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EVALUATION OF THE SCHOOLNET PROGRAM

Final Report

Audit and Evaluation Branch

January 16 2004

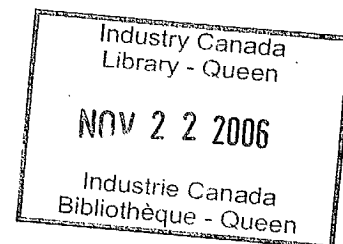


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TABLE OF CONTENTS

| | |
|-----------------------------------------------------------------|-----------|
| Executive Summary | ii |
| I Introduction | 1 |
| 1.1 Profile of the SchoolNet Program | 1 |
| 1.2 Evaluation Objective and Evaluation Questions | 3 |
| 1.3 Approach | 4 |
| II Relevance of the Program | 9 |
| 2.1 Rationale | 9 |
| 2.2 Key Findings | 10 |
| 2.3 Findings from Interviews | 11 |
| 2.4 Findings from Previous Studies | 14 |
| III Achievement of Objectives | 17 |
| 3.1 Identifying the Federal Government's Commitment to SN | 17 |
| 3.2 Objectives of SchoolNet and Related Activities | 18 |
| 3.3 Findings from Interviews | 20 |
| 3.4 Findings from Previous Studies | 26 |
| 3.5 Key Findings | 28 |
| IV Options | 30 |
| 4.1 Findings from Interviews | 30 |
| 4.2 Findings from Previous Studies | 33 |
| 4.3 Key Findings | 34 |
| V Themes, Challenges and the Role of IC | 36 |
| 5.1 Emerging Themes and Challenges | 36 |
| 5.2 Role of Industry Canada | 40 |
| VI Lessons Learned and Recommendations | 45 |
| 6.1 Lessons and Recommendations from Past Evaluations | 45 |
| 6.2 Management Response to Previous Recommendations | 47 |
| 6.3 Lessons Learned and Current Recommendations | 48 |

NOTE:

Minor editorial changes were made to this report in order to prepare the document for posting to the Internet (including removal of standard Appendices such as list of interviewees and questionnaires). Readers wishing to receive a copy of the original version of this report should contact the Audit and Evaluation Branch at Industry Canada.

Executive Summary

This report presents the results of an evaluation study prepared by BearingPoint for the Audit and Evaluation Branch and the Information Highway Applications Branch (IHAB), Industry Canada (IC).

Approach—The approach for the study involved an extensive consultation process with key informants, participants and partners in SchoolNet (SN) initiatives and activities; a review of six other previous evaluation studies of SchoolNet program components; a review of other relevant documents such as policy reports, strategic issues papers, and SchoolNet planning and research studies; and feedback on the results of the study from a SchoolNet Evaluation Steering Committee set-up by Industry Canada. The combination of the above references, including previous evaluation studies, together are based on a full spectrum of evaluation methodologies, used to garner evidence from multiple sources, including participants and non-participants in the SN program, stakeholders, successful and unsuccessful applicants, Canadian federal/provincial government officials, private sector and academic organizations, institutions, and associations. The reader is invited to consult the six other evaluation studies, referenced in this current report, since they provide an additional basis for the synthesis of findings, lessons learned and recommendations presented.

Purpose—The purpose of this evaluation is to provide input to policy and programming decisions regarding the development of the next generation of Industry Canada's *Connecting Canadians* and *Innovation* strategies, specifically as this relates to the SchoolNet family of programs. Furthermore, this evaluation contributes to addressing the government's commitment in the 2003 Federal Budget to 'review all of its programs connecting Canadians to determine how best to collaborate with Canadian industry, the provinces, communities and others'.

Focus on Industry Canada's SchoolNet Program—This Executive Summary provides findings and recommendations concerning the SN family of programs. It represents a synthesis of findings from this and six previous evaluation studies regarding various issues and components of the program. A roll-up of results from these previous evaluations of SN programs is integrated within the various chapters of the main report.

While the focus of this study is on Industry Canada's SchoolNet, it should be recognized that IC delivers components of this program in partnership with other federal and provincial government departments and agencies, and that these other federal and provincial departments and agencies also have separate initiatives and programs of their own that address e-learning and technology issues and needs in education environments. Responsibility and mandate for evaluating these other initiatives and programs rests with the respective other federal and provincial departments and agencies, and consequently was not included in the terms of reference for this current Industry Canada study of SchoolNet.

EVALUATION QUESTIONS

The focus of this evaluation is on the following key areas of investigation that are consistent with Treasury Board Secretariat's guidelines for evaluation studies:

- **Relevance of the program**—Is the SchoolNet program still relevant?
- **Achievement of objectives**—To what extent has SchoolNet achieved its objectives?
- **Options**—What are the relevant alternatives/options that would effectively address current connectivity and/or innovation challenges?
- **Emerging themes and challenges and the role of Industry Canada**—What are the emerging connectivity and/or innovation themes/challenges for SchoolNet? What is the appropriate role of Industry Canada and what are the appropriate delivery mechanisms for SchoolNet objectives?
- **Lessons learned and recommendations for future policy and programming needs**—What are the relevant lessons learned from SchoolNet, and what recommendations can be made for future policy and programming needs?

FINDINGS

Continued Relevance of the SchoolNet Program

- *Economic and social policy outcomes*—Informants consulted for this study felt that there is strong economic rationale for a SN program focused particularly on the following areas:
 - ✓ Building and maintaining competency and competitiveness through applications of information and communications technology (ICT) in education.
 - ✓ Moving from connectivity to innovative applications—to build wealth through knowledge and a sense of community.
 - ✓ Achieving a flexible workforce through a system of learning that re-trains and re-educates on an ongoing basis—i.e., a lifelong learning system.
 - ✓ Developing a competency-based learning system that is responsive to the economy and the needs of industry.
 - ✓ Promoting innovative project-based solutions for learning.
 - ✓ Fostering partnerships that traverse political and cultural boundaries, and engage industry and educational institutions.
- There is also strong rationale presented by key informants for a SN program focused on social outcomes—namely, to contribute to narrowing the “digital divide” in

education, focusing on educational institutions in rural and remote regions of the country, First Nations schools, and schools in economically lagging urban locations. A focus on disabled students and students at risk are also areas of social concern that SN could potentially address.

- *Targeting the program*—There is strong endorsement by key informants that the SN program is still relevant, and that it continues to evolve and support sophisticated users of ICT in education—i.e., the early adopters and the innovators. However, there is also consensus on addressing the needs of late adopters and uninitiated users, to the extent that resources permit. In addition, while K-12 students are primary targets for SN, post-secondary and adult training is considered a high priority, especially by industry and post-secondary institutions. The latter is seen as a more immediate priority, while the former is seen as a medium to long-term priority.
- *Consolidating SchoolNet*—Over the past decade, SN has played a leadership role in addressing connectivity and ICT capacity issues. Some of the key informants for this study have suggested that the program now needs a new focus and programming that converges the rationale of the program around the key economic and social policy themes identified above.

Objectives Achievement

- The connectivity objective of the SN program has been achieved (15,300 schools, including 480 First Nations schools and 3,400 libraries have been connected and more than 450,000 refurbished computers have been provided to schools and libraries). However, technology upgrades and ICT capacity building continues to be an ongoing mission, requiring long term commitment by all those involved in the education system of Canada, with the support of government and other participants and partners.
- The SN program is credited by most of those interviewed for this study, and as evidenced in previous studies, as having resulted in a major shift in teacher's skills in the use of ICT to enhance educational opportunities. This is consistent with the recent Canadian Teachers' Federation Report which found that most teachers have accepted computers and other information and communication technology in their classes and are integrating ICT in their lessons and concluded that "eight out of 10 teachers say computers are essential or important in the way they teach (three out of 10 say essential)."
- The SN program has provided an effective and broad forum for the exchange of ideas and debate among educators, and for sharing knowledge and success stories in the use of ICT for educational purposes. This apparently has had a spin-off effect on late adopters of technology in the education community.
- The program has empowered teachers, empowered students, and provided significant value for money incentives to migrate to the use of ICT in the classrooms and other learning environments in Canada.

- The program has provided new learning opportunities through technology projects (e.g., through 29,400 GrassRoots classroom projects) that have been scoped broadly across regional, national and international levels. Through collaborations involving various school projects, the program has brought students and teachers together in a broad spectrum of innovative applications.
- Initial program recipients have had a cascading effect on others to take advantage of the program, creating a demand and a culture of change among some schools within Canada (e.g., 150 Network of Innovative schools).
- It is generally recognized by those interviewed for this study, and based on evidence from previous studies, that without SN there would be far less collaboration and development in the use of ICT in the Canadian educational system today. Further, it is considered to be highly likely that with any overall roll back or abridgement of SN initiatives there would be a reversal in Canadian learning environments in the use of ICT for education, largely due to limited resources in provincial education budgets and other competing priorities of the system.
- Partnerships enabled through SN initiatives have been a very successful program delivery approach. Key informants, and the evidence from previous studies, suggest that thousands of collaborative and partnership initiatives have resulted from SN activities, since the inception of the program.
- Building ICT capacity in First Nations schools is an unfinished job. A majority of teachers in First Nations still do not have the requisite skills and experience to implement ICT into their teaching.
- There is a consensus among educators interviewed that SN program managers and administrators at IHAB have done an excellent job in delivering a complex program, and in designing program instruments for education that address challenging technology issues of national concern. On the other hand, while the original SN program targets were effective for program administration and delivery purposes, there is now a general impression that SN has less clarity about its targets and purpose.

Options

- *Continuing to support the early adopters and innovators in future program design and delivery*—An underlying principle of the SN program has been to support early technology adopters and innovators in the educational arena. This principle is seen as having continuing relevance to current and future challenges in program delivery.
- *Teaching the teachers*—Program design mechanisms that target teachers to help them apply ICT are deemed necessary (e.g., teacher mentoring programs, networking, and best practices tools and repositories). Teaching the teachers, however, is primarily a provincial responsibility, and Industry Canada can only contribute to this effort indirectly as a partner to the provinces and local schools and school boards.

- *Supporting the development of learning objects and standards*—There is a need to continue to support the building of learning objects by establishing a repository for these objects. The program could also pursue a nationally coordinated initiative towards the adoption of voluntary standards in the application of ICT to education—including standards for learning objects, quality, and interoperability specifications for e-learning.
- *Narrowing the digital divide by improving access*—Equity of access to ICT in learning environments is a social as well as an economic goal. The SN program has addressed this goal over the years (e.g., First Nations program), but increased efforts and collaborations with key responsibility centres in other federal, provincial or municipal governments are needed to adequately address increasing “digital divide” challenges – particularly for rural and remote regions.
- *Research to gauge private sector needs and interests, and to measure ICT impacts on learning*—Program options and delivery mechanisms need to be devised that are based on a sound understanding of business models that are likely to engage private sector participants in future program initiatives. New research and market analysis is needed with a focus on developing appropriate mechanisms to accomplish this goal. The SN program could also contribute to research towards the ongoing challenge of measuring the real impacts of ICT on learning.
- *Implementing community-based program options*—Other Industry Canada programs have focused on community-based initiatives (e.g., the CAP program). In this respect, SN has an opportunity to devise program mechanisms that encourage innovative community-based technology applications for local learning institutions.

Emerging Themes and Challenges

- From its inception the SN program has relied extensively on partnerships and collaborations with provincial and territorial governments, school boards and schools, post-secondary institutions, educational associations, volunteers, and the private sector. An earlier evaluation of the program (December 2000) concluded that the program has been “outstandingly successful” in partnerships and that “the wide range of SN partnerships represents one of the key successes of the program”. On the other hand, successes of the program have varied across provinces, with some provinces opting out of some SN partnership initiatives and program components due to different socio-political dynamics and prevalent education systems and jurisdictional issues outside the federal government’s control.
- The current situation, however, suggests that there are continuing and new partnership and collaborative opportunities emerging for the SN program in the following areas:
 - ✓ Developing standards and accreditation requirements in educational applications of ICT.
 - ✓ Mutual recognition of credits across educational institutions.

