parents, community institutions and business)

Objectives

- ✔ To impart the concept of challenge to students through multiple curriculum areas and experiential, real world, real time, authentic learning activities
- ✔ To instill in children the idea that they can make a difference
- ✔ To develop children's awareness of the global community and their role within it
- ✔ To develop and enhance ICT skills in students, teachers and the community beyond the schools, including parents and siblings

Activities

Cross-curricular activities (social studies, science, mathematics, technology, fine arts, language arts, physical education) for Canadian students have included:

- ✔ Taking a closer look at Australia, its people, Aboriginal art, climate, weather, ecosystems, flora and fauna, and cultures
- ✔ E-mailing messages and corresponding with David Adie and Australian schools
- ✔ Conducting conference telephone calls
- ✔ Building Web pages for every topic covered in social studies and science
- ✔ Using spreadsheets and graphs to plot David Adie's and their own progress in their different walk/run activities
- ✔ Scanning digital photographs and editing David Adie's video using Avid Cinema software to produce a documentary; this was shared with the school at assembly, as well as with other schools and with David Adie
- ✔ Using video clips and audio clips from telephone calls to produce a short video (using Avid Cinema software), which was placed on the Web site
- ✔ Animating dramatic writing, inspired by David Adie's run, through the use of clay animation facilitated by Quick Time Virtual Reality Software
- ✔ Drawing pictures and writing responses for David Adie
- ✔ Scripting and dramatizing a play
- ✔ Holding 5,000-km walk/run events on the school track to simulate David Adie's journey and raise money for Alberta Children's Hospital ("The Great TWOnie Challenge")
- ✔ Preparing their own personal challenge journals, in which they interpret quotations dealing with challenges in their own terms and write up their own personal challenges
- ✔ Attending a talk about living with disability by paraplegic athlete Christian Bagg and trying out his modified sports equipment
- ✔ Attending a talk about living with disability by a blind, brain-injured person
- ✔ Studying the novel *The Quay*, which included people versus nature and people versus people challenges (e.g., racism)
- ✔ Building connections to Terry Fox and other "heroic" Canadians by examining the qualities of a hero
- ✔ Designing a bridge out of food, punning on the idea of "I can" (students had to work co-operatively to construct a bridge from over 900 non-perishable food items, including many canned goods, which weighed over 1,100 lbs. and were worth approximately $2,200)
- ✔ Visiting the Food Bank to see how some members of our community face the challenge of not having enough to eat
- ✔ Building nets in geometry to cover the geometrical solid of the food bridge
- ✔ Holding a nickel carnival

Benefits for Education

- Shows how information and communications technology can be applied
- Builds experience in technology beyond what is normally possible through the curriculum

This project helps teachers and students make the connection between Web skills and other subjects and projects. ▶

- Extends the use of technology beyond the initial cohort of teachers and students who are working on a particular technology-related project
- Makes the connection between ICT and the curriculum
- Exploits the attraction of Web-based materials in a curriculum-based learning context
- Entails the use of technology that might not otherwise be used in the classroom
- Transfers Web skills to other subjects and projects
- Extends the curriculum beyond the walls of the schools involved
- Creates engaging and exciting projects around technology by emphasizing the personal contacts made possible by the technology
- Develops meaningful learning experiences for students and incorporates a single theme, Imagine the Challenge, into everything from physical education to English, mathematics and science

Students and teachers develop collaborative, problem-based learning skills. ▶

- Develops collaborative, problem-based learning skills—students understand the choices they are making (and how they are treating other students) in a concrete situation in which they want to succeed; this reduces drop-out rates and discipline problems
- Leads to more collaborative learning, with teachers and students sitting at the same table
- Gets teachers to talk to one another across disciplines and between schools about what they are doing and how they are doing it
- Expands students' learning through the logic of electronic communication—students no longer limit themselves to the traditional emphasis on answering the immediate question to the exclusion of all else that is going on
- Encourages students to look for information on the Internet and bring it to school to enrich their learning experience
- Makes learning feel "real" for students and creates opportunities for them to get involved; this encourages students to take education home and into the community as well as back to the classroom (students surf the Internet at home and post materials they would like to share at school on a Web site dedicated to the project)
- Engages students on their own ground—students do not know the world without technology
- Focuses teaching and learning
- Interweaves teachers' learning, development and preparation with students learning experience; teachers are less afraid to learn from a student than from another teacher
- Helps teachers and students learn how to take part in education and depend on each other in what they do; students cross-tutor and learn from their peers
- Encourages students to research on the Internet questions that teachers cannot answer
- Engages students in meaningful dialogue with one another and with adults
- Builds positive attitudes in the classroom
- Engages the community through a school newsletter

Teachers think beyond their subject disciplines and co-operate with one another. ▶

Benefits for Teachers

- Use the Imagine the Challenge project as a starting point, then build it into the curriculum through other activities
- Are motivated to get involved with technology—they have to use technology to work with their students on the project
- Learn to think outside the box—there is more than one way to solve problems
- Broaden their knowledge horizons and think beyond their subject disciplines
- Co-operate with other teachers across disciplinary lines to connect their courses and enrich student learning
- Open their minds and see how "cool" things can fit into the curriculum
- Are able to link classroom theory with real world situations to enhance their teaching and make it more explicitly relevant

Teachers make team-building connections within the learning community. ▶

- Develop project-based strategies to assist in lesson development
- Gain experience of practical or current applications of theories that they understand and teach
- Can add pictures and reality to chalk and talk
- Can develop their own classroom activities, which support their curriculum objectives
- Gain a sense of fun and adventure
- Encourage students to identify their challenges and take step-by-step actions to overcome them
- Identify resources available in their local communities
- Make team-building connections within the learning community and between schools

Teachers connect with students on their own level. ▶

- Can choose to use computers in their courses if this will better facilitate learning
- Connect with students on their own level to see what students like, starting with learning with technology

Benefits for Students

- Develop ICT skills as well as "softer" skills including communication, research, teamwork and innovation skills
- Learn how to use digital cameras, e-mail and computers
- Learn how to evaluate Web sites
- Make more use of computers to do research
- Initiate and drive their own learning through the use of e-mail, the Internet, telephone and video technology; at times, the project becomes a very personal experience for learners

Students initiate and drive their own learning. ▶

- Actively research and think about how to incorporate results into their school life—realize that the Internet gives access to extensive information on learning topics provided they are willing to dig deeper (previously students used the Internet to find simple answers to questions and did not explore)
- Teach parents technology and other skills
- Initiate and participate in numerous fundraising activities for Alberta Children's Hospital ("The Great TWOnie Challenge")
- Accept people for what they are instead of trying to change them
- Incorporate other students' ideas as well as their own
- Brainstorm and rely on one another to work as a team (peer learning)
- Find learning more interesting
- Gain a sense of personal effectiveness; students are empowered technologically and improve their self-confidence
- Learn to believe in themselves and in their capacity to overcome their own challenges—see real-life examples of what people facing challenges can accomplish and are encouraged to realize their own positive potential
- Feel important while they are learning
- Enhance their poise and social skills
- Write down their dreams and reflect on other people's dreams
- Learn empathy—realize what others feel as they struggle with various challenges
- Learn how to hope; an underlying part of David Adie's activities is to help prevent youth suicide by opening up possibilities for young people and tapping into their positive potential
- Expand respect for people who work on Web sites; students initially think this work is easy, but after trying it themselves they realize the skill required
- Learn about other cultures (such as the Australian Aboriginal culture) on their own terms and make friends around the globe
- Develop a sense of responsibility and do what they say they are going to do; learn the power of delivering on promises and completing words-and-paper plans with concrete actions
- Gain the sense of accomplishment that goes with following through on their plans—honouring commitments without having to make up excuses about why they cannot do what they said they would do

