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 SHOWCASE GRASSROOTS PROJECT

BY DOUGLAS WATT

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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, generic presentation, communication and teamwork—and use technology in the classroom to communicate and share ideas. GrassRoots is an Industry Canada initiative.

## Overview

This Is Nova Scotia—From Individuals Out encourages elementary school teachers to integrate technology into their classroom curriculum by developing various information and communications technology (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.

**Program 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: $5,500 block project

**National Business and Education Centre (NBEC)**

Director: MaryAnn McLaughlin

Associate Director, Project Development:
Michael Bloom

Senior Research Associate:
Kurtis Kitagawa

Research Associates:
Alison Campbell
Debbie Murray
Douglas Watt

Awards Program Manager:
Linda Scott

Senior Administrator and
Symposium Manager:
Jean Smith

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Camille Beaufort
Anne-Marie Brown
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- 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 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

**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
- 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 Hyper Studio 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 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

✔ 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 co-ordinator, the integration of technology would not have taken place)
✔ 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' use of the Internet in carrying out research and in interacting and collaborating. It is

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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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***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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*Employability Skills Toolkit for the Self-Managing Learner*

*Science Literacy for the World of Work*

*Understanding Employability Skills (Apr. 99)*

*The Economic Benefits of Improving Literacy in the Workplace*, 206-97 Report

*Enhancing Employability Skills: Innovative Partnerships, Projects and Programs*, 118-94 Report

*Linking Teachers, Science, Technology and Research: Business and Education Collaborations That Work*, 144-95 Report

*1999–2000 Business and Education Ideabook*

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