- ✓ Community-based initiatives, broadening the scope of educational opportunities for K-12, adult education, skills learning, and on the job training.
 - ✓ Developing and supporting campus consortia that foster the development of online applications for post-secondary education and lifelong learning programs.
 - ✓ International collaborations focused on sharing educational content and networking opportunities.
- There is also a need to re-engage the private sector, including big players and SMEs, as originally done by the program in its earlier manifestations. With experience, SN rapidly learned that partnerships with the private sector were desirable in themselves, since they helped build participation and sustainability—particularly for program components such as Computers for Schools (CFS), Learnware and SchoolNet Youth Employment Strategy funded programs.
 - There is general recognition that there are benefits to evolving community-based initiatives, but that these initiatives also need better broad-based educational tools, and building blocks to support local initiatives. This includes the development and application of educational portals, training modules, and learning objects.
 - The contributions of the SN National Advisory Board have been instrumental to the success over the years of the SN program—particularly in providing policy and strategic input to help shape the direction and focus of the various SN components. There is a need, however, to re-confirm the role and effectiveness of the Board, in light of emerging partnership challenges, provincial priorities, and the social and economic rationale underlying the SN program.
 - The *Innovation Agenda* of Industry Canada is a central theme that continues to guide program initiatives across the department. For the SN program, “innovation” has focused on new applications of ICT to promote educational opportunities in the classroom and other learning environments (virtual or otherwise). Key informants suggest that in going forward with the SN program, there is a need to clarify what “innovation” means in the context of SN, particularly in light of continuing and emerging *technology* themes and challenges.
 - These emerging *technology* themes and challenges involve the following:
 - ✓ Broadband application.
 - ✓ Learning objects and interoperability specifications and standards for e-learning.
 - ✓ Building repositories of knowledge and contemporary tools for ICT applications.
 - ✓ Rich multimedia.
 - ✓ Floating infrastructure (e.g., wireless, laptops) versus fixed infrastructure (e.g., desktops).
 - ✓ SN program support for R&D (e.g., for learnware applications)

- ✓ Recycling (involving environmental issues) and re-using computers (involving supplying computers for schools and libraries).
- The SN program over the years has built up and maintained a high profile, with visibility among educators in this country, and abroad. As some key informants have suggested this “brand name” is an asset that needs to be capitalized on in future configurations of the SN program.
- However, there is also concern expressed that the program has become too “fragmented” in that it has diversified into many sub-themes, to the extent that there is now a need for a new “man on the moon” vision for the program—to consolidate its purpose and strategic directions over the next few years.
- The program has achieved significant clarity with the issuance of its *Results-based Management and Accountability Framework* (RMAF) (most recently updated in February 2003), and its *Risk-based Audit Framework* (RBAF) (most recently updated in June 2003). These documents are comprehensive and represent a significant achievement in establishing appropriate structures for program performance and financial accountability. The challenge remains, however, to establish an effective and ongoing information gathering mechanism that feeds into the reporting scheme of program management.
- In this respect, several program evaluations have been successfully concluded over recent years. These evaluations have identified the achievements and key issues involving the SN program components. The responses of IHAB to the issues raised by these evaluations have been appropriate and comprehensive, providing additional rationale and mitigation strategies to address risks or misconceptions about program intents and delivery mechanisms.
- However, there is still a need to further the state of the art in measuring impacts of ICT in learning situations. The jury is still out on the extent and character of ICT impacts, the specific indicators that best gauge these impacts, and the ultimate effects of an ICT enabled education system on the Canadian economy and the social wellbeing of Canadians.

Role of Industry Canada

- The SN program has stayed well within the connectivity/innovation mandate of Industry Canada, with a clear focus on technology applications and the role of ICT in progressing Canadians towards an economy with rapidly changing skills and knowledge requirements.
- Focusing efforts on connectivity is a continuing and relevant goal for Industry Canada and for SN. However, interviewees in this study generally agree that there is a more complex set of issues that need to be addressed by IHAB and Industry Canada, including the strategic use of e-learning technology, in a very broad sense, for preparing the current and future Canadian workforce for the evolving knowledge-based economy. This broadened scope includes a complete and holistic view of

learning as a lifelong endeavour—from K-12, to post-secondary, to on-the-job training, and adult learning.

- The evidence from past evaluation studies, and from the majority of interviewees consulted for this study, agree that IC is in a good leadership position to articulate a clear vision of where Canada needs to be in five years with regards to the application of ICT to education, and to clarify the actionable goals and program designs to get there.
- The infrastructure and network of partnerships that SN has built over the years validates this view, and corroborates the likelihood of a successful re-deployment of the program during, and beyond, 2004.
- The consensus view is that without IC's leadership through SN, in evolving the use of ICT for education and learning in Canada, progress on this front will be slowed. The consequences would be a fracturing of initiatives, and disparities in progress across Canada and between provinces and territories.

LESSONS LEARNED AND RECOMMENDATIONS

The lessons learned and recommendations presented in this section of the Executive Summary represent a synthesis of the results from consultations and analysis of this and six previous evaluation studies of SchoolNet program components. The recommendations presented cover a broad policy and program spectrum, based on feedback and evidence from multiple sources. This evaluation report is intended to provide one source, amongst others, that informs future policy and program priorities, in response to lessons learned and recommendations emanating from the evaluation work undertaken. It is the prerogative and responsibility of Industry Canada and the Information Highway Applications Branch to provide an appropriate management response to the findings and recommendations, and to establish priorities, for future connecting Canadians program initiatives.

- **Flexibility of the program**—The SN program is generally deemed to be a flexible program delivery mechanism in that it has relied on building extensive participation of partners, and in that it has been successful in responding to various opportunities in different jurisdictions, within the bounds of IC's mandate as a catalyst and facilitator of innovative technology applications, and within the context of the departmental agenda for progressing Canadians towards an economy with rapidly changing skills and knowledge requirements. The Canadian education system varies from province to province, and the flexibility of the SN program in responding to these differences has served its purpose well by allowing it to adapt to changing needs and situations between and within provincial/territorial jurisdictions. ***Recommendation:** For future programming design needs, it is recommended that SN retain a flexible delivery approach that responds to the different requirements of the varying provincial/territorial and First Nations education systems across Canada.*

- **Mission**—SN was served well by an original, consensus-building long-term connectivity goal for implementing ICT in schools. There is currently a need to articulate a similar, consensus-building steady and long-term mission for SN. In other words, there is a need to clarify the role of SN as it relates to where Canadian education should be five years from now with respect to the use of ICT. ***Recommendation:** The SchoolNet National Advisory Board could be recruited for this purpose—with a special working group from within SNAB commissioned to address specific challenges and workable solutions. The “Foresight” document prepared by SNAB in this respect is an appropriate foundation to build on. Active representation on this working group from educational institutions, private sector stakeholders, and federal and provincial/territorial government departments is required.*
- **Program components**—The GrassRoots and Network of Innovative Schools (NIS) program components have proven to be successful program models for delivering ICT to the classroom—specifically referring to the project-based program support design and concept (GrassRoots) and the professional teacher development aspects (NIS) underlying these components. ***Recommendation:** Future program designs of SN should continue to incorporate project-based delivery and professional teacher development schemes as a means to effectively engage partners and to implement innovative ICT solutions for education.*
- **Partnerships and voluntary participation**—The partnerships and voluntary nature of the many SN initiatives has had very strong appeal to educators over the past decade. SN was not a compulsory program for any participant, and was not built into a curriculum-based framework. This character of the program enabled active partnerships and participation of provincial, municipal and other federal government departments, as well as volunteer groups, school boards, and private sector organizations. The recent RBAF for SchoolNet (June 2003) stipulates that the number one risk associated with the program is “the loss of partners and availability of volunteers” for which various and ongoing mitigating strategies have been developed and implemented. ***Recommendation**—SN should continue to implement its stated goals through program initiatives that are based on voluntary participation of partners, providing value-for-money financial and in-kind incentives that contribute to the adoption and use of ICT by educational institutions and learning environments.*
- **Program alternatives/options**—Continued federal government support for the proliferation of ICT for learning through supply program delivery mechanisms (such as Computers for Schools) and capacity-building programs (such as GrassRoots and NIS), may not be sustainable in the long-term. This is particularly the case in times of resource constraints and alternate government priorities, and when dispersion of federal-provincial government tax dollars is involved. Therefore, identifying options for sharing most cost and outcome effective practices that respond to particular requirements of provincial/territorial and First Nations education systems is needed, and is a responsible initiative to undertake. ***Recommendation:** A study of the most cost and outcome effective practices for different provincial and territorial education systems, will contribute to determining if there are appropriate alternative delivery mechanisms that meet present and future challenges. In addition, cost-effectiveness*

comparisons of Canada's SchoolNet program to other national SchoolNet programs in other countries would provide valuable insights. Industry Canada should initiate a comparison study to identify the most cost and outcome effective practices for continuing to integrate information and communications technology in learning environments.

- **Innovation**—Fostering innovative applications in education has been a main goal of the SN program. However, what is considered to be innovative has evolved with the advent of new and more robust technologies, including wireless and rich media. There is a need to redefine what is considered innovative and what is now state-of-the-art (e.g., the design and proliferation of web pages in itself is hardly an innovative *raison d'être* for SN any more). **Recommendation:** *Any new SN policy and program design, that focuses on early adopters and innovators, needs to "raise the bar" on what constitutes innovation. Naturally, the relevance and impact of innovative initiatives also need to be considered.*
- **Entry levels**—The ICT competency levels of educators and students varies across Canada, within provinces, schools, and even classrooms. **Recommendation:** *Future SN program designs need to consider different entry levels for participants in the program—e.g., based on different skill levels, age groups, geographical distributions, cultural differences, and provincial/territorial school systems and characteristics.*
- **Networking opportunities**—Educators see opportunities for networking, created by SN program activities and events, as a major benefit of the program. Without the networking opportunities created by SN many successes in ICT applications would not have otherwise occurred. **Recommendation:** *SN should plan and budget for frequent networking events (both virtual and face-to-face) to bring together participants and partners in the program, particularly educators, to learn from each other and share results of their initiatives.*
- **Regionalization and devolution**—The regionalization and the devolution of SN program initiatives to local responsibility centres are considered by program participants as a positive characteristic of the program. This, for example, is considered a very strong point of the First Nations program. **Recommendation:** *Industry Canada and the SN program should continue to rely on a decentralized delivery mechanism for its program components, while retaining overall budget control and oversight responsibilities, as well as policy and program design and delivery decisions.*
- **Collaboration with schools and school boards**—The SN program overall has received high marks from schoolteachers and principals, and school board representatives across Canada. **Recommendation:** *Collaboration with schools and school boards is essential, if the program is to continue to succeed.*
- **Role of Industry Canada and the private sector**—The role of Industry Canada as a promoter of ICT for education is valid and should continue, but a current gap is the absence of drive to foster partnerships with the private sector. **Recommendation:**

Research should be supported to understand the appropriate business model and incentives to engage the private sector in future SN initiatives.

- **Issues scan**—The timing seems right to do a broad issues scan of what is needed and what needs to be done for future applications of ICT in education in Canada. **Recommendation:** *Industry Canada is in a position to provide leadership to oversee such an issues scan, and therefore should consider undertaking this initiative.*
- **Absence of a national strategy for ICT in education**—Results from SN initiatives often evolve slowly and the process of fostering innovation and innovative uses of ICT in education requires a long-term commitment, by all stakeholders, and by federal/provincial governments. In the absence of a national strategy for the use of ICT in education, it is very important to at least articulate a clear vision that creates consensus for action. **Recommendation:** *Industry Canada, with the participation of the SchoolNet National Advisory Board, should play a leadership role in articulating this vision.*

I Introduction

This report presents the results of an evaluation study prepared by BearingPoint for the Audit and Evaluation Branch and the Information Highway Applications Branch, Industry Canada.

1.1 Profile of the SchoolNet Program

SchoolNet as an Industry Canada initiative—The SchoolNet initiative consists of a number of different programs and activities to provide Canadian schools and libraries with increased computer access to the Internet (i.e., increased “connectedness”) and to facilitate the use of this access for a variety of learning applications and opportunities. The original mandate of SchoolNet was articulated in 1994 under the government’s strategy, *Building A More Innovative Economy*.¹

The Department of Industry Canada maintains that integration of information and communications technologies into learning settings creates better-qualified personnel for the knowledge-based economy, and enables better use of the information and telecommunications infrastructure. The Information Highway Applications Branch (IHAB) of Industry Canada manages and oversees the delivery of the SchoolNet programs. IHAB’s overall vision is to “use the information highway to build Canadians’ skills and knowledge to promote Canada’s economic competitiveness and social well-being.” SchoolNet is one of the initiatives consistent with this vision.

Original goals of SchoolNet—A set of goals for SchoolNet was developed in 1994, and the timing for achieving these original goals was March 31, 1999. These goals were:

- to help connect all of Canada’s K-12 schools and public libraries to the Internet by March 31, 1999;
- to connect all of Canada’s First Nations’ schools under federal jurisdiction to the Internet by March 31, 1999; and
- to contribute to enhanced educational opportunities and information technology skills development among K-12 students.