Students learn to study in partnership with other students. ▶

Students become motivated to use editing skills. ▶

Students take chances in a variety of subjects. ▶

- Build their leadership skills; learn how to set goals and overcome challenges
- Seek knowledge and find resource people for themselves based on their own interests and needs
- Take active ownership of the curriculum outcomes they are supposed to achieve and mark their own development and progress
- Become the owners/authors of their own lives and take responsibility for being true to themselves
- Learn to study in partnership with other students rather than independently (take turns looking up information and writing it down)
- Gain awareness of other parts of the world and how they fit into the world
- Gain a greater sense of self by reaching out to others
- Gain purpose by sharing their learning—making formal and informal presentations and bringing their sense of self-worth to further learning
- Build better relationships with themselves, with one another, with things (computers) and with concepts and ideas; build bridges between making and knowing
- Learn to take care of one another, of the planet and of themselves; become part of a global family
- Learn interviewing and presentation skills by developing questions for telephone interviews with David Adie, recording the conversation and reporting back to their classes
- Become motivated to use editing skills because there is a purpose to it (posting their work to the world on the Internet)
- Develop visual literacy; understand the significance of Aboriginal symbols and techniques
- See and hear for themselves, thanks to technology, David Adie's and their own progress
- Take chances in a variety of subjects such as mathematics; they attempt answers even when they are not sure they are right
- Feel motivated and challenged (high-achieving students in particular)
- Have an adult from the community validate their ideas and thoughts and stand up for them in a safe, non-threatening way

Benefits for Parents

- Become involved in their children's learning experiences through the project's Web site, newsletter and hands-on learning experiences
- Expound on family ideals in a more meaningful fashion, drawing on the correlation between home life and school life and learning
- Learn applications for PowerPoint (slide/overhead presentation software) from their children's knowledge of HyperStudio

Benefits for Business

- See that people are the best resource for making connections and making things happen
- See students gain an understanding of "stretch goals"—pushing themselves to go beyond set objectives
- Recognize opportunities to partner with education in real world learning activities that make a difference globally and locally

Keys to Success for Teachers

- ✔ Having an interest in and being committed to the project, being flexible, being able to take risks and being able to see beyond what the curriculum says to what it could encompass
- ✔ Having time to meet as a group to talk about what their focus is and to build an integrated learning framework
- ✔ Having access to other teachers who are compatible in terms of planning and working together and have a very strong understanding of the curriculum and how to integrate the project theme and technologies into different subjects
- ✔ Embedding the project in the curriculum

Using technology as a tool requires a human connection; that is where teachers come in. ▶

- ✔ Integrating activities among subjects to achieve project goals
- ✔ Helping students mark out manageable steps to achieve their own goals; this is important given the example set by David Adie with his monumental goal
- ✔ Having students do primary source research alongside a real time event

Keys to Success for the Project

- ✔ Using technology as a tool and exploring ways it can be used to research, learn, build skills, communicate and present information as people become more familiar with it; delivering curriculum and being sensitive to students' needs requires a human connection
- ✔ Having technology that is available and reliable; technical infrastructure in the schools has to be at a certain level and someone has to have a basic understanding of how the technology can be used and applied

Teachers need mechanisms in place that foster innovation. ▶

- ✔ Walking the talk at every stage: an important part of helping students develop confidence in their ability to overcome their challenges lies in demonstrating credible behaviour—to be credible, David Adie had to finish his run across Australia and teachers and students had to follow through on their commitments
- ✔ Having a school champion, who inspires other teachers and students
- ✔ Having the technical expertise to design Web pages within the schools and encouraging collaboration between schools to provide appropriate support
- ✔ Having mechanisms in place that foster innovation, for example, a cash resource to free up time to do the project and develop skills—GrassRoots funding helped the Imagine the Challenge project to happen and ultimately enriched it
- ✔ Using GrassRoots money to pay for substitute teachers (for teacher release time) instead of trying to squeeze the project into lunch hours
- ✔ Using GrassRoots funding to buy technical equipment (digital cameras, scanners, software)
- ✔ Creating a live Web page that can be updated every two or three days
- ✔ Getting parental support
- ✔ Having a definite life span for the project
- ✔ Taking a collaborative (teamwork) approach to learning experiences
- ✔ Having everyone (teachers, students, parents, community) bring their own sense of identity and self-worth into the project—project ownership is communal, not individual

Challenges for Teachers

Teachers need to have time to reflect. ▶

- Having time to reflect, make connections and see the meaning of what they are doing
- Having time to develop new activities and adapt technology
- Overcoming fears of Web-based teaching and learning—getting time and help to get up to speed with their technical skills
- Finding and making time for the project (the project took over their lives for a few months)
- Supporting students heavily in the early days until they improve their skills enough to be more self-sufficient
- Being motivated and not seeing the project as onerous or threatening
- Feeling bound by the Alberta curriculum and not seeing project's connection to the curriculum—taking a broader view of the curriculum
- Listening carefully to the needs of the children
- Keeping up with students' learning capacity and learning expectations

Challenges for Students

- Being active participants in their own learning and skills development—seeing themselves as responsible for mastering the content instructors provide
- Making the connection for themselves between the courses they are taking and the skills they are developing

Teachers need to be skillful at managing student expectations. ▶

Imagine the Challenge is innovative because it gives an educational reason to use technology. ▶

- Actively transferring and extending their skills in new home, school, work or community contexts

Challenges for the Project

- Getting David Adie to start running in the middle of September so that his run would coincide with the school year and the students who would be his virtual road crew could see him off (he had been planning to start at the end of July)
- Keeping the learning alive and going when David Adie's run was over
- Breaking down borders between school boards, schools and classes to ensure maximum participation
- Managing students' expectations around limited technological resources; it is hard to plan so that every student can build a Web page, and ideas fade when students do not have access right away to implement their ideas

Innovative Approaches to GrassRoots' Projects

- ✔ Exploiting technology as a vehicle for, and as a driver of, learning
- ✔ Connecting people with technology to underline the different kinds of connectedness in the knowledge economy (connections between physically present and long-distance project team members, connections between information sources [which can be downloaded and/or uploaded to make the connections more palpable and immediate], and connections between real life events and the electronic recording of those events)
- ✔ Getting entire school communities involved in a technologically linked learning activity—bridging learning activities between many schools, classes and grade levels
- ✔ Providing an educational reason to use technology and giving students who have very little or a high degree of skill a chance to practice or hone their skills to accomplish specific tasks
- ✔ Having students demonstrate their learnings to their classes based on their telephone interviews with David Adie (e.g., what did they learn about time zone changes? what did they ask him? what did he say?) and act as technological resources for other classes (e.g., showing entire classes how to scan and upload images)
- ✔ Having each school handle the project differently, basing their involvement on their own technical savvy, areas of expertise, time commitments, school resources and interests
- ✔ Opening up cross-class, cross-grade, cross-school, cross-curriculum and cross-country learning opportunities
- ✔ Opening up possibilities for new teaching methods and new ways of sharing information