With the substantial achievement of these SchoolNet goals, an evaluation study of the program was conducted during fiscal year 1999-2000.² The results of the evaluation study (December 2000) were used as a basis for the implementation of an extended

¹ *Building a More Innovative Economy*, produced by Industry Canada, Ottawa, November 1994.

² *Evaluation of the SchoolNet Initiative, Final Report*, prepared for Industry Canada by KPMG Consulting LP, December 12, 2000.

SchoolNet program under the government's *Connecting Canadians*³ and *Innovation* strategies.⁴

Current mission of SchoolNet—The first phase of SchoolNet essentially operated from 1994-1999 and the current SchoolNet has been operating from 1998 to the present. The current SchoolNet has the following mission:

*"SchoolNet works with Canadian learning partners to increase access to and integration of Information and Communications Technologies (ICT) into the learning environment in order to develop an ICT-skilled population, capable of participating in the Knowledge Economy."*⁵

The current SchoolNet program seeks to encourage the integration of ICT into Canadian society, which requires a strong focus on learning settings.

SchoolNet program objectives—The SchoolNet family of programs share the common objective of connectivity. Some activities encourage the supply of connectivity into the school system; others encourage connectivity by creating a demand for high quality Canadian educational content. The principal objectives of SchoolNet's various components, as articulated in the SchoolNet RMAF document,⁶ are as follows:

- to encourage use of the Internet telecommunications infrastructure for learning purposes, by supporting or linking to safe, high quality online educational services;
- to support the use of the Internet telecommunications infrastructure for learning purposes by assisting connectivity through the Canadian library infrastructure;
- to provide and maintain connectivity and related support services to First Nations schools;
- to augment the inventory of multimedia computers in use in the schools system through the recycle and re-use activities of the Computers for Schools Program;
- to increase interoperability and access of Canadian educational content available to the Canadian school system;
- to support capacities to use ICT through project-based collaborative and interactive learning;
- to facilitate adoption of ICT in the learning system by sharing best practices and achievements;

³ *Connecting Canadians* is the Government of Canada's initiative to help Canadians become the most connected people on earth, ready for the jobs and opportunities of today's knowledge based economy, see www.connect.gc.ca.

⁴ See *Achieving Excellence: Investing in People, Knowledge and Opportunity: Canada's Innovation Strategy*, Government of Canada, Ottawa, 2001, www.innovationstrategy.gc.ca.

⁵ *Results-based Management Accountability Framework (RMAF) for the SchoolNet Program*, V.003.8/03/02/21, Industry Canada, Ottawa, February 2003, page 11.

⁶ *Ibid.*

- to provide online career development and selection services for graduates of the secondary school system;
- to encourage adoption of e-business and other Internet practices by Canadian small and medium-sized enterprises.

A listing of SchoolNet program components is included in Chapter 3, (Exhibit 3.1).

Budget—The SchoolNet family of programs was allocated \$30 million for each of fiscal 2002-2003 and 2003-2004. In addition, the SchoolNet family accesses \$14.865 million from the Youth Employment Strategies program annually. The Industry Canada expenditures for SchoolNet from 1995-1996 through 2001-2002 were approximately \$143 million.

1.2 Evaluation Objective and Evaluation Questions

The objective of this evaluation is to provide input to policy and programming decisions regarding the development of the next generation of Industry Canada's *Connecting Canadians* and *Innovation* strategies, specifically as this relates to the SchoolNet family of programs. Furthermore, this evaluation contributes to addressing the government's commitment in the 2003 Federal Budget to 'review all of its programs connecting Canadians to determine how best to collaborate with Canadian industry, the provinces, communities and others'.

The focus of this evaluation is on the following key areas of investigation, consistent with federal government policy on evaluation:⁷

- **Relevance of the program**—Is the SchoolNet program still relevant?
- **Achievement of objectives**—To what extent has SchoolNet achieved its objectives?
- **Options**—What are the relevant alternatives/options that would effectively address current connectivity and/or innovation challenges?
- **Emerging themes and challenges and the role of Industry Canada**—What are the emerging connectivity and/or innovation themes/challenges for SchoolNet? What is the appropriate role of Industry Canada and what are the appropriate delivery mechanisms for SchoolNet objectives?
- **Lessons learned and recommendations for future policy and programming needs**—What are the relevant lessons learned from SchoolNet, and what recommendations can be made for future policy and programming needs?

⁷ *Evaluation Policy*, Treasury Board of Canada Secretariat, Ottawa, April 1, 2001—see web site reference document www.tbs-sct.gc.ca/pubs_pol/dcgpubs/TBM_161/ep-pe_e.asp.

Federal government policy on evaluation requires that federal government departments evaluate issues related to relevance, results and alternatives, "to ensure that the government has timely, strategically focused, objective and evidence-based information on the performance of its policies, programs and initiatives to produce better results for Canadians."⁸

1.3 Approach

The approach for this SchoolNet evaluation study involved:

- an extensive consultation process with key informants, participants and partners in SchoolNet initiatives and activities;
- a review of the results from past and recent evaluation studies of SchoolNet program components;
- a review of evidence from other relevant documents such as policy reports, strategic issues papers, and SchoolNet planning and research studies;
- feedback on findings and recommendations of the study from a SN Evaluation Steering Committee consisting of federal and provincial government, private sector and academia participants.

Consultation with key informants—Consultation with key informants included in-depth interviews with the following:

- ✓ school teachers (from K-12)
- ✓ school principals
- ✓ school board members
- ✓ students
- ✓ representatives from post-secondary institutions (colleges and universities)
- ✓ SN Advisory Board members
- ✓ representatives from First Nations school system
- ✓ provincial government education officials
- ✓ industry and technology experts
- ✓ consultants
- ✓ IHAB program staff and management.

The names of individuals consulted are listed in Appendix B. A copy of the interview questions is provided in Appendix C. Fifty-two interviews were conducted for the study. Interviews generally lasted from 40 to 90 minutes.

⁸ *Ibid.*

An initial consultation process at the outset of the study, with fifteen key informants, helped scope the evaluation to focus it on key issues of relevance for future policy and programming requirements.

Results of previous evaluation studies—The review of previous evaluation studies included examining the results reported in the following documents:

- *Evaluation of Canada's Digital Collections Program*, prepared by Prairie Research Associates (PRA) Inc. for Industry Canada, February 19, 2003.
- *Evaluation of Industry Canada's Information Highway Applications Branch Youth Employment Strategy Science and Technology Programs, Final Report*, prepared by SPR Associates Inc. for Industry Canada, March 13, 2003.
- *Evaluation of the SchoolNet1 Initiative, Final Report*, prepared by KPMG Consulting LP for Industry Canada, December 12, 2000.
- *Evaluation of the SchoolNet Multimedia Learnware and Public Access Applications Program*, prepared by KPMG Consulting for Information Highways Applications Branch, Industry Canada, April 30, 2002.
- *Formative Evaluation of the NetCorps Canada International Program, Final Report*, Prepared by EKOS Research Associates Inc. for Audit and Evaluation Branch, Industry Canada, April 30, 2003.
- *Formative Evaluation of the Network of Innovative Schools Program*, prepared by BearingPoint for Audit and Evaluation Branch, Industry Canada, March 31, 2003.

Exhibit 1.1 summarizes the quantitative and qualitative approaches taken in each of these past evaluation studies commissioned by Industry Canada. As Exhibit 1.1 demonstrates, a full spectrum of evaluation methodologies were used, to garner evidence from multiple sources, including participants and non-participants in the SN program, stakeholders, successful and unsuccessful applicants, Canadian federal/provincial government officials, private sector and academic organizations, institutions, and associations.

Results of these studies are integrated into the discussions contained in the following chapters of this report. The reader is invited to consult the six other evaluation studies, referenced in this current report, since they provide an additional basis for the synthesis of findings, lessons learned and recommendations presented in the following chapters.

Review of evidence from other relevant documents and research—Examples of other studies reviewed include the following:

- *Consensus of the SchoolNet National Advisory Board on a Foresight of the Role of Information and Communications Technologies in Learning*, SchoolNet National Advisory Board, December 21, 2001.
- *Canada's SchoolNet E-Learning Programs: A Synthesis of Selected Studies*, prepared by Proactive Information Services Inc., prepared for SchoolNet, Ottawa, March 2003.

Exhibit 1.1: Approaches of SchoolNet Evaluation Studies

| SchoolNet Evaluation Study | Date of Study | Evaluation Approach |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SchoolNet I Initiative (including Computers for Schools, GrassRoots, Youth Employment Initiative, LibraryNet, First Nations) | December 12, 2000 | ⇨ Document review ⇨ Interviews with federal government officials ⇨ Interviews with provincial government officials ⇨ Survey of school and library administrators re Computers for Schools ⇨ Survey of teachers, principals and library administrators ⇨ Survey of First Nations communities ⇨ Case studies of collaboration and leveraging ⇨ Analysis of Second Information Technology in Education Study (SITES) data |
| Youth Employment Strategy Science & Technology Programs (YES S&T) (including SchoolNet Youth Initiative, CFS Technical Work Experience, SkillNet Youth Initiative, and Information Highway/Science and Entrepreneurship Camps) | March 13, 2003 | ⇨ Review of existing data from program documentation and web-sites ⇨ Interviews with Industry Canada representatives from four SN program components ⇨ Survey of 400 youth program participants ⇨ Survey of 171 employers/contractors who employed SN youth interns |
| Network of Innovative Schools Program | March 31, 2003 | ⇨ Two focus groups with teachers, principals and school board members ⇨ Interviews with successful and unsuccessful school applicants ⇨ Case studies of schools, and interviews with teachers, principals and board members ⇨ Interviews with stakeholders |
| Learnware and Public Access Applications Program | April 30, 2002 | ⇨ Interviews with successful and unsuccessful program applicants ⇨ Survey of successful applicants & project managers ⇨ Review of relevant program documents and research policy and program studies ⇨ Interviews with CANARIE Inc., and with Industry Canada staff and management ⇨ Interviews with Selection Committee members, industry associations and other industry stakeholders ⇨ Interviews with other federal and provincial government departments |
| Canada's Digital Collections Program | February 19, 2003 | ⇨ Interviews with key informants ⇨ Fax survey of 59 contractors and 42 custodians ⇨ Interviews with 575 youth participants ⇨ Analysis of data collected from 249 visitors to the CDC web site ⇨ Document review of online materials from the CDC web site |
| NetCorps Canada International Program | April 30, 2003 | ⇨ Review of NCI documentation and data ⇨ Interviews with key informants ⇨ Four focus groups with NetCorps interns ⇨ Four small-scale case studies of NetCorps intern-ships in four different countries, including Coalition members, interns and overseas host agencies |

- *Evolution of Strategic Directions for ICT Integration into Learning*, draft policy document, Information Highway Applications Branch, Industry Canada, May 28, 2003.
- *National Summit on Innovation and Learning*, Canada's Innovation Strategy, Government of Canada and Conference Board of Canada, Ottawa, 2002, www.innovationstrategy.gc.ca.
- "The Summary of all Summaries", draft results from a focus group consultant study on SchoolNet, provided by Information Highway Applications Branch, Industry Canada, 2003.
- *Canada's SchoolNet GrassRoots Program: Case Studies*, Conference Board of Canada, Ottawa, 2001.
- *Innovation and Educational Change: A Study of GrassRoots in NIS Schools*, by David C. Dibbons, Ph.D., prepared for Industry Canada's SchoolNet, Memorial University of Newfoundland, April 17, 2002.
- *National Poll on Teachers and Information and Communication Technology in Classrooms and Schools*, conducted for the Canadian Teachers' Federation by Vector Research, Toronto, April 2003.
- "SchoolNet Family Portraits: Activities and Initiatives", document provided by Information Highway Applications Branch, Industry Canada, Ottawa, January 2003.
- "Policy Discussion Template—SchoolNet", draft document provided by Information Highway Applications Branch, Industry Canada, Ottawa, not dated.
- *Results-based Management and Accountability Framework (RMAF) for the SchoolNet Program*, Information Highway Applications Branch, Industry Canada, Ottawa, June 2003.
- *Risk-based Audit Framework (RBAF) for the SchoolNet Program*, Information Highway Applications Branch, Industry Canada, Ottawa, June 2003.

Appendix A provides a more complete reference list of the studies and documents reviewed, results of which are integrated into the discussions contained in the following chapters of this report.

Feedback from SN Evaluation Steering Committee—In addition to the consultation process, and the review of results from various relevant studies, feedback on findings and recommendations was provided by the SN Evaluation Steering Committee set up by Industry Canada. This committee included representation from Industry Canada (evaluation, program and policy personnel), and provincial governments, private sector and academia—as well as an observer from the Department of Finance and Treasury Board Secretariat. Names of SN Steering Committee representatives are included in the list of those persons consulted for this study provided in Appendix B.

Limitations—This study in part presents a consolidation of results from six previous evaluation studies. Four of these studies were completed in 2003, one in 2002 and one in 2000 (see Exhibit 1.1). While many of the findings and lessons learned from these studies are still relevant, not all the results are pertinent to more recent policy issues. For example, there are certain concerns with respect to the impacts and effectiveness of using ICT as a teaching/learning aid—i.e., about whether “computers help students learn”. Some educators have argued more recently that the jury is very much out on this issue. For example, in a recent article in *MacLean's*, the author presents research findings for and against the use of computers. The author opines, “The jury is out about the benefits of computers, whereas the costs of maintaining and updating technology can be prohibitive.”⁹ On the other hand, a recent survey done for the Teachers Federation of Canada, on the role of ICT in classrooms and schools, concludes “most teachers have accepted computers and other information and communication technology in their classes and are integrating ICT in their lessons.... Eight out of 10 say computers are essential or important in the way they teach (three out of 10 say essential).”¹⁰

This current SchoolNet evaluation study does not attempt to resolve the debate among educators about whether “computers help students learn”, but rather is focused on the contributions made by the SN program within the context of Industry Canada’s *Connecting Canadians* and *Innovation* strategies—i.e., in terms of its goal to deliver and integrate ICT into the learning environment of Canadians.

The study findings on relevance, objectives achievement, the role of Industry Canada, and lessons learned and recommendations are based on the aforementioned previous evaluation studies, as well as additional research on the current SN program. The evaluation, however, does not address differences in the way the SN program has evolved in the different provinces and territories in Canada. Provinces and territories have different education and school systems, and the nature of the SN partnerships and various SN initiatives evolving from these partnerships, have varied from province to province. The previous evaluation studies, and this study, have not addressed this challenging issue.

Nonetheless, all the previous evaluation studies, and the current study, do focus on issues of concern for policy and programming decisions, following standard Canadian federal government policy on evaluation.¹¹

⁹ “The ABCs of Classroom Fun,” by Sue Ferguson, *MacLean's*, September 22, 2003, page 21.

¹⁰ *National Poll on Teachers and Information and Communication Technology in Classrooms and Schools*, conducted for the Canadian Teachers’ Federation by Vector Research, Toronto, April 2003, page 2.

¹¹ *Evaluation Policy*, op.cit.

II *Relevance of the Program*

This chapter addresses the evaluation question: *Is the SchoolNet program still relevant?* The Industry Canada rationale for the program is presented and related economic and social outcomes are identified. Key results for this question from the review of previous evaluations and other studies and the consultation process are presented in the following sections.

2.1 Rationale

Integrating ICT into learning settings—In establishing the SchoolNet program, the government's rationale was that it is important to adopt and integrate information and communication technologies (ICT) into learning settings, especially those within the primary and secondary school systems across provinces and territories in Canada. Further, it was deemed within the context of Industry Canada's mandate that efficient and expert use of ICT in learning environments is critical to industrial competitiveness in a knowledge-based economy. The SchoolNet program initially focused on the needs of the primary and secondary schools, as the students in these schools represent the workers and citizenry of the future. ICT capabilities acquired in school are useful whether the learner continues education or proceeds directly into the Canadian workforce. The federal government announced its commitment to SchoolNet and to the integration of ICT in learning environments by announcing its intentions in successive *Speeches from the Throne* (see Section 3.1 for references from the 1999 and 2001 *Throne Speeches*).

SN Mandate—SchoolNet activities prior to the *Connecting Canadians Strategy* have been referred to as SchoolNet 1, and the renewed SchoolNet, since 1998, as SchoolNet 2. The original mandate of SchoolNet, established in November 1994, was "to help connect all 16,500 schools and 3,400 libraries in Canada by the end of fiscal year 1998". This mandate has been extended since then, partly because of the success of the program in fulfilling its original mandate, and partly because connectedness became a much higher priority of the federal government during the past five years. The program has been a key part of the government's *Connecting Canadians Strategy*. This strategy has been aimed at building the infrastructure and skills that are necessary for Canada to become and remain a leader as a knowledge-based economy. The program has also become associated with Industry Canada's *Innovation Strategy*, in that opportunities evolved out of the program activities to contribute to innovative educational solutions through online resources and applications, and through the innovative use of ICT in the classroom and other learning environments.

Justification—Justification for SchoolNet is based on the premise that connectivity enhances learning by making the transfer and sharing of knowledge among the population of Canada more effective. This is intended to lead to economic, social and cultural benefits towards a competitive economy and a just society.

The diagram shown in Exhibit 2.1 provides a depiction of the rationale underlying SchoolNet. The "pyramid" leading to Canadian ICT competitiveness for a knowledge-based economy reveals that each level builds upon the one before it.

Exhibit 2.1: SchoolNet Strategy – How the Pieces Fit Together



Source: Adapted from *Evaluation of the SchoolNet1 Initiative, Final Report, op.cit.*

Partnerships—It is important to emphasize that the federal government does not carry out the SchoolNet activities alone. They all involve partnerships between the federal government, provincial governments, the private sector, non-profit organizations, and educational institutions. SchoolNet's role has been to act as a catalyst and facilitator. The SchoolNet National Advisory Board (SNAB), consisting of partners from these various groups and organizations, has provided strategic directions for the program.

2.2 Key Findings

Economic and Social Policy Outcomes

- Informants consulted for this study felt that there is strong economic rationale for a SN program focused particularly on the following areas:
 - ✓ Building and maintaining competency and competitiveness through applications of information and communications technology (ICT) in education.
 - ✓ Moving from connectivity to innovative applications—to build wealth through knowledge and a sense of community.

- ✓ Achieving a flexible workforce through a system of learning that re-trains and re-educates on an ongoing basis—i.e., a lifelong learning system.
 - ✓ Developing a competency-based learning system that is responsive to the economy and the needs of industry.
 - ✓ Promoting innovative project-based solutions for learning.
 - ✓ Fostering partnerships that traverse political and cultural boundaries, and engage industry and education institutions.
- There is also strong rationale presented by key informants for a SN program focused on social outcomes—namely, to contribute to narrowing the “digital divide” in education, focusing on educational institutions in rural and remote regions of the country, First Nations schools, and schools in economically lagging urban locations. A focus on disabled students and students at risk are also areas of social concern that SN could potentially address.

Targeting the Program

- There is strong endorsement by key informants that the SN program is still relevant and that it continues to evolve and support sophisticated users of ICT in education—i.e., the early adopters and the innovators. However, there is also consensus on addressing the needs of late adopters and uninitiated users, to the extent that resources permit. In addition, while K-12 students are primary targets for SN, post-secondary and adult training is considered a high priority, especially by industry and post-secondary institutions. The latter is seen as a more immediate priority, while the former is seen as a medium to long-term priority.

Consolidating SchoolNet

- Over the past decade, SN has played a leadership role in addressing connectivity and ICT capacity issues. Some of the key informants for this study have suggested that the program now needs a new focus and programming that converges the above rationale around the key economic and social policy themes identified above.

2.3 Findings from Interviews

This section presents results from interviews on the question of the relevance of SchoolNet, by interview group.

Teachers, Principals, School Boards, Students

- Priorities for the education system in Canada are numerous, competing for limited resources. ICT for learning requires funding that is otherwise not available due to other priorities. Without SN, funding for the use of ICT in learning would be significantly diminished.

- SN is particularly relevant in that it significantly contributes to teachers' understanding of the use of ICT for learning, and provides opportunities for teachers to learn and share experiences.
- The SN program components are considered unique in that they are not generally duplicated by any other programs, either federal or provincial, and thus of particular value to Canada and Canadian institutions served by them.
- The project-based approach of SN programs, such as GrassRoots, is particularly relevant for the classroom. Teachers, students and schools benefit in that a relatively small amount of money results in enriched access to teaching and learning resources.
- The SN program is relevant because it fills a gap in the K-12 school system that is otherwise not addressed by other means.
- SchoolNet is relevant in that it provides a unique forum where teachers across the country can come together to exchange views and share experiences in the use of ICT for teaching and learning environments.

Post-secondary Institutions (Colleges and Universities)

- Canada's education system is increasingly being referred to in a broad sense, as a lifelong learning system, from K-12 to post-secondary and post-graduate, to on the job training, and even including online applications and opportunities. SN should focus on youth and adult-learning systems at all levels. Integration of ICT in all phases and institutionalized levels of learning need to be supported by federal and provincial government policies and programs.
- For example, as a priority, support from SN is needed to develop flexible learning accreditation systems across colleges and universities, as well as for developing nationally based technical and voluntary standards for learning/teaching environments.
- There is a need for government to support research on the impacts of using ICT for learning—particularly to measure how computers help students learn.

First Nations School System

- The First Nations SchoolNet program is now more relevant than ever, as other mainstream schools move ahead. The "digital divide" could grow wider without the support of the First Nations SchoolNet program.
- Investing in First Nations SchoolNet continues to be relevant because upgrading the technology in place and implementing broadband is a continuing challenge for First Nations.

- Building ICT capacity in First Nations schools is an unfinished job. A majority of teachers in First Nations still do not have the requisite skills and experience to implement ICT into their teaching.

Provincial Governments

- To determine relevance, there is a need to determine how SchoolNet has affected learning outcomes across provincial jurisdictions and different provincial school systems.
- SN needs to develop a convergence of themes that drive the program in a way that is consistent with provincial jurisdictions, and in partnership with provincial school systems.
- SchoolNet as a federal government program continues to be relevant in that it provides a supportive role to provinces, to integrate ICT in the provincial school systems.
- Many of the issues faced in increasing connectedness and introducing innovative use of technology for learning environments (e.g., lack of knowledge and skills in using ICT, access to the Internet, access to computers, etc.) are not limited to specific cities or towns—there are barriers in all Canadian provinces.

Industry and Technology Experts, Consultants

- A competency-based system of education is needed that provides online learning options for the Canadian workforce, pre and post schooling. The SN program can continue to contribute to the development of such a system for Canada, which is responsive to training and skills development needs of industry.
- The SN program is needed because a primary focus of industry is using ICT in a way that improves productivity. By promoting online learning, SN contributes to productivity improvement in industry.
- SN services and tools have helped Canadian employers and job seekers use the Internet for recruitment, career, labour information and learning. The SkillNet program, for example, has really helped employers and youth by facilitating recruitment and by providing access to resources to match the needs of industry and job seekers.
- One area not sufficiently covered by SN has been the role and impact of wireless technologies. More research is needed on how to integrate wireless technology in learning environments, and to determine the most effective uses of this technology.
- The SN program needs to address the requirements of industry for the use of ICT in learning environments, if it is to re-engage the private sector as a partner. The relevance of the program for industry is in its long-term impact on the education

system of Canada. The short-term relevance is in its role in matching workforce demand and supply for the knowledge-based economy and for knowledge workers.

2.4 Findings from Previous Studies

This section presents findings from previous evaluation studies. Overall, these studies have all confirmed the relevance of SchoolNet as a federal program.

SchoolNet1 Initiative *[Evaluation dated December 12, 2000—including Computers For Schools, GrassRoots, Youth Employment Initiative, LibraryNet, First Nations]*

- SN has been a key element of the federal government's *Building a More Innovative Economy* strategy, and continues to play a strong role in Industry Canada's *Connectedness Strategy*.
- Partnerships facilitated by SN are crucial to success of this endeavour and must be nurtured and maintained. Consequently: SN partnerships require continuing direction and resources from Industry Canada and/or SN to be sustainable over the medium to long terms.
- The presence of an apparent champion in Industry Canada through SN, and a well-defined vision, ensures that the needed synergies are created and maintained for evolving ICT applications for education in Canada.

Youth Employment Strategy Science & Technology Programs (YES S&T)

[Evaluation dated March 13, 2003—including SchoolNet Youth Initiative, CFS Technical Work Experience, SkillNet Youth Initiative, and Information Highway/Science and Entrepreneurship Camps]

- The IHAB YES S&T programs were key in bringing together employers who wanted to hire personnel with computer/Internet experience and youth who wanted computer/Internet-related jobs, or opportunities to learn more about computers and the Internet.
- There is a continuing benefit from and need for the Federal government to invest in IHAB YES S&T programs because they help keep Canada "competitive" with other countries by expanding Canada's communications infrastructure and by promoting the development of ICT skills, which are essential for Canadians wanting to compete in today's knowledge-based economy.