Achievements

- Grades 5 and 6 students used the ICT skills they developed during the Imagine the Challenge project to develop their own Web page
- Grade 5 students produced a 30-minute documentary through the use of presentation software by editing eight hours of video from David Adie in Australia
- Grades 3 and 4 students produced their own Web pages related to Imagine the Challenge (focus on Aboriginal Art) using ICT skills
- Students raised over $1,500 for Alberta Children's Hospital and presented a cheque during the Children's Miracle Network Telethon
- Students and teachers developed an opportunity to give service (and continue to do so)
- Students developed a wider sense of audience; instead of writing for their teacher they now write for the world, because the real power of the Web is that it goes beyond paper and pen and allows for near instantaneous communication
- Students are better at setting goals and are more aware of the "edges" of their abilities, where targeted growth can happen
- Students see history as something in which they can participate and help

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Recycled paper

make and not as "something in the past" to be studied forensically
- Students may not be totally proficient in certain ICT skills, but they know that things can be done if only they take the trouble to find out how—they realize they have a choice
- Teachers know what is technologically feasible when they want to go into more detail
- Students appreciate the benefits of hearing and working with other people's ideas, which opens them up to new insights and ways of doing things
- Students and teachers significantly improve their ability to apply and learn through real-life experiences
- Teachers and students learn more from one another

Conclusion

Imagine the Challenge shows the connection between empowering individuals and developing community capacity. It further demonstrates that integrating the use of ICT with the delivery of curriculum can be a powerful tool for opening up lines of communication between teachers across subject and disciplinary lines. Opening these kinds of channels between teachers is important not only to support and reinforce learning done in one classroom situation in other courses, but also to leverage teaching strengths to better identify and capitalize on learning opportunities that make the most sense when viewed across the curriculum and the planned activities of a community of teachers. This allows teachers to build students' skills and knowledge using a team approach that maximizes their collective capabilities and avoids any unnecessary duplication of effort. Finally, Imagine the Challenge underlines the importance of engaging students with ICT so that they are motivated to drive their own learning and benefit from the support offered by teachers acting in a facilitating role.

SchoolNet's GrassRoots Program

GrassRoots projects are initiated, designed and implemented by teachers and students and are curriculum-relevant. The GrassRoots Program, in collaboration with provincial, territorial and corporate partners, offers funding to schools for the creation of innovative, Internet-based interactive learning projects that:
- foster the acquisition of academic, employability and computer skills in Canadian youth;
- integrate information and communications technology into learning;
- build unique and relevant Canadian content on the Internet; and
- facilitate increased connectivity and training opportunities.

For more information on GrassRoots, visit http://www.schoolnet.ca/grassroots

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1999–2000 Business and Education Ideabook

1998 100 Best Partnerships IdeaBook

1997 100 Best Partnerships IdeaBook

1996 100 Best Partnerships IdeaBook

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The Conference Board of Canada

CASE STUDY 36

Building a Global Community Through the Use of Technology in the Classroom

Contact
Industry Canada's GrassRoots Program
http://www.schoolnet.ca/grassroots

Name of Program
SchoolNet GrassRoots Program

Skills Developed
ICT
Employability

Prepared for Industry Canada by The Conference Board of Canada

Effective practices in developing and supporting teachers' and students' information and communications technology skills

This Is Nova Scotia—From Individuals Out

Promoting the Use of Information and Communications Technology at Home, School, Work and in the Community

A SCHOOLNET GRASSROOTS PROJECT

BY DOUGLAS WATT

December 2000

This Is Nova Scotia—From Individuals Out involves almost all the students and teachers in Atlantic View Elementary School by linking a variety of curriculum initiatives under the electronic umbrella of the GrassRoots Program's design and learning environment. As they complete learning projects and post them on the Internet, teachers and students develop a variety of skills—Information and Communications Technology (ICT), generic presentation, communication and teamwork—and use technology in the classroom to communicate and share ideas. The project was supported by Industry Canada's SchoolNet GrassRoots Program in partnership with the Nova Scotia Department of Education and Culture.

Overview

This Is Nova Scotia—From Individuals Out encourages elementary school teachers to integrate technology into their classroom curriculum by developing various ICT implementation strategies. As well, students are encouraged to research a variety of aspects of Nova Scotia's cultural identity, history, people and events using ICT skills and to place their findings and interpretations on the Internet.

In addition to accommodating a range of learning approaches, from the close-to-home perspective of kindergarten children to the broader perspective of Grade 6 students, the project encourages the sharing of ideas and learnings among different classes, teachers and subject matter themes.

Project Details

- Grade levels: K–6
- Number of schools: one
- Number of classes: eight, as well as modified materials for children with special needs and an African Nova Scotian Heritage unit
- Number of participants: 180 students (approx.) and 12 educators
- Number of sub-projects completed: eight
- Initial development: February 2000–May 2000
- GrassRoots Funding: Block 2 Fixed Funding Model, $5,500

- Primary use of GrassRoots funding: release time (hiring a substitute teacher to free up time for the project co-ordinator to develop materials, conduct in-service sessions and plan a summer institute for elementary school teachers) and purchase of a digital camera
- Project scope: school, provincial, national
- Language: English
- ICT resources: e-mail, HTML, Internet access, graphics, digital cameras, PCs, adaptive software, multimedia—Hyper Studio templates and simple Web page generation
- Project Web site: http://www.aves.ednet.ns.ca/gr/gr2000.html

Groups Served

✔ Students (K–6 and 6-adapted)
✔ Teachers
✔ Community (including other schools, interested community members and the global Internet community)

Objectives

✔ To extend the number of links between existing curriculum objectives and classroom lesson plans through the use of the Internet and other ICT resources without adding to the teachers' workload
✔ To incorporate the use of computers, software and ICT into classroom project work
✔ To have students study a regular curriculum topic and use technology and ICT to enhance their research skills and their communication and presentation skills
✔ To improve the literacy skills of emergent readers through engaging them in vocabulary-building activities such as on-line crossword puzzles and word searches
✔ To generate funds for buying time to develop technology integration materials

Activities

Multi-class, multi-grade and cross-curricular activities for students (primary to Grade 6) have included:

✔ Studying different topics and projects relating to Nova Scotia's history, culture, climate, geography and economy, all of which are tied into the existing curriculum (topic/project titles included Food Grown in Nova Scotia, Symbols of Nova Scotia, Nova Scotia's Forest Environment and Inhabitants, Bluenose II, Man-made Disasters of the Past Century, Explorers of Nova Scotia, Nova Scotia's Ancestors, Multi-cultural Perspectives and Issues in Nova Scotia, and African Nova Scotian Heritage)
✔ Building a school GrassRoots Web page as well as Web pages on which to post the work and findings of eight individual class projects. Web pages include various combinations of text, links, images, on-line crossword puzzles, on-line fill-in-the-blanks activities, word search puzzles, colouring pages, essays and poems
✔ Taking digital pictures of students and their work and placing them on the Internet
✔ Working with teachers to use computers and the Internet to search for information, access Web links, send e-mail messages, create Hyper Studio presentations of findings, convert images to Web format and participate in on-line activities such as e-puzzles and e-quizzes
✔ Learning how to synthesize and generalize from the vast amounts of information found on the Internet
✔ Establishing Internet links with the Coast Guard and to "Theodore Tugboat"—Nova Scotia's new nautical ambassador
✔ Studying the flag, flower, coat of arms and other symbols of the province
✔ Studying various forms of wildlife in Nova Scotia, focusing on the forest

Teachers are encouraged to take a close look at how useful the Internet really is. ▶

Teachers build confidence, self-esteem and comfort in using and applying ICT in the classroom. ▶

Teachers recognize that the Internet is a valuable resource for classroom materials and content. ▶

environment and establishing links to various wildlife-related Web sites

✔ Using the Internet to do research projects and then creating Hyper Studio presentations of their findings and posting them on their class Web sites