Network of Innovative Schools Program *[Evaluation dated March 31, 2003]*

- NIS has been effective at supporting the integrated use of ICT in the learning system. NIS schools are using funds predominantly for professional development and the purchasing of technology for use in classrooms. Both facilitate the integration of ICT into the curriculum.

- The program seeks schools that are innovative with the technology they have, rather than identifying schools with the highest investment of technology.
- This is one of the few programs that allow teachers/schools to spend money on professional development. Teachers are sent on professional development courses, and on their return they “teach” the teachers, thus further facilitating the introduction of ICT in the curriculum.
- NIS has facilitated the integration of ICT into the school curriculum. Teachers who are more comfortable with using technology are more likely to adopt it in the classrooms; likewise, access to software/hardware ensures a greater integration into the curriculum.

Learnware and Public Access Applications Program [Evaluation dated April 30, 2002]

- The focus of need for supporting the development of e-learning solutions has shifted from the *Connectivity Agenda* to improving productivity and “achieving excellence” in the new knowledge-based economy.
- New funding should be focused on achieving commercial development of e-learning solutions and learning platforms.
- The learnware industry is still fragmented. The issue of “consolidating” supply and demand is still prevalent. Creative solutions are required to address this issue – not necessarily to reduce fragmentation, but to understand how to manage it and work with it as a reality.

Canada’s Digital Collections Program [Evaluation dated February 19, 2003]

- The CDC program is seen as relevant to Canada’s *Connecting Canadians Strategy*. It is useful as a tool for providing young people with ICT experience and opportunities to gain work experience in multimedia. Key informants have indicated that many existing collections would never have been digitized without the program.
- At the same time some key informants indicated that Canadian Heritage was about to embark on a similar program, and that this could wane the relevance of CDC.

NetCorps Canada International Program [Evaluation dated April 30, 2003]

- NCI offers young people volunteer internships of approximately six months in duration in the information and communications technology sector in developing countries.
- Key informants agreed that NetCorps is relevant and that the federal government should continue to invest in the program.

- NCI takes a creative approach to pursuing a number of federal objectives, including those related to international development, youth employment and raising Canada's international profile in information and communications technology.

III Achievement of Objectives

This chapter addresses the evaluation question: *To what extent has SchoolNet achieved its objectives?* The results for this question from the consultation process and the review of past evaluations and other studies are presented. The objectives of the program identified in the RMAF for SchoolNet are examined in the following sections.¹²

3.1 Identifying the Federal Government's Commitment to SN

SchoolNet began in 1993 as a pilot project to link a limited number of schools to the Internet. Since that project proved practical, positive and popular in its impact, it was incorporated into the 1994 micro-economic strategy of the government, *Building a More Innovative Economy*.

SchoolNet's first target was to connect all schools (including First Nations schools) and libraries to the Internet¹³ by March 31, 1999. That was achieved, with the assistance of partners in both public and private sectors. The second target had three parts, all to be achieved by March 31, 2001: ensuring connectivity equivalent of one computer per classroom;¹⁴ generating 20,000 GrassRoots projects; and connecting all First Nations communities. All elements of that target have been met, or exceeded—again with the support and participation of partners.

The government in the 1999 *Speech from the Throne* announced a third target:

“The Government will provide increased access to high-speed Internet service for classrooms and libraries and stimulate the production of Canadian multimedia learning content and applications”.

This target was restated with different emphasis in the 2001 *Speech from the Throne*:

“The government will continue to support SchoolNet, ensuring that Canadians, their communities and their schools can have an on-ramp to the information highway. These programs are critical to Canada's effort to close the digital divide, particularly in rural, remote Northern and Aboriginal communities. The Government will also enhance SchoolNet, focussing on creating more and better learning content online.”

The commitment was reiterated in the 2001 *Budget*:

“Funding was provided in *Budget 1998* for computers and Internet access in communities, schools and libraries through SchoolNet and the Community Access Program. The Government is committed to building

¹² See SN program objectives in Section 1.1 of this report, and on page 11 of the *Results-based Management and Accountability Framework for the SchoolNet Program, op.cit.*

¹³ Provided they wanted to be connected to the Internet.

¹⁴ Schools organized connectivity in various ways: labs, pods, and individual classrooms.

on these strengths and to ensuring that Canadians have access to the Internet.”

Ministers considered the Memorandum to Cabinet, *Canada's SchoolNet Renewal*, in the Fall of 2001 and approved a shift in emphasis for SchoolNet programming: more resources were to be directed to improving the connectivity of First Nations and to providing more multimedia refurbished computers to schools through Computers for Schools.

3.2 Objectives of SchoolNet and Related Activities

The principal objectives of SchoolNet's various components, as articulated in the RMAF for SchoolNet, were listed in Chapter 1. Essentially, Industry Canada has acted as a facilitator and provided support aimed at integrating ICT in learning environments by:

- using ICT infrastructures for learning purposes;
- supporting First Nations schools;
- recycling and re-using computers for schools;
- increasing access to Canadian content for learning;
- improving capacities to use ICT through project-based learning;
- sharing best practices;
- online career development; and
- supporting industry (learnware).

To achieve these objectives, several program components were devised over the years since the inception of SchoolNet. Exhibit 3.1 outlines these programs. In general six main categories of program activities were carried out over the years to achieve the above objectives:

- activities to facilitate the connectivity of schools and libraries;
- activities which involve the provision of computers to schools and libraries;
- development and operation of the SchoolNet website;
- support for the development of online educational materials and resources;
- activities intended to build partnerships; and
- research and competency development.

Exhibit 3.1: SchoolNet Program Components

| SchoolNet Programs | Start/End Date | SchoolNet I 1994-1999 | SchoolNet II 1998-2001 |
|----------------------------------------------------------------------------------------------------------|----------------|--------------------------|---------------------------|
| Computers for School (CFS) | 1993 | √ | √ |
| SchoolNet First Nations | 1995 | √ | √ |
| LibraryNet | 1997 | √ | √ |
| Network to Savings | 1995/2001 | √ | not part of SN II |
| SchoolNet E-Learning Programs (GrassRoots and NIS) | | | |
| GrassRoots | 1994 | √ | √ |
| NIS | 1999 | not part of SN I | √ |
| ICT Skills, Promotion and Marketing * | | √ | √ |
| Multimedia Learning Group (earlier known as Multimedia Learnware and Public Access Applications Program) | 1998 | not part of SN I | √ |
| SchoolNet Virtual Products | 1997/1998 | √ | not part of SN II |
| SkillNet.ca (earlier known as National Graduate Register) | 1996 | √ | √ |
| Office of International Partnerships (OIP) | 1996 | √ | √ |
| Youth Programs | | | |
| Computers for School TWEP | 1997 | √ | √ |
| Canada's Digital Collections (CDC) (earlier known as SchoolNet Digital Collections) | 1996 | √ | √ |
| SchoolNet YI (non-program specific initiatives which support ICT integration) | 1997 | √ | √ |
| SchoolNet E-Learning Portal - incl. Francophonie (earlier known as SchoolNet Portal) | 2002 | √ | √ |
| SchoolNet First Nations YI | 1999 | not part of SN I | √ |
| GrassRoots YI | 1997 | not part of SN I | √ |
| NIS YI | 2003 | not part of SN I | √ |
| LibraryNet YI | 1998 | not part of SN I | √ |
| Student Connections (joined SchoolNet Family in 2003, but still within CIO) | 1996 | not part of SN I | √ |
| SkillNet YI | 1997 | not part of SN I | √ |
| Innovation and Entrepreneurship Camps (earlier known as ISE Camps) | 1997 | not part of SN I | √ |
| NetCorps Canada International (NCI) | 2001 | not part of SN I | √ |

ICT Skills, Promotion and Marketing: originally called Scholarships, Grants & Science Promotion (94-95) and operates under SchoolNet I, and then in 98 the name changed to Information Technology Skills Development (operates under SchoolNet II and in 2002 the name changed to ICT Skills Promotion and Marketing.

3.3 Findings from Interviews

This section presents the findings from recent interviews and other sources on the achievement of SN objectives through its many components and related activities. The connectivity objective of the SN program has been achieved, but technology upgrades and ICT capacity building continues to be an ongoing mission, that needs a long term commitment by government and other participants and partners in the education system of Canada.

Using ICT Infrastructure for Learning Purposes

- Delivering technology for education is an ongoing job—a long-term commitment. The SN program has been successful in its connectivity objective, and in its objective to supply computers for schools, as well as in creating access to Internet resources across Canadian schools. However, ICT and applications have evolved considerably since the mid 1990s. What is needed now is to explore the use of more advanced rich multimedia, hardware and software on the learning environment, thus enabling the use of highly developed and complex learning techniques and practices.
- Canada risks falling behind in advancing ICT infrastructures for learning purposes. There are many examples from other countries such as Australia, United Kingdom, and United States in developing local infrastructures (the “last mile”) within schools that SN needs to address. These countries, for example, are conducting initiatives to implement more contemporary hardware (e.g., laptops), rich multimedia applications, and teacher mentoring programs.
- In some sense, SN is now in a position to be “penalized” for its success in delivering ICT infrastructure over the past decade. There is a demand to refresh and refurbish the technology to keep pace with the advancing knowledge base and innovative applications in education. Without a renewed commitment by SN to do this, the past investment in integrating ICT would be diminished.
- One of the key success factors of SN in helping integrate ICT infrastructures for learning purposes is that it has been a voluntary initiative, in that it did not dictate content and focused on playing a catalyst role, helping to facilitate and bring provinces together, to collaborate towards a common objective.

Supporting First Nations Schools

- The program has helped First Nations schools by achieving connectivity and building capacity. As of 2003, 480 First Nations schools (or approximately 95 percent) are connected.”
- The First Nations SchoolNet program provided these schools with Pentium computers, DirecPC terminals, and support for Internet and telecommunications costs, as well as technical assistance.

- First Nations schools have benefited from regional “help desks” that have been instrumental in building up the core expertise of participating schools. The regional help desks have been an important part of the success of the First Nations program in that they have provided the technical and other know-how support to schools, teachers and students to make best use of equipment provided.
- Connectivity was accomplished through a partnership with the telephone companies that made up the former Stentor Alliance (valued at \$12 million), whose commitment comprised free satellite channel capacity for DirecPC usage until 2003. The program also supported the development of the First Nations Homepage on SchoolNet.
- There is a need to continue to support First Nations schools to achieve the same computers- to-student ratio comparable with other schools in Canada.
- First Nations schools often have a high turnover rate of teachers. One of the benefits of the First Nations program has been its flexibility in targeting students as well as teachers. By targeting students, and allowing them to take the lead in various initiatives, the program has achieved a measure of success.
- Content development in education emphasizing First Nations cultures is an important aspect that has been identified by program participants, but this needs continued support by the SN program to achieve the goals of integrating ICT in First Nations classrooms.
- SN has helped First Nations schools to reduce student dropout rates, and has renewed the interest of students in learning.
- SN has also helped First Nations schools to contribute to a sense of community at the local levels, through connectivity and community association with school campuses.

Recycling and Re-using Computers for Schools

- The growth and development of the CFS program over the past few years has been tremendous. The partnerships that have developed through this program represent what the public and private sectors, along with individuals, can accomplish when working towards a common goal of making a difference.
- CFS has succeeded in recycling and re-using computers for schools and libraries by having all schools and libraries eligible to receive computers on a first come, first served basis. Tax receipts are issued to donors for eligible equipment donated. The program’s success is due to the awareness engendered by the program in the education community and among Canadians in general about the benefits of recycling computers.
- The positive response to CFS has helped bolster good corporate citizenship, environmental responsibility, by diverting computers away from landfill sites to help Canadian children.

- The CFS program has been successful because it was designed as a volunteer-based initiative, managed locally on a partnership basis. Volunteers, non-profit and private organizations, collect, repair and deliver surplus computers donated by governments, organizations and individuals to schools and public libraries across Canada. The fact that the program has operated successfully since its foundation in the early 1990s attests to this.