✔ Sending e-mail requests to Web page owners for permission to use certain relevant images

✔ Learning about the concept of copyright

✔ Analysing information on what constitutes a disaster and the role that humans play

✔ Creating on-line puzzles and word search games using Hot Potato

✔ Making digital images of student-designed and -created posters and putting them on the Internet

✔ Exploring issues of racism, bias and stereotyping, writing poems about these issues and posting the poems on the Internet

Other activities under the This Is Nova Scotia project have included:

✔ Using software such as BoardMaker Program to adapt books so that students with Down's syndrome can participate in classroom learning activities at their own speed

✔ Enabling students with special needs to write their own journals and books and adapting much of the class project work posted on the Web site

✔ Using part of the GrassRoots funding to develop course materials and classroom information binders for teachers participating in the Technology Integration Summer Institute (a professional development and ICT training opportunity for teachers)

Benefits for Education

- Raises awareness of how technology can be used and integrated into classroom learning—a first step toward highly valuing on-line learning resources for all subject areas and all grade levels
- Uses technology and ICT as tools to enhance regular curriculum topics
- Provides an opportunity to illustrate how technology and ICT can be applied and used by teachers and students
- Extends the curriculum beyond the walls of the school
- Enables students to use technology to enhance their basic research and presentation skills and to transfer their Web skills to other subjects and projects
- Enables emergent readers to improve their literacy skills through active engagement in vocabulary building using on-line resources such as e-puzzles and e-word search activities
- Promotes cross-class learning and sharing of information
- Provides a collection of student-developed resources that can be used by other students in the school, across North America and around the world
- Enables students to develop and take ownership of their own living library resource on the Internet, which they can refer to and use on a continuous basis
- Strengthens links with local and regional cultural organizations
- Offers opportunities for older students to support and assist younger students in learning and using ICT, teamwork and problem-solving skills
- Makes learning more fun and more hands-on (students doing word search puzzles on the Internet get immediate feedback)

Benefits for Teachers

- Are encouraged to take a close look at how useful the Internet really is—without the structure of the project, many teachers would not have taken the time to learn about the Internet and how to apply it in their classes
- Build confidence, self-esteem and comfort in using and applying ICT in the classroom
- Learn new ICT skills that they can share with their students—teachers and students often learn new skills together
- Recognize that the Internet is a valuable

resource for classroom materials and content
- Work with other teachers to develop topics and classroom activities that cross grade levels and curricula and are linked by ICT
- Co-operate with other teachers across disciplinary lines to connect their courses and enrich student learning
- Develop their own classroom activities, which support their curriculum objectives
- Develop project-based activities to assist in lesson development
- Are motivated to sign up for the Technology Integration Summer Institute—a number of teachers signed up for the Institute who would not have done so prior to their involvement in the project

Students develop ICT skills (such as keyboarding and Web searching) and employability skills (such as communication, research, independant learning, teamwork and problem solving). ▶

Benefits for Students

- Develop ICT skills (such as keyboarding and Web searching) and employability skills (such as communication, research, independent learning, teamwork and problem solving)
- See the link between learning and the Internet—the application of technology is no longer a mystery
- Find learning more interesting and are keen to produce high-quality projects and finish them on time; students take pride in work that may be seen and used by many others
- Share their learnings and findings with a broad audience by posting their work on the Internet—without the technology this would not have happened
- Improve their self-confidence, poise and social skills (e.g., students who were reluctant to write on paper now write on the computer knowing that technological helpers such as spell-check are available—technology is an enabler of learning, especially for those who are not self-confident)
- Initiate their own learning by using the Internet to seek out resources, people and activities

Students see the link between learning and the Internet. ▶

Students find learning more interesting and are keen to produce high-quality projects and finish them on time. ▶

- Use the computer to develop good work habits
- Learn how to use digital cameras, scanners, e-mail and computers
- Learn how to design and develop Web sites
- Use the computer as a research tool as they find topics, pick out and sort ideas, discriminate between fact and opinion, and evaluate on-line sources for reliability
- Gain a sense of accomplishment from completing a project from start to finish
- Initiate and drive their own learning through the use of e-mail, the Internet, telephone and video technology

As well:

- Children with behavioural problems stay focused because of the application of ICT—the learning experience is different, hands-on and more personal

Keys to Success for Teachers

✔ Having a project co-ordinator who is ICT-literate to 1) develop strategies for teaching them how to integrate technology into the classroom curriculum and 2) advise them on the types of classroom activities that lend themselves to posting materials on the Web

✔ Having a project co-ordinator who is available to help them with integrating new technologies and methods during class time as well as after school

✔ Having access to continuous, just-in-time professional development opportunities through instructional videos, overheads and step-by-step handouts for producing materials such as HyperStudio presentations and simple Web pages

✔ Having the resources, time, support and training necessary to use and adapt ICT in their classrooms

✔ Being interested in and committed to the project and being flexible

✔ Having as much independence as they want, when they want, and as much support as requested, when requested

✔ Selecting a GrassRoots project theme

Challenges for teachers include having time to reflect, make connections and see the meaning of what they are doing and how technology fits into the scheme of things. ▶

or topic that crosses grade levels and curriculum boundaries

✔ Having time to meet as a group to talk about what their focus is and to build an integrated learning framework

✔ Working with other teachers who are compatible in terms of planning and working together and have extensive understanding of the curriculum and how to integrate a project theme into different subjects

✔ Embedding a project in the curriculum

✔ Integrating activities among subjects to achieve project goals

Keys to Success for the Project

Challenges for teachers include having time to develop new learning activities and use and adapt technology. ▶

✔ Using technology as a tool and exploring how it can be used to research, learn, build skills, communicate and present information as people become more familiar with it; delivering curriculum and being sensitive to children's needs requires a human connection

✔ Having technology that is available and reliable; the technical infrastructure in the schools has to be at a certain level (hardware, software, bandwidth), and someone has to have a basic understanding of how the technology can be used and applied

✔ Having a school project champion, who inspires other teachers and students, and who has the technical expertise necessary to design the school's and sub-project's GrassRoots Web pages (without the project coordinator, the integration of technology would not have taken place)

Challenges for students include making the connection for themselves between the courses they are taking and the skills they are developing. ▶

✔ Using GrassRoots money to buy technology and hire a substitute teacher, thus freeing up time for the project co-ordinator

✔ Ensuring the project has a definite life span and is designed to be manageable and within the capabilities of the school

✔ Taking a collaborative (teamwork) approach to developing, implementing and carrying out learning experiences

✔ Having everyone (students, teachers, parents, community members, administrators) bring their own sense of identity and self-worth into the project—project ownership is communal, not individual

Challenges for Teachers

- Having time to reflect, make connections and see the meaning of what they are doing and how technology fits into the scheme of things
- Having time to develop new learning activities and use and adapt technology
- Overcoming fears of Web-based teaching and learning—needing time and help to get up to speed on their technical skills
- Setting realistic goals and objectives for the project
- Determining the extent to which students are involved in the design, development and application of the on-line learning activities (are they builders, implementers or users only?)
- Being motivated and recognizing the link between the GrassRoots project and the curriculum
- Building on the momentum of success to continue learning

Challenges for Students

- Making the connection for themselves between the courses they are taking and the skills they are developing
- Actively transferring and extending their skills in new home, school, work and community contexts
- Understanding all of the information found on the Internet (e.g., the reading level can be higher than students can manage, which can be discouraging—in this situation, students and teachers can print out material and, together, put it into their own words)

Challenges for the Project

- Having the support of school administrators to provide adequate resources for the technical expertise needed to sustain ICT initiatives
- Overcoming the ICT fears of some

teachers to ensure maximum participation
- Having time to build technology into class lesson plans and the curriculum
- Having access to the proper hardware, software and bandwidth
- Managing students' expectations around limited technology resources
- Switching a sub-project theme after the conception and planning was completed (when co-ordination with local artists and woodworkers was not possible)
- Modifying a sub-project theme when an unforeseen circumstance affected one of the classroom teachers

Innovative Approaches to GrassRoots' Projects

- ✔ Providing an educational reason to use technology
- ✔ Selecting one curriculum outcome from each grade level and applying the GrassRoots project to these outcomes to get the support and interest of teachers
- ✔ Providing a first step in teaching children about on-line learning, a lifelong skill that they can use throughout their learning and working lives
- ✔ Working within the limits of the system and using only the skills and resources that are readily available
- ✔ Effectively harnessing technology as a vehicle for, and as a driver of, learning by producing a Web-based resource on Nova Scotia for use by all teachers and students in the school and elsewhere
- ✔ Opening up new teaching methods and new ways of sharing information
- ✔ Getting over 180 students, eight classes and nine teachers involved in a technologically linked learning activity—connecting students and classes, curriculum and content with technology
- ✔ Using GrassRoots funding to free up staff time to plan and develop activities
- ✔ Having each class handle the GrassRoots project differently, basing their involvement on their own areas of interest and expertise, teacher resources, technical savvy and time commitments, then sharing their outcomes
- ✔ Fostering a sense of self-confidence and independence in student learning

Achievements

- ✔ Students have a wider sense of audience—instead of writing for their teachers or their classmates they now write for their entire school, their community and the world by presenting their materials in a public forum
- ✔ Students and teachers have transformed their ability to apply and learn through real-life experiences and through the use of technology; they also have a sense of accomplishment based on what they have been able to do and what they learned
- ✔ The school community has a better sense of what ICT is and how technology can be used and applied in the classroom
- ✔ There is recognition that in some situations, on-line learning projects are more conducive to collaborative learning outcomes than are classroom-based projects (i.e., clustering 10 students together can be easier on-line than in a classroom setting)
- ✔ Students who have computer access at home apply their knowledge and skills outside the formal classroom environment for learning as well as recreation

Conclusion

This Is Nova Scotia—From Individuals Out shows that while the classroom may be the place where much learning takes place, it is not the only place where learning is shared. This GrassRoots project also demonstrates that computers are much more than platforms for playing games; when connected with the Internet, they also serve as tools for research and vehicles for interaction and collaboration.

As well, This Is Nova Scotia underlines the importance of having a school champion or leader to facilitate teachers' and students'

This Is Nova Scotia—From Individuals Out shows that while the classroom may be the place where much learning takes place, it is not the only place where learning is shared. This GrassRoots project also demonstrates that computers are much more than platforms for playing games; when connected with the Internet, they also serve as tools for research and vehicles for interaction and collaboration.

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use of the Internet in carrying out research and in interacting and collaborating. It is noteworthy that a number of teachers at Atlantic View Elementary School who were involved in the project went on to sign up for a Technology Integration Summer Institute, something they would not have done prior to their participation in the project. This Is Nova Scotia also demonstrates how teachers can develop their own classroom activities to support the achievement of mandated curriculum outcomes.

Finally, the project emphasizes the value 1) of being engaged with ICT and learning to use ICT by incorporating it into a specific learning context and 2) of teachers having time and opportunities to reflect on their experiences, their successes and transferable learnings, and challenges that remain. Only by being engaged, learning by doing and reflecting on that experience can teachers extend and maximize their role in introducing students to ICT as an enabler of research, learning and sharing knowledge and as an engine of individual empowerment as well as community development.

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CASE STUDY 37

Building a Global Community Through the Use of Technology in the Classroom

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Name of Program
SchoolNet GrassRoots Program

Skills Developed
ICT
Employability

Prepared for Industry Canada by The Conference Board of Canada

Effective practices in developing and supporting teachers' and students' information and communications technology skills

La boîte à jeux

Building Connections Between High School and Elementary School Students Through Information and Communications Technology

A SCHOOLNET GRASSROOTS PROJECT

BY ELAINE LACROIX, DOUGLAS WATT & KURTIS KITAGAWA

December 2000

La boîte à jeux encourages elementary and high school students and teachers to work together on a variety of student-centred learning projects. Older students work hand in hand with younger students, sharing knowledge and skills and collaborating on similar subject matter themes and ideas. Together the students are able to produce interactive, hands-on and user-friendly Internet-based learning resources that all students and teachers can access. La boîte à jeux's value lies in the engaging and dynamic manner in which it enriches the teaching and learning experience at all levels. The project was supported by Industry Canada's SchoolNet GrassRoots Program in partnership with AQUOPS (l'Association québécoise des utilisateurs de l'ordinateur au primaire et au secondaire).

Overview

Since 1998, grade 11 and 12 students and teachers from l'école secondaire Jean-Nicolet have partnered with local area elementary school students and teachers to produce Internet-based, interactive platforms for their stories, games and puzzles.

La boîte à jeux encourages learning and teaching "outside the box" by enabling secondary students to mentor elementary students, share their knowledge of Information and Communications Technology (ICT) skills, and broadcast their expertise to the world through the Internet. La boîte à jeux also encourages teachers to design class projects and curriculum-based learning modules that transcend classrooms, schools and subject matter with a focus on the integration and implementation of ICT.

Project Details

- Grade levels: elementary 1–2, secondary 11–12
- Number of schools: two
- Number of classes: eight
- Number of participants: 300 students (approx.) and nine educators
- Project status: 1998–ongoing
- GrassRoots funding: Block 2 Fixed Funding Model, $5,500
- Project scope: community
- Language: French
- ICT resources: e-mail accounts, Internet access, PC's, supporting software
- Project Web site: http://www.esjn.csriveraine.qc.ca/Boite/

National Business and Education Centre (NBEC)

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Associate Director, Project Development: Michael Bloom

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Research Associates: Alison Campbell, Debbie Murray, Douglas Watt

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Groups Served

- ✔ Students (elementary 1–2, 5–6 and secondary 11–12)
- ✔ Teachers

Objectives

- ✔ To enrich the teaching and learning experience at all levels
- ✔ To engage students of all ages in a dynamic learning environment in which peer learning and mentoring are encouraged and recognized
- ✔ To develop a greater awareness among students and teachers of how ICT can transform their work into an interactive, hands-on, interesting and fun resource
- ✔ To integrate ICT into academic learning by using technology as a tool to mediate hands-on, active learning experiences
- ✔ To develop and enhance ICT and employability skills in students and teachers

Activities

Cross-grade and cross-school activities have included:

- ✔ Building connections between the secondary school and the elementary school
- ✔ Having elementary students prepare their own ideas, stories and activities based on French and mathematics curriculum outcomes
- ✔ Having secondary students enrol in the technology option course and mentor elementary students in developing, designing and implementing on-line educational games based on elementary students' work
- ✔ Building Web pages that showcase students' work—both the elementary students' stories, word games and puzzles and the secondary students' ICT applications and additional research
- ✔ Using MicroMondes Pro (French version of MicroWorlds) to create and post Internet-based educational games
- ✔ Using e-mail and the Internet to conduct research and perform on-line searches for additional pictures and information related to the students' initial work in order to enhance the Web pages
- ✔ Having students work in teams—cross-school and cross-grade—to develop on-line, curriculum-based learning projects