Increasing Access to Canadian Content for Learning

- SN program staff and administration have contributed considerably to the success of the program in achieving this objective, by being accessible to the education community, and by responding with rich information and references to sources on Canadian content for learning, either virtually or otherwise, through the SN online access points or personally.
- The SN program has helped Canadian school systems to improve their capacity to produce and share learning content online—by achieving connectivity goals, supplying computers and support for improving skills in the use of ICT.
- There is a problem of redundancy of information and a growing body of accessible knowledge. In itself this may be a good thing, but the sheer volume enabled by online access is creating confusion and what is truly valuable (e.g., best practices) is not that clear or obvious anymore. There is a role for SN to contribute to research that helps sort this out.
- By helping students to create websites, the SN program has given students a sense that their work is important. This applies both to the various projects they get involved in through GrassRoots and other SN components (such as Canada's Digital Collections through which 3,000 youth have received temporary work experience and more than 550 digital collections are currently available on the CDC website).
- SN has resulted in an increased awareness by educators of the importance of ICT for learning purposes. SN has enabled the evolution of a culture of change, especially for the early adopters and the frontrunners. However, the less initiated and late adopters are also now involved in integrating ICT into their programs.

Improving Capacities to Use ICT Through Project-based Learning

- Tying the GrassRoots program to project work has helped teachers and students develop their computer and Internet skills, and has provided educational opportunities for enriching the learning environment of students.
- While SN, through GrassRoots and other program components has helped teachers and students integrate ICT into the learning environment, "there is still a long way to go", as one prominent educator put it.
- It is generally recognized among teachers and schools that have participated in SN that a relatively small amount of funding has resulted in many benefits in their

classrooms. Teachers and schools have used GrassRoots and NIS funding, for example, to purchase ICT equipment and software and to get training and support for integrating the use of computers and the Internet into their programs.

- GrassRoots project-based approach has given teachers hope and enabled them to purchase and use technology they would not otherwise have done. Many spin-offs and ongoing project activities have ensued as a result of original SN projects. GrassRoots recipients have had a cascading effect on fellow teachers and students from other classrooms. New applicants evolve within participating schools in subsequent years.
- Spin-offs in international projects have resulted in building capacities, by sharing experiences of integration of ICT in learning environments of other countries.
- While there is a tendency for GR and NIS to support those who are able to take advantage of these programs, because of a greater understanding of the benefits of integrating ICT into learning, the needs of those who are at an entry level or are uninitiated also need to be addressed by the Canadian education system.
- “Block” projects (inter or intra school based) have not been as successful as individual classroom-based projects, because they involve more organization and extra-curricular commitment by teachers and students that are not necessarily able to make this commitment, or to sustain it over a long period of time.
- At the same time, there is a need to recognize that projects are not necessarily a primary focus of the education system. As long as teachers are able to integrate the SN-related projects into their lesson plans, and curriculums, they are able to justify the time and effort.

Sharing Best Practices

- By providing a forum for exchange of ideas and sharing experiences, SN has brought together the education community across the country with positive benefits. Many innovative projects that integrate ICT into the learning environment would not have occurred without the sharing of best practices.
- The role of SN databases and repositories created to document online content and teaching practices has helped build Canadian capacities and applications of ICT.
- There has been a major shift in teachers’ skills as a result of SN program activities, and the easy access to shared information that has resulted.
- The extra support from SN has allowed teachers to free up some of their time to network and to share their experiences with each other—e.g., in face-to-face as well as virtual (teleconferencing) events, and online access and exchange of information opportunities.

- The key success of SN is in getting teachers aware and involved in the program. The program offers incentives for teachers to prepare themselves to integrate technology in their classes and lesson plans, by sharing best practices and lessons learned.

Online Career Development

- SkillNet has helped create useful databases for job searching in different job categories. The job opportunities and match-ups that have resulted have greatly benefited both job seekers and employers.
- The Campus Connection program has been successful in addressing an important issue faced by colleges and universities today—lifelong learning and retraining, and addressing the needs of the mobile student and the mobile workforce. Canada's Campus Connection program has 75 active institutions and over 2,000 courses online. Universities and colleges benefit by reaching new markets for their on-line courses and learning materials. Government and private sector employees benefit by gaining access to new on-line learning opportunities. And Canada benefits by helping Canadian post-secondary education institutions reach new markets and develop new products that can compete with the on-line course offerings of universities, colleges, and private sector producers in other countries.
- Online career development initiatives are a logical expansion of SN for lifelong learning objectives of the federal government. Campus Connection helps address this issue.
- Another SN online career development initiative, Campus Worklink evolved into a significant partnership involving 550 universities, colleges and private institutions across Canada. In partnership with the federal government's Youth Employment Strategy, the Campus WorkLink project offers employment opportunities for youth interns on campus to help students obtain career information and create effective profiles.
- The SN Campus Worklink initiative also gave rise to a spin-off example of a partnership initiative that got privatized and is now quite successfully operating on its own. Workopolis is now Canada's biggest job site for students and recent graduates.
- Creating worklinks, for career development opportunities, is good for smaller universities and colleges – for example, it brings colleges and universities together for common course sharing, to respond to an increasingly mobile student body and workforce. Under these mobile conditions, students and workforce need to continue their education uninterrupted.
- Partnerships for delivering online career services have generally been successful in launching career development initiatives; however, it has been difficult to sustain these partnerships focused on the SN objective of online career development.
- Nonetheless, SN has played an appropriate facilitator role, to help achieve the common interests between colleges and universities. For example, in August 2000,

Industry Canada released a call for proposals, inviting Canadian colleges and universities to complement the Campus Connection portal with services relating to on-line student mobility. An alliance of 18 colleges and universities were selected as the winners of this competition. The alliance, called Campus Canada, has representation from the Canadian Virtual University, the Canadian Virtual College, and the Canadian Learning Bank.

- As a catalyst for making career development initiatives work, SN has been successful – e.g., the Canadian Virtual University project/initiative. The Canadian Virtual University is an online doorway to 11 Canadian universities offering over 250 programs available through the Internet or by distance education. When students enroll in one of these programs, they can select from over 2000 courses offered by any of the participating universities.

Supporting Industry (Learnware)

- There are strong indications that the SN program helped in facilitating partnerships in the learnware industry, but not to the full extent originally anticipated. The partnerships forged as a result of the Learnware program signify only a limited success in bringing together “content” partners with “marketing” and “technology” partners.
- The learnware industry is still fragmented. The issue of “consolidating” supply and demand in this industry and market is still prevalent. Creative solutions are required to address this issue—not necessarily to reduce fragmentation, but to understand how to manage it and work with it as a reality.
- There is a need to develop a national e-learning policy framework and forum for coordinating the diverse federal government programs, to improve effectiveness in government support and to avoid duplication.
- The need to improve marketing skills and distribution channels is still a priority, in that developers and suppliers of learnware products generally lack these attributes.
- While the Learnware program has contributed to improving skills and building capacity, the limited number of projects, and the slow sales cycle of these projects, suggests that the program results are not adequate to address the full scope of this issue at the national level.
- Only seven percent of program recipients said that their partnership arrangements led to better access to markets and to potential users of their learnware products (see Learnware program evaluation study).
- Learnware projects funded are falling short in terms of time to market and reasonable sales cycles anticipated. But, generally, program recipients still believe their participation in the program is producing learnware applications with promising commercial potential—several successful applications have been marketed.

3.4 Findings from Previous Studies

This section presents the findings from previous studies on the achievement of SN objectives through its many components and related activities.

SchoolNet1 Initiative [*Evaluation dated December 12, 2000—including Computers For Schools, GrassRoots, Youth Employment Initiative, LibraryNet, First Nations*]

- SN has been extremely successful in meeting its original objective of facilitating the electronic connection of Canada's public schools, First Nations' schools, and public libraries (LibraryNet).
- Moreover, it has done this in an environment where jurisdictional sensitivity is of paramount concern, and resource availability is scarce.
- SN has resulted in increased connectivity and use of ICT in Canadian schools and libraries—including more computers (through Computers for Schools), increased connectivity, and increased provision of educational resources (e.g., through GrassRoots). 100 percent of schools and libraries that wished to be connected are now connected. 15,300 schools, including 480 First Nations schools and 3,400 libraries have been connected and more than 450,000 refurbished computers have been provided to schools and libraries.
- For First Nations schools, this is particularly relevant because of the remote settings for many of these schools. First Nations SchoolNet has provided satellite connections to schools that almost certainly would not have them otherwise.
- Many educators consider GrassRoots as an effective program as it has offered funding to schools which helps cover the costs of creating and implementing classroom learning projects on the Internet.
- There are several indications that the library community feels that LibraryNet has been relatively neglected, with much less thinking about the needs of this community, and interaction with it, than is necessary.

Youth Employment Strategy Science & Technology Programs (YES S&T)

[*Evaluation dated March 13, 2003—including SchoolNet Youth Initiative, CFS Technical Work Experience, SkillNet Youth Initiative, and Information Highway/Science and Entrepreneurship Camps*]

- Responses provided for each main evaluation issue indicate that the program rationale was appropriate, delivery was generally effective, and results were significant and positive.
- Between 1999 and 2002, IHAB YES S&T programs assisted more than 3,000 youth to find employment and have directly provided ICT skills and knowledge to an estimated quarter million Canadians. These programs have substantially improved

Canadians knowledge base regarding ICT and thus have provided a valuable service in today's computer-based society.

- Both youth and employers were highly satisfied with IHAB YES S&T programs.

Network of Innovative Schools Program *[Evaluation dated March 31, 2003]*

- NIS has been very successful at disseminating ideas for implementing ICT in the classroom.
- NIS acknowledges those teachers/schools that are implementing ICT in the classroom, and by doing so schools are able to gain a higher profile, which enables them to tap other resources that can be brought back to school.
- NIS facilitates collaboration and sharing of best practices among schools/teachers.

Learnware and Public Access Applications Program *[Evaluation dated April 30, 2002]*

- Program reach fell short in terms of bringing on other sources of funding (e.g., from provincial government departments), and in attracting applicants from the volunteer and non-profit sectors, and libraries and K-12 school boards. The matching funds and minimum funding requirements may have hindered smaller organizations, and smaller-scoped projects, from applying.
- There is some indication that the program helped in facilitating partnerships, but not to the full extent originally anticipated. Only 7 percent of program recipients said that their partnerships arrangements led to better access to markets and to potential users of their learnware products.
- The Learnware projects funded are falling short in terms of time to market and reasonable sales cycles anticipated. But, generally, program recipients believe their participation in the program is producing learnware applications with promising commercial potential.

Canada's Digital Collections Program *[Evaluation dated February 19, 2003]*

- Those involved in the program are generally satisfied with CDC. This is displayed in the fact that most contractors and custodians (86 percent) rated the CDC program as "good" or "excellent", and nearly all youth participants (94 percent) said that the particular project they were involved with through CDC met or exceeded their expectations.
- Key informants mentioned that CDC is not only for training and providing youth with valuable work and business skills, but it also promotes Canadian heritage and creates quality historical content for the Internet.

NetCorps Canada International Program *[Evaluation dated April 30, 2003]*

- The NetCorp internship has helped 1,035 interns with their education and career development—by helping them to develop and apply their ICT skills.
- NetCorps also has had beneficial impacts on the host organizations. In particular, sustainable knowledge transfer has occurred through the train-the-trainer component of the internship, for example, related to basic computing training and the maintenance of websites or databases.
- With respect to the broader ICT industry in Canada, the program has had some modest impacts. The program may be helping to create the perception that Canada is a world leader in the application of ICT, though key informants felt that this type of impact will only be observable in the long term because NetCorps' contribution is limited to the "grass roots" level.

3.5 Key Findings

- The connectivity objective of the SN program has been achieved (15,300 schools, including 480 First Nations schools and 3,400 libraries have been connected and more than 450,000 refurbished computers have been provided to schools and libraries). However, technology upgrades and ICT capacity building continues to be an ongoing mission, requiring long term commitment by all those involved in the education system of Canada, with the support of government and other participants and partners.
- The SN program is credited by most of those interviewed for this study, and as evidenced in previous studies, as having resulted in a major shift in teachers' skills in the use of ICT to enhance educational opportunities. The recent Canadian Teachers' Federation national poll of teachers and ICT in classrooms and schools concludes, "eight out of 10 teachers say computers are essential or important in the way they teach (three out of 10 say essential)."
- The SN program has provided an effective and broad forum for the exchange of ideas and debate among educators, and for sharing knowledge and success stories in the use of ICT for educational purposes. This apparently has had a spin-off effect on late adopters of technology in the education community.
- The program has empowered teachers, empowered students, and provided significant value for money incentives to migrate to the use of ICT in the classrooms and other learning environments in Canada.
- The program has provided new learning opportunities through technology projects (e.g., through 29,400 GrassRoots classroom projects) that have been scoped broadly across regional, national and international levels. Through collaborations involving various school projects, the SN program has brought students and teachers together in a broad spectrum of innovative applications.

- Initial program recipients have had a cascading effect on others to take advantage of the program, creating a demand and a culture of change among some schools within Canada (e.g., 150 Network of Innovative schools).
- It is generally recognized by those interviewed for this study, and based on evidence from previous studies, that without SN there would be far less collaboration and development in the use of ICT in the Canadian educational system today. Further, it is considered to be highly likely that with any overall roll back or abridgement of SN initiatives there would be a reversal in Canadian learning environments in the use of ICT for education, largely due to limited resources in provincial education budgets and other competing priorities of the system.
- Partnerships enabled through SN initiatives have been a very successful program delivery approach. Key informants, and the evidence from previous studies, suggest that thousands of collaborative and partnership initiatives have resulted from SN activities, since the inception of the program.
- There is a consensus among educators interviewed that SN program managers and administrators at IHAB have done an excellent job in delivering a complex program, and in designing program instruments for education that address challenging technology issues of national concern. On the other hand, while the original SN program targets were effective for program administration and delivery purposes, there is now a general impression that SN has less clarity about its targets and purpose.

IV Options

This chapter addresses the evaluation question: *What are the relevant alternatives/options that would effectively address current connectivity and/or innovation challenges?* The results for this question from the consultation process and the review of previous studies are presented.

4.1 Findings from Interviews

Role of SNAB

- The success of SchoolNet over the years in part has been due to beneficial partnerships and collaborations established with the private sector—both in providing connectivity and building capacity for learning environments in Canada. There is a need to re-engage the private sector and renew these partnerships and collaborations. This extends to hardware and software producers of information technologies for education, as well as communications organizations across Canada.
- One way of doing this is to ensure that the private sector is well represented in SNAB, providing strategic and management advice to SchoolNet.
- Educators and government officials from various levels of government have also been essential partners and collaborators for SchoolNet over the years. Active representation by decision-makers from these groups needs to continue to play an important role in providing advice on strategy and future policy and programming needs of SchoolNet.

Repositories

- The activities of SchoolNet have resulted in a wealth of material—building blocks and tools for e-learning and integration of ICT in learning environments. There is a need to consolidate this material to make it more readily accessible to the education community.
- Developing a repository of Canadian ICT learning tools will require leadership and will require action soon, following a definitive critical path. SchoolNet is in a position to provide this leadership, but will need to get “ahead of the game”. Software for learning objects is expected to be available on a more common basis over the next couple of years, not just in Canada but worldwide. The risks are high that Canadian developers of educational software, learning objects and content, will lose their competitive edge to bigger international organizations, not only in the global market but also in Canada.

Learnware Industry

- The Learnware program of SchoolNet was able to build on partnerships with industry and with educators by sharing costs and distributing the risks of early stage learnware development, through issuing connectivity credits and providing 50/50 funding support. The marketing results of learnware products and services that evolved from the program have been less than expected. An option to address this issue is to have SchoolNet participate more actively in supporting the marketing side of this business, for example by helping to distribute learnware products and services.

Research

- Some educators have argued more recently that the jury is very much out on the issue of “whether computers help students learn”. For example, in a recent article in *MacLean's*, the author presents research findings for and against the use of computers. The author opines, “The jury is out about the benefits of computers, whereas the costs of maintaining and updating technology can be prohibitive.”¹⁵ On the other hand, a recent survey done for the Teachers Federation of Canada, on the role of ICT in classrooms and schools, concludes “most teachers have accepted computers and other information and communication technology in their classes and are integrating ICT in their lessons.... Eight out of 10 say computers are essential or important in the way they teach (three out of 10 say essential).”¹⁶
- SchoolNet should provide funding support for research on this issue, by establishing a research component in the program, and inviting education and industry researchers to contribute to addressing the current and emerging challenges in identifying and assessing the most effective means of integrating ICT for the benefit of learning in Canada. As a supporter of research in this area, SchoolNet should strive to make Canada a leader in measuring impacts of ICT on learning.

Community Clusters

- Exploring alternatives and options that complement broadband technology, particularly for rural and remote regions of Canada, is necessary to address some of the connectivity and access issues associated with the “digital divide” phenomenon.
- In this context, one of the alternatives to examine and consider is the potential of developing self-contained community clusters for management and organization in delivering access, broadband or otherwise. The technical and organizational issues associated with this option (community clusters) need to be addressed and researched. SchoolNet could provide a supportive role in identifying the practicalities of such

¹⁵ “The ABCs of Classroom Fun,” by Sue Ferguson, *MacLean's*, September 22, 2003, page 21.

¹⁶ *National Poll on Teachers and Information and Communication Technology in Classrooms and Schools*, conducted for the Canadian Teachers' Federation by Vector Research, Toronto, April 2003, page 2.

community clusters—e.g., in association with the Community Access Program (CAP).

Traveling Labs

- Another option to consider, for providing access to rural and remote regions, is to support the development of “traveling labs”—to transport the ICT hardware and software for local use in learning settings. These traveling labs have been tried in some situations (e.g., First Nations schools) and are considered effective in providing access for students and teachers on a project-basis and as a transition towards more permanent access to ICT infrastructure.

Targeting Students

- Students are ultimately the focus of the SchoolNet program components, and should be explicitly targeted for project funding and innovative applications of ICT for learning—e.g., as in CDC.
- Many students, especially at the high school and post-secondary levels, are often more adept and more experienced with ICT than their teachers. For this reason, SchoolNet should identify ways in which it can continue to encourage students to integrate ICT into their education by directly targeting them for funding from the SN program.

Cost-effectiveness and Long-term Commitment to Integration of ICT for Learning

- Continued federal government support for the proliferation of ICT for learning through supply program delivery mechanisms (such as Computers for Schools) and capacity-building programs (such as GrassRoots and NIS), may not be sustainable in the long-term. This is particularly the case in times of resource constraints and alternate government priorities, and when dispersion of federal-provincial government tax dollars is involved. Identifying the most cost-effective program alternatives for fostering innovation in learning, through mechanisms that respond to the requirements of provincial/territorial and First Nations education systems, is needed.
- A study of the most cost and outcome effective practices suitable for different provincial and territorial education systems will contribute to determining appropriate delivery mechanisms that meet present and future challenges. In addition, cost-effectiveness comparisons of Canada’s SchoolNet program to other national SchoolNet programs in other countries would provide valuable insights. Industry Canada should initiate a comparison study to identify the most cost and outcome effective practices for continuing to integrate information and communications technology in learning environments.

4.2 Findings from Previous Studies

SchoolNet1 Initiative *[Evaluation dated December 12, 2000—including Computers for Schools, GrassRoots, Youth Employment Initiative, LibraryNet, First Nations]*

- As a program option, SN has demonstrated that collaboration and leveraging is a successful program delivery approach. Through collaboration and leveraging arrangements SN has been “outstandingly successful”. It is not unreasonable to suggest that the wide range of SN partnerships represents one of the key successes of the program, and that SN would not exist without them.
- Developing useful online resources is an effective strategy that encourages teachers and librarians to access the Internet and meet industry Canada objectives, while limiting the costs to the program of ensuring that all schools and libraries across Canada are connected.
- Limited data suggest that LibraryNet has had programmatic and resource difficulties. Findings ways to address the needs of libraries, librarians, and library users continues to be a challenge.

Youth Employment Strategy Science & Technology Programs (YES S&T) *[Evaluation dated March 13, 2003—including SchoolNet Youth Initiative, CFS Technical Work Experience, SkillNet Youth Initiative, and Information Highway/Science and Entrepreneurship Camps]*

- Program alternatives and options suggested in the evaluation include suggestions: to improve program awareness among youth; to increase the duration of internships and provide more flexible internship arrangements; to provide better defined learning opportunities by identifying the level of ICT knowledge needed by youth interns; and to facilitate more flexible pay scales so that interns get paid a salary that better reflects their skills (this could be achieved by allowing for employer “top-ups” or introducing a mentoring program with a tiered pay-scale).

Network of Innovative Schools Program *[Evaluation dated March 31, 2003]*

- The NIS Institute is unique in that it provides a forum where teachers across the country can come together. This approach is clearly a successful programming option with recognized results in creating indirect and spin-off effects by allowing teachers and schools to share their successful experiences and lessons learned.
- The use of regional coordinators is considered to be a key asset of the program. As a programming option, the NIS has been successful in delivering the program by connecting schools and in facilitating communication and collaboration through these regional coordinators.

- The three-year time limit for participating schools is considered an appropriate program delivery option. Also pioneer schools are able to remain part of the network, thus benefiting from continued collaborations and sharing of lessons learned.

Learnware and Public Access Applications Program *[Evaluation dated April 30, 2002]*

- Useful program models to emulate include the TVOntario Lifelong Learning Challenge Fund; the New Media Fund of Telefilm Canada; and the programs of the Office of Learning Technologies (HRDC). These programs have somewhat different design and delivery aspects than those of the Learnware program—namely, they have: narrower scopes and objectives; tighter eligibility criteria for projects and applicants; a range of projects, between them, from small, medium to large funding; simpler concepts for eligible matching funds; more streamlined contract negotiation and contract closure procedures and requirements; and communications and events for building synergy between program recipients.

Canada's Digital Collections Program *[Evaluation dated February 19, 2003]*

- Considerations should be given to two options for broadening the CDC program: migrating it to departments/agencies that are more directly involved with culture; expanding the involvement of departments, agencies, and even private organizations to increase the range of collections.

NetCorps Canada International Program *[Evaluation dated April 30, 2003]*

- Options suggested by the evaluation for NetCorps include expanding computer software options (i.e., expanding the types of computer software available to interns); allowing more flexibility in the duration of internships (i.e., varying the duration of internships depending on the project objectives as well as the travel and related expenses associated with internships in some host countries); and increasing the NCI budget to reflect increases in travel and related expenses.

4.3 Key Findings

- *Continuing to support the early adopters and innovators in future program design and delivery*—An underlying principle of the SN program has been to support early technology adopters and innovators in the educational arena. This principle is seen as having continuing relevance to current and future challenges in program delivery.
- *Teaching the teachers*—Program design mechanisms that target teachers to help them apply ICT are deemed necessary (e.g., teacher mentoring programs, networking, and best practices tools and repositories). Teaching the teachers, however, is primarily a provincial responsibility, and Industry Canada can only contribute to this effort indirectly as a partner to the provinces and local schools and school boards.

- *Supporting the development of learning objects and standards*—There is a need to continue to support the building of learning objects by establishing a repository for these objects. The program could also pursue a nationally coordinated initiative towards the adoption of voluntary standards in the application of ICT to education—including standards for learning objects, quality, and interoperability specifications for e-learning.
- *Narrowing the digital divide by improving access*—Equity of access to ICT in learning environments is a social as well as an economic goal. The SN program has addressed this goal over the years (e.g., First Nations program), but increased efforts and collaborations with key responsibility centres in other federal, provincial or municipal governments are needed to adequately address increasing “digital divide” challenges – particularly for rural and remote regions.
- *Research to gauge private sector needs and interests, and to measure ICT impacts on learning*—Program options and delivery mechanisms need to be devised that are based on a sound understanding of business models that are likely to engage private sector participants in future program initiatives. New research and market analysis is needed with a focus on developing appropriate mechanisms to accomplish this goal. The SN program could also contribute to research towards the ongoing challenge of measuring the real impacts of ICT on learning.
- *Implementing community-based program options*—Other Industry Canada programs have focused on community-based initiatives (e.g., the CAP program). In this respect, SN has an opportunity to devise program mechanisms that encourage innovative community-based technology applications for local learning institutions.

V Themes, Challenges and the Role of IC

This chapter addresses the evaluation questions: *What are the emerging connectivity and/or innovation themes/challenges for SchoolNet? What is the appropriate role of Industry Canada and what are the appropriate delivery mechanisms for SchoolNet objectives?* The results for these questions from the consultation process and the review of previous studies are presented.