Benefits for Education

- ✔ Provides an opportunity to apply technology and ICT to an existing curriculum-based learning outcome—providing a "bang" to the learning experience by engaging the power of Web-based materials
- ✔ Builds experience in technology beyond the curriculum and makes the connection between ICT and the curriculum
- ✔ Extends the curriculum beyond the walls of the schools involved
- ✔ Uses technology that might otherwise not be used in the classroom and leverages students' and teachers' strengths by transferring Web skills to other subjects and projects
- ✔ Enhances students' projects as they use technology as a tool to create engaging and exciting projects
- ✔ Develops collaborative, problem-based learning skills, which help students understand the choices they are making and "learn as they go" when solving problems they did not expect
- ✔ Gets teachers from different schools to talk to one another about what they are doing and how they are doing it
- ✔ Enables students to take pride in their work and go beyond what is expected—they embark on journeys of self-discovery, enhanced by the Internet and ICT
- ✔ Enables teachers and students to learn from one another and depend on one another for what they do—students cross-tutor and learn from their peers

Benefits for Teachers

- Learn to think outside the box—there are many ways to solve problems, teach curriculum and engage students

Students are more motivated to learn because the work is interesting and rewarding. ▶

Students use computers and the Internet as a research tool. ▶

High school students develop a sense of responsibility by helping younger students get their work on the Internet ▶

- Are better able to share knowledge with other teachers and schools
- Co-operate with other teachers across disciplinary lines and schools to connect their courses and enrich student learning
- Develop project-based strategies to assist in lesson development
- Elementary teachers benefit from the technical support provided by secondary students
- High school teachers benefit from having their students engaged in real world learning and from giving students an opportunity to apply their theoretical and technical knowledge

Benefits for Students

- Are more motivated to learn because the work is interesting and rewarding
- Experience using e-mail, MicroMondes Pro and other computer software
- Use computers and the Internet as a research tool
- Are empowered through more self-confidence and the ability to apply technology—they are willing to try new things
- Incorporate other students' ideas as well as their own into their projects and learning activities
- Gain the sense of accomplishment that goes with completing a Web page and posting a puzzle, game or story on the Internet
- Have a sense of ownership in the project that motivates them to go the "extra mile"—they become more demanding of themselves
- Learn to work in partnership with other students in other classrooms and schools, rather than independently
- High school students develop and apply their ICT skills as well as their "softer" skills, including communication, teamwork, innovation and problem-solving skills
- High school students develop a sense of responsibility by helping younger students get their work on the Internet
- Elementary students see their stories, word games and puzzles posted on the Internet and enjoy learning from their peers and older students

Keys to Success for Teachers

- Being interested in and committed to the project and using ICT as part of their learning platform
- Understanding the connection between curriculum expectations and the application of ICT—embedding the project into curriculum outcomes
- Making the project as simple as possible and easy to incorporate into existing classroom activities and learning modules
- Seeing beyond the curriculum to encompass new learning activities and approaches using ICT
- Being able to plan and work together with other teachers from both the elementary and secondary school systems
- Having a solid understanding of the curriculum and how best to integrate the ICT and employability skills of elementary and secondary students into the project

Keys to Success for the Project

- Using technology as a tool to deliver curriculum in a fun, interactive fashion
- Recognizing that the curriculum and learning outcomes of both the elementary and secondary schools are important
- Having support for the project from all of the schools and key teachers
- Having a project champion to inspire and encourage teachers
- Using GrassRoots money to "support" schools to participate in the project
- Having students take ownership in developing and creating a Web page
- Taking a collaborative (teamwork) approach to learning experiences
- Having everyone (teachers and students in different schools and

different classes) bring their own sense of identity and self-worth into the project—project ownership is communal not individual

Challenges for the project include maintaining a focus on integrating ICT into the curriculum. ▶

Challenges for Teachers

- Having time to reflect, make connections and see the meaning of what they are doing
- Overcoming any preconceived notions of the difficulties of Web-based teaching and learning
- Being able to see the project's connection to the curriculum—seeing the curriculum in a broader context

Challenges for Students

Challenges for the project include keeping the lines of communication between all the classes and between all the schools open. ▶

- Being active participants in their own learning and skills development—seeing themselves as being responsible for the success of the project
- Making the connection for themselves between the courses they are taking and the skills they are developing

Challenges for the Project

- Sparking initial interest in the project and getting teachers on board
- Maintaining a focus on integrating ICT into the curriculum
- Keeping the lines of communication between all the classes and between all the schools open

Innovative Approaches to GrassRoots' Projects

La boîte à jeux's real value lies in the engaging and dynamic manner in which it enriches the teaching and learning experience at all levels. ▶

- ✔ Building a high degree of collaboration between two levels of education—the elementary and secondary school systems
- ✔ Using technology as a vehicle for, and as a driver of, learning
- ✔ Bridging learning activities between schools, classes and grade levels
- ✔ Opening up cross-class, cross-grade, cross-school, cross-curriculum and cross-country learning opportunities
- ✔ Providing an educational reason to use technology
- ✔ Having students demonstrate their learnings and application of ICT skills through use of the Internet
- ✔ Opening up possibilities for new teaching methods and new ways of sharing information

Achievements

- Elementary students are exposed to technology and its application in the school and other environments
- Grades 11 and 12 technology students use their ICT skills in real-world projects by enhancing and posting the elementary students' materials on the Internet—creating interactive applications
- In its third year, the project now includes collaborative initiatives in which high school classes (visual arts and music) work together to help produce animated stories and soundtracks for the elementary students' initial work
- A Grade 5/6 class of special needs students teamed with a high school class to create an interactive project on energy and electricity
- All students developed a wider sense of audience—instead of writing only for their teachers and classmates, they now create projects for the world to see and use through the Internet
- Students appreciate the power of hearing and working with other people's ideas—opening themselves up to new ideas and ways of doing things
- Teachers and students learn more from and share more with one another
- Mr. Massicotte (the lead teacher on La boîte à jeux) was invited by other school boards and universities to speak about the project and to conduct workshops and symposiums on its benefits

Conclusion

La boîte à jeux's real value lies in the engaging and dynamic manner in which it enriches the teaching and learning experience at all levels. Students get the experience of producing work not just for their teachers but for the world. Elementary students are mentored by secondary students and feel stimulated. They take

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pride in seeing their work transformed through technology and are pleased to try out the interactive products that are built using their own work as a platform. Secondary students, for their part, acquire a sense of purpose and see the relevance of what they are doing. They gain motivation, learn how to be resourceful and find technical solutions to problems they did not anticipate as they drive the process of adding value to elementary students' work. In these ways, integrating ICT into the curriculum provides avenues for students to realize and demonstrate their potential, both socially and technically.

Moreover, teachers benefit from the feedback and technical support of their students. Their teaching is also enriched when they collaborate across grades and between schools. They see value of expanding the project to operate between classes of secondary students at different schools and include student mentoring of special needs students.

Finally, La boîte à jeux has sparked the interest of the outside community. Mr. Massicotte's passion and ideas have made an impact at the school board, and he has been invited to give seminars and lectures to teachers in training at the Université du Québec à Trois Rivières. ICT integration through GrassRoots has thus become a vehicle for teacher professional development as well as community building and skills development generally.

SchoolNet's GrassRoots Program

GrassRoots projects are initiated, designed and implemented by teachers and students and are curriculum-relevant. The GrassRoots Program, in collaboration with provincial, territorial and corporate partners, offers funding to schools for the creation of innovative, Internet-based interactive learning projects that:

- foster the acquisition of academic, employability and computer skills in Canadian youth;
- integrate information and communications technology into learning;
- build unique and relevant Canadian content on the Internet; and
- facilitate increased connectivity and training opportunities.