5.1 Emerging Themes and Challenges

Partnerships

- From its inception the SN program has relied extensively on partnerships and collaborations with provincial and territorial governments, school boards and schools, post-secondary institutions, educational associations, volunteers, and the private sector. An earlier evaluation of the program (December 2000) concluded that the program has been “outstandingly successful” in partnerships and that “the wide range of SN partnerships represents one of the key successes of the program”. On the other hand, successes of the program have varied across provinces, with some provinces opting out of some SN partnership initiatives and program components due to different socio-political dynamics and prevalent education systems and jurisdictional issues outside the federal government’s control.
- The current situation suggests that there are continuing and new partnership and collaborative opportunities emerging for the SN program in the following areas:
 - ✓ Developing standards and accreditation requirements in educational applications of ICT.
 - ✓ Mutual recognition of credits across educational institutions.
 - ✓ Community-based initiatives, broadening the scope of educational opportunities for K-12, adult education, skills learning, and on the job training.
 - ✓ Developing and supporting campus consortia that foster the development of online applications for post-secondary education and lifelong learning programs.
 - ✓ International collaborations focused on sharing educational content and networking opportunities.

Engaging the Private Sector

- There is also a need to re-engage the private sector, including big players and SMEs, as originally done by the program in its earlier manifestations. With experience, SN rapidly learned that partnerships with the private sector were desirable in themselves, since they helped build participation and sustainability—particularly for program

components such as Computers for Schools (CFS), Learnware and SchoolNet Youth Employment Strategy funded programs.

Community-based Initiatives

- There is general recognition that there are benefits to evolving community-based initiatives, but that these initiatives also need better broad-based educational tools, and building blocks to support local initiatives. This includes the development and application of educational portals, training modules, and learning objects.

SN National Advisory Board

- The contributions of the SN National Advisory Board have been instrumental to the success over the years of the SN program—particularly in providing policy and strategic input to help shape the direction and focus of the various SN components. There is a need, however, to re-confirm the role and effectiveness of the Board, in light of emerging partnership challenges, provincial priorities, and the social and economic rationale underlying the SN program.

Innovation and the Contribution of ICT

- The *Innovation Agenda* of Industry Canada is a central theme that continues to guide program initiatives across the department. For the SN program, “innovation” has focused on new applications of ICT to promote educational opportunities in the classroom and other learning environments (virtual or otherwise). Key informants suggest that in going forward with the SN program, there is a need to clarify what “innovation” means in the context of SN, particularly in light of continuing and emerging *technology* themes and challenges.
- These emerging *technology* themes and challenges involve the following:
 - ✓ Broadband application.
 - ✓ Learning objects and interoperability specifications and standards for e-learning.
 - ✓ Building repositories of knowledge and contemporary tools for ICT applications.
 - ✓ Rich multimedia.
 - ✓ Floating (e.g., wireless, laptops) versus fixed infrastructures (e.g., desktops).
 - ✓ SN program support for R&D (e.g., for learnware applications)
 - ✓ Recycling (involving environmental issues) and re-using computers (involving supplying computers for schools and libraries).

Retaining the SchoolNet Brand Name

- The SN program over the years has built up and maintained a high profile, with visibility among educators in this country, and abroad. As some key informants have

suggested this “brand name” is an asset that needs to be capitalized on in future configurations of the SN program.

- However, there is also concern expressed that the program has become too “fragmented” in that it has diversified into many sub-themes, to the extent that there is now a need for a new “man on the moon” vision for the program—to consolidate its purpose and strategic directions over the next few years.

Measurement and Evaluation of Impacts

- The program has achieved significant clarity with the issuance of its *Results-based Management and Accountability Framework* (RMAF) (most recently updated in February 2003), and its *Risk-based Audit Framework* (RBAF) (most recently updated in June 2003). These documents are comprehensive and represent a significant achievement in establishing the appropriate structures for program performance and financial accountability. The challenge remains, however, to establish an effective and ongoing information gathering mechanism that feeds into the reporting scheme of program management.
- In this respect, several program evaluations have been successfully concluded over recent years. These evaluations have identified the achievements and key issues involving the SN program components. The responses of IHAB to the issues raised by these evaluations have been appropriate and comprehensive, providing additional rationale and mitigation strategies to address risks or misconceptions about program intents and delivery mechanisms. However, there is still a need to further the state of the art in measuring impacts of ICT in learning situations. The jury is still out on the extent and character of ICT impacts, the specific indicators that best gauge these impacts, and the ultimate effects of an ICT enabled education system on the Canadian economy and the social wellbeing of Canadians.

Findings from Previous Studies on Themes and Challenges

- *SchoolNet1 Initiative (including Computers for Schools, GrassRoots, Youth Employment Initiative, LibraryNet, First Nations)*—Barriers to the increased use of ICT in schools include the professional development of teachers. To address this issue SN participated in the SN Youth Employment Initiative funded by HRDC, the development of a paper-based SN Offline tool, and Alberta’s School Integration Resource. While SN has undertaken these steps, and others, many teachers, principals, and librarians still acknowledge their lack of professional development in application of ICT for learning. The SN program has played a facilitator and catalyst role in addressing this issue, but this remains as one of the challenges. It is unclear whether the responsibility for ensuring that teachers/principals/librarians are properly instructed falls upon the shoulders of the SN program, or whether it should remain mainly a provincial responsibility.
- *Youth Employment Strategy Science & Technology Programs (YES S&T) (including SchoolNet Youth Initiative, CFS Technical Work Experience, SkillNet Youth*

Initiative, and Information Highway/Science and Entrepreneurship Camps)—Employers generally noted YES funding issues (need for faster approvals and dollar transfers) and the short length of the intern work term as being barriers for achieving the program's connectivity and innovation goals, while youth participants reported a need for better program advertising and expressed concern about the short duration of the work-term, and the need (in some cases) for enhanced work opportunities to emanate from program activities.

- *Network of Innovative Schools Program*—The purpose of this program is to identify and support the most innovative schools. A small fraction of innovative schools have been recognized by the NIS program and consequently, received funding that may further facilitate innovation. However, the NIS program is limited in that it cannot provide funding to more schools, given its small budget. The impacts of innovation within the school-learning environment are not always easily detected, and the impacts from innovation are difficult to measure. The challenge for the NIS is to continue to identify and support the most innovative schools with the broadest impacts.
- *Learnware and Public Access Applications Program*—The challenge is to discover the best practices and the appropriate business models that work, to build a program around sustainable partnerships and consortia that address the issues of learnware industry growth and consolidation of supply and demand. Competition from U.S. and European learnware firms is a big challenge—even more than before, when the Learnware Program was introduced. There is a need to develop a Canadian national e-learning policy framework and forum for coordinating the diverse federal government programs, to improve effectiveness in government support and to avoid duplication.
- *Canada's Digital Collections Program*—A key challenge that the CDC program faces is to show that the results of the program indeed demonstrate that productivity enhancement benefits of digitization are achieved. This is one of the stated objectives of the program. The underlying rationale is that by providing wider access to Canadian material of public interest via the information highway will produce productivity enhancement benefits.
- *NetCorps Canada International Program*—There is a need to clarify the meaning of some of this programs objectives (e.g., promoting a connected Canada to the world) and also to ensure that adjustments made from time to time by Industry Canada to the program are feasible to accomplish. Although the communication and collaboration among the various stakeholders appear to be satisfactory, NetCorps needs to be better promoted in Canada to broaden its reach and impact.

5.2 Role of Industry Canada

Legislative Authority

- In Canada, education is the responsibility of provincial governments. Within this context, however, Canadian education is changing in that more and more electronic educational products are available, and the availability of such products is changing the way students are taught and the way they learn.
- To deliver these innovative products nationwide, Canada through the SchoolNet program uses established broadcast and telecommunications networks for education, particularly online and Internet media. Provinces and territories in partnership with the federal government have developed an infrastructure to support the delivery of education and training to all their citizens.
- Broadcasting and telecommunications, however, are a federal responsibility. Industry Canada is responsible for Canada's communications policy and spectrum management, as mandated under the *Telecommunications Act* (1993). This Act provides the legislative framework for all federally regulated common carriers. In so doing, it provides for an integrated Canadian market for communications services. In addition, it allows the federal regulator, the CRTC, to put in place a more flexible regulatory framework that facilitates innovation and the development of Canada's principal high-technology industry.
- As a result, there is an intrinsic federal involvement in matters relating to communications technology, including access issues such as those that have played a key role in SchoolNet's push for connectivity.

Federal Interest in SchoolNet

- The federal government in partnership with other levels of government, private industry, labor and associations, since the mid-1990s has carried out a number of initiatives that take advantage of the enabling potential of the Information Highway to foster Canada's economic, social and cultural development objectives. The goal was to make information and knowledge infrastructures accessible to all Canadians. This knowledge infrastructure was intended to provide individuals, schools, libraries, small and large businesses, rural and Aboriginal communities, public institutions, and all levels of government opportunities for learning, interacting and developing their social and economic potential.
- The federal interest in SchoolNet has been strongly tied to the government's *Connecting Canadians Strategy*, which had a goal to make Canada the most connected country in the world. This strategy essentially seeks to foster knowledge and information skills for all Canadians. Industry Canada continues to believe that federal involvement is generally important for economic development and Canadian culture.

- Issues that continue to be addressed by SN and IHAB are those such as: How best to implement information and communications technology? How best to disseminate knowledge and research results? What are the best practices? The federal government can also introduce or encourage the development of tools from a policy perspective, for example, bringing issues of learning into the government agenda or dealing with the need for a knowledge-based population and workforce in the education system through development of knowledge-based education.

Situating SchoolNet in Industry Canada (Building an Innovative Economy)

- The original rationale of the SchoolNet program was based on government policy launched in 1994: *Building a More Innovative Economy*.¹⁷ Two key policy areas provided the main rationale for this program and situated it within Industry Canada's mandate:
 - ✓ *Building efficient infrastructure for tomorrow*: The goal was to ensure that Canada has "transportation, telecommunication, and information networks that will allow [it] to function effectively in the innovative economy, where moving information, goods and people efficiently and in innovative ways is the key to success."
 - ✓ *Harnessing technology to support innovation*: The goal was "to use the government's resources more creatively to help [Canadians] gain access to the leading-edge technologies that are today's determinants of success and develop them."
- The evidence from the literature reviewed (see references in Appendix A), and the consultations in this and previous evaluation studies, suggest that these goals are still relevant today, and that there is a consensus among key informants that situating the SchoolNet initiative within Industry Canada is consistent with these policy goals.

International Dimensions

- SchoolNet activities and collaborations have not been solely within Canada—the SN model has been also actively marketed and applied internationally through the Office of International Partnerships. Canadian firms (e.g., telecom, wireless, cable, software, ICT design consultants) have benefited from international agreements made under the auspices of SN, and have frequently participated in the negotiations of these agreements. Such negotiations and agreements are a legitimate aspect of federal involvement.

Federal and Provincial Input into SchoolNet

- Information technologies are generally considered by many government officials (federal and provincial) to be among the major drivers for the skills required for the

¹⁷ *Op. cit.*

knowledge-based economy. Using information technologies to generate these skills has been of great interest across the education system of Canada, including schools and school boards.

- However, provinces have the mandated authority for the education system (with the exception of First Nations education, which is a federal responsibility), and thus Industry Canada's involvement is by no means a given.
- At an early stage of the SN program, in 1993, Industry Canada established the SN National Advisory Board (SNAB). This board provided support for the SN vision promoted at that time by Industry Canada's Information Highway Applications Branch. Roughly 80 people were brought together in a series of meetings to shape the vision for using the Internet in K-12 schools. This led to small pilot projects at a few schools across Canada, which shared experiences through advisory boards across the provinces. SNAB recommended focusing on addressing the barriers to connecting Canadian schools (e.g., lack of computers, teacher competency, Canadian and francophone content, etc.). In these early times, it was an experiment with a high degree of technical content. For example, it was not known whether it was physically and technically possible to create a network of schools.
- Industry Canada's role then became a catalyst for provincial interest and involvement, with federal involvement required because of its formal mandate in dealing with the telecommunications infrastructure. Many key infrastructure issues are decided at the federal level, and prior to SchoolNet provinces had little input into these decisions.
- As SchoolNet evolved, the concept of infrastructure has broadened. In the early days, there were some tensions between federal and provincial/territorial partners, mainly related to jurisdictional issues.
- At one point, after much of the infrastructure was in place, some provinces questioned the need for ongoing federal involvement. However, as SchoolNet expanded, and especially as more and more content was introduced, this concern faded. This trend accelerated over time as more senior officials became involved, especially during planning for new SchoolNet initiatives.
- Industry Canada now focuses on creating collaborations, rather than trying to lead or manage within provincial jurisdictions. The result has been the achievement of effective federal-provincial partnerships. The long-term sustainability of the SchoolNet initiative has been achieved, at least in part, through leveraging and partnerships.

SN Program Components

- There is a clear sense that federal involvement in the form of a national connectivity strategy