For more information on GrassRoots, visit http://www.schoolnet.ca/grassroots

Thanks are due to our interviewee, Yvon Massicotte.

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CASE STUDY 38

Building a Global Community Through the Use of Technology in the Classroom

Contact
Industry Canada's GrassRoots Program
http://www.schoolnet.ca/grassroots

Name of Program
SchoolNet GrassRoots Program

Skills Developed
ICT
Employability

Prepared for Industry Canada by The Conference Board of Canada

Effective practices in developing and supporting teachers' and students' information and communications technology skills

Backyard Bird Feeding in Newfoundland

Using Peer and Cross-Tutoring to Help Primary Students Acquire Information and Communications Technology Skills

A SCHOOLNET GRASSROOTS PROJECT

BY KURTIS KITAGAWA

December 2000

Backyard Bird Feeding in Newfoundland used peer and cross-tutoring to help help primary students acquire Information and Communications Technology (ICT) skills through learning about the habits of local birds, their environments and their eating habits in an innovative Internet-based learning project. The project was supported by Industry Canada's SchoolNet GrassRoots Program in partnership with the Newfoundland Department of Education and STEM~Net.

Overview

In the past 12 months, teachers and students at St. Anne's Academy in Dunville, Newfoundland, have completed 10 GrassRoots projects. One of the school's first projects was Backyard Bird Feeding in Newfoundland, which four classes of Grades 3, 8 and 9 students designed and completed in April 2000. The project involved 110 students and four educators in intensive, curriculum-related activities that built students' and teachers' ICT skills and enhanced students' communications, problem-solving and teamwork skills.

Backyard Bird Feeding in Newfoundland grew out of a Grade 3 science lesson relating to animals and their habitats. It made sense to do a GrassRoots project on a subject with which the students were very familiar from their own observation and experience, namely, backyard birds.

Other GrassRoots projects undertaken by students and teachers at St. Anne's Academy have included:

- ✔ Animal Adaptations—a series of Web pages created by Grade 9 students as an information resource focusing on how familiar animals such as beavers adapt to increase their chances of survival and reproduction;
- ✔ Environment & the Weather—a series of Web pages created by Grades 5, 8 and 9 students that tackle weather-related issues, from the effects of global warming to the particulars of a detailed Newfoundland weather forecast;
- ✔ Remembrance Day—a competition that called on participating Grades 6 to 9 students to work alone or in teams of two or three to create Web pages using

Netscape Composer, FrontPage Express or HTML; the pages had to contain information appropriate to Remembrance Day and incorporate several internal and external links. Web pages were judged according to three main criteria: technical aspects (including correct links to external and internal sites, effective tables/titles/forms, effective use of animated Graphics Interchange Formats); design (including creativity and innovation, effective use of photographs/images, effective use of fonts/sizes/colours, effective use of text); and functionality (i.e., correct spelling, effective communication of information, ease of locating information);

- ✔ Off to the Zoo—a series of Web pages created by teams of Grade 2 and some Grades 8 and 9 students working together; the teams described and posted photographs of their favourite zoo animals;
- ✔ The Alphabet Zoo—a series of Web pages researched and illustrated by kindergarten and Grade 8 students; and
- ✔ Hydroponics as an Alternative to Traditional Farming—an Internet project created by Grades 8 and 9 students.

Project Details

- Grade levels: 3, 8 and 9
- Number of schools: one
- Number of classes: four
- Number of participants: 110 students and four educators
- Initial program development: March–April 2000
- GrassRoots funding: Networking Project, $600
- Project scope: regional
- Language: English
- ICT resources: HTML, graphics software, digital camera, scanner, audio resources
- Project Web site: http://www.k12.nf.ca/stannesacademy/birds/BackyardBirds.htm

Groups Served

- ✔ Students (Grades 3, 8, 9)
- ✔ Teachers

Objectives

- ✔ To meet subject-specific curriculum outcomes in a way that is relevant to, and engaging for, Newfoundland students, including through investigating how wild birds adapt to seasonal change and observing and recording data relating to the impact of seasonal changes on wild birds in Newfoundland; drawing conclusions from recorded data to understand the dependence of wild birds on their environment; identifying and observing the characteristics and behaviours of juncos, pine grosbeaks, purple finches, evening grosbeaks, etc.; and developing an awareness of bird habitats and the importance of feeding and caring for birds
- ✔ To give students a taste for learning on their own terms and motivate them to continue to learn
- ✔ To use the Internet to do research
- ✔ To enhance students' ICT skills, including keyboarding, using a mouse and constructing and interpreting graphs, charts and tables
- ✔ To develop students' writing skills, from pre-writing to drafting, revising/editing and publishing
- ✔ To build students' presentation skills, including the ability to make oral presentations using displays and to produce written reports
- ✔ To develop teamwork and effective peer learning skills

Activities

Students were involved in the planning, implementation and evaluation stages of the project. These included:

- ✔ Doing research at home on different wild birds native to Newfoundland using library books and encyclopedias and bringing that completed homework to class
- ✔ Downloading information about birds from the Internet with the assistance

Teachers link classroom theory with immediate realities to enhance their teaching and make it more explicitly relevant. ▶

Teachers can choose to use computers in their courses if this will better facilitate learning (e.g., in science, language arts). ▶

Students develop ICT skills as well as "softer" skills, including communication, research and teamwork skills. ▶

Students learn problem-solving and troubleshooting techniques. ▶

of a teacher, fellow students and/or students from Grades 8 or 9

✔ Using an outline to research specific questions by focusing on the information they needed and eliminating the rest—teachers, fellow students and/or students from Grades 8 or 9, or parents worked with teams of Grade 3 students, asking them questions related to the outline and helping them determine whether the selected information was relevant for their reports

✔ Designing Web pages

✔ Downloading images and audio clips of call notes or birdsong from the Internet

✔ Presenting their reports to other Grade 3 students

Benefits for Education

✔ Makes the connection between ICT and the curriculum

✔ Exploits the engaging power of Web-based materials in a curriculum-based learning context

✔ Lets students do research the "old-fashioned way" (i.e., with print media) at home and complements that with guided on-line research activities in the classroom to provide an integrated, seamless learning experience

✔ Takes education to students by making learning real for them and creating opportunities for them to get involved

✔ Engages students on their own ground—students do not know the world without technology

✔ Enables students to cross-tutor and learn from their peers

✔ Engages the community and showcases students' and teachers' achievements through a school newsletter

Benefits for Teachers

- Use the Backyard Bird Feeding in Newfoundland project as a starting point for using the Internet in the classroom
- Are motivated to get involved with technology—they have to use technology to work with their students on the project
- Learn to think outside the box—there is more than one way to solve problems and get results—especially when the expectant (or at least hopeful) eyes of Grade 3 students are on them
- Co-operate with other teachers across disciplinary lines to connect their courses and enrich student learning
- Are able to link classroom theory with immediate realities to enhance their teaching and make it more explicitly relevant
- Add pictures and sounds downloaded from the Web to enrich traditional "chalk and talk" teaching and learning
- Can choose to use computers in their courses if this will better facilitate learning (e.g., in science, language arts)
- Deal more with students on their own level to see what they want to do, for example, learn with technology
- Use an evaluation template (created to assess student submissions to a GrassRoots project) to support evaluation on students' report cards

Benefits for Students

- Develop ICT skills as well as "softer" skills, including communication, research and teamwork skills
- Learn how to use HTML, graphics software, digital cameras, scanners and audio resources
- Learn problem-solving and troubleshooting techniques related to inserting audio clips and find alternative means of getting audio clips (e.g., by using a video camera)
- See that they can use the computer for much more than playing games—learning to download audio files was particularly challenging and was a valuable tool in showing students how to go to a higher level with computers
- Use computers to do research
- See the Internet as a powerful tool for gathering and storing information
- Initiate and drive their own learning on a topic that has immediate relevance—

the birds they were studying can be attracted to their own backyards
- Work in pairs within clearly defined parameters and, with coaching and appropriate supervision, build their teamwork skills
- Take pride in their accomplishments at school and visit their Web sites with their parents to show what they have done

Students find learning more interesting and make the connection between what the curriculum requires them to do, what they would like to do and how they would like to do it. ▶

- Find learning more interesting and make the connection between what the curriculum requires them to do, what they would like to do and how they would like to do it—for example, some students found chemistry dull, but when they used the Internet to explore the periodic table of the elements they became more motivated to understand chemistry and get more out of it. Another class wanted to "jazz up" their social studies course by doing a GrassRoots project relating to artifacts and local culture
- Develop a sense of responsibility by completing their Web pages

Students become motivated to use editing skills. ▶

- Gain a sense of purpose by making presentations and sharing their learning
- Become motivated to use editing skills—their work is posted on the Internet and available to the world
- Have parents (usually their fathers) who know about birds and like to share their knowledge participate in schoolwork—in this locale, it is usually the mothers who help with homework

Students are keen to do more challenging Web-based projects in later grades. ▶

- Are keen to do more challenging Web-based projects in later grades

Benefits for Parents

✔ Become involved in their children's learning experiences through the project's Web site, a newsletter and hands-on learning experiences they can relate to and participate in

✔ See their efforts to support learning at home extended at school and vice versa

✔ Find the interactive projects engaging

Keys to Success

People

- Having teachers who are motivated to use technology
- Having a school administration that makes the opportunities available through GrassRoots clear to all teachers
- Having a teacher champion who has done similar projects at other schools, understands the GrassRoots application process, and has the appropriate technical skills
- Having teachers know what they are committing to in terms of time and the expertise they may need to supply—teachers have to look at their overall workload in the classroom to see if they can take on a GrassRoots project
- Having teachers explore how technology can be used to research, learn, build skills, communicate and present information as they become more familiar with it—delivering curriculum requires a human connection, that is, teachers who are sensitive to the particular needs of students and can achieve curriculum outcomes in creative ways
- Having teachers use a "buddy" system—collaborating and sharing the workload makes things go more smoothly when they run into a glitch (other teachers can help sort out a problem and move the project along)

Process

- Alotting part of a professional development day to inform teachers about GrassRoots—teachers can take the idea back to their classrooms to see whether students are interested in participating
- Having an interesting project topic that students can own and will be motivated to work on
- Getting a group of teachers to meet after school to talk about what their focus and objectives should be and to write a proposal—it may take a month or so to finalize a proposal

- Embedding the project in the curriculum
- Assembling teams of children who can work together and will all have input within their teams—often this means putting a brighter student with one who may be struggling with the language
- Dividing Grades 8 and 9 students into functional teams depending on their abilities and inclinations (e.g., one working on graphics, another on audio clips, and a third helping Grade 3 students input text and put it all together)
- Pairing a team of Grade 3 students with a Grade 8 or 9 student, who acts as a referee—younger students tend to like the idea and look up to the older student for guidance and support
- Investing time and energy to help children simplify a project so they can manage it themselves
- Investing time and energy to help children simplify information (e.g., text, pictures, audio clips) so they can use it
- Actively building on the momentum generated when one student team completes its part of the project to encourage other student teams to get their bits done
- Communicating successes to the school board and school council
- Holding an open house to showcase achievements
- Supporting completed projects as a learning resource for other teachers and students—Grade 5 teachers took their students to the Grade 3 Web site to show them what the Grade 3 students had done

Challenges include getting computers in classrooms upgraded to support Internet connections. ▶

Challenges include getting Grade 3 students to understand and assimilate printed and on-line material. ▶

Challenges include coping with the heavy time demands on participating teachers. ▶

Infrastructure

- Receiving GrassRoots funding for developing and carrying out ICT projects—this funding is both an incentive and a necessity—it motivates teachers to use technology in the classroom and enables them to upgrade and acquire new technology (e.g., computers were upgraded to support Web connections, printers and scanners were upgraded and a digital camera was purchased)
- Having technology that is available and reliable—technical infrastructure in the schools has to be at a certain level, and someone has to have adequate understanding of how the technology can be used and applied

Challenges

- Getting computers in classrooms upgraded to support Internet connections—this enables students to access the Internet from their own classrooms instead of having to book time in the computer lab, which is constantly in use
- Finding and using audio files presented in different formats—material found on the Web can be great, but students need to be able to find it first (one particular audio clip took a week to find) and then harness it to their own specific purposes
- Getting a powerful Web page editor such as Front Page—Netscape Composer cannot put text and pictures side by side
- Getting Grade 3 students to understand and assimilate printed and on-line material—a teacher, parent or student from a higher grade needed to read through the information gathered by students and to prompt them with questions regarding its relevance to their Web page
- Coping with the heavy time demands on participating teachers
- Depending on a technical champion, who has to spend more and more time in the computer lab (fixing computers) while fulfilling his regular classroom teaching responsibilities in mathematics and science
- Making telephone calls and going in person to the school board offices to get technical support for using on-line audio and video technology to complete projects

Integrating ICT skills into the delivery of curricula is most efficiently and effectively achieved when such an initiative is coupled with a communications plan and designed to be supported as a permanent learning resource. ▶

Innovative Approaches to GrassRoots' Projects

- ✔ Drawing on the expertise of a teacher who has participated in GrassRoots projects before to engage other teachers and students in using technology in the classroom as a vehicle for, and as a driver of, learning
- ✔ Communicating successes to the school board and school council
- ✔ Holding an open house to showcase achievements
- ✔ Supporting completed projects as a learning resource for other teachers and students

Achievements

- The school has completed 10 GrassRoots projects in less than a year, which shows that once students and teachers successfully achieve curriculum outcomes using computer technology in the classroom (as in the Backyard Bird Feeding in Newfoundland project), the technology tends to "stick"
- A student-developed Web site was written up in the school newsletter, which reaches 450 families
- An open house was planned to demonstrate and showcase the Web site to the general public

Conclusion

Backyard Bird Feeding in Newfoundland showed how important it is for teachers to collaborate with each other in integrating ICT skills into classroom activities across a school. It also underscored how integrating ICT skills into the delivery of curricula is most efficiently and effectively achieved when such an initiative is:

- ✔ coupled with a communications plan designed to showcase successes to school councils and school boards and celebrate achievements with students and their parents; and
- ✔ designed to be supported through time as a permanent learning resource for other teachers and students.

The project also underlined how developing young people's skills is a shared endeavour in which students and parents as well as teachers play a crucial role. Backyard Bird Feeding in Newfoundland shows the value of older students helping to facilitate the learning of younger students while building marketable skills of their own.

Canada's competitiveness and the innovation skills that support it hinge in significant respects on the entry into the workforce of young people who have developed their ICT and employability skills. GrassRoots projects help make that connection for students, empowering them and helping them understand their potential to contribute to the well-being and sustained quality of life of all Canadians.

SchoolNet GrassRoots Program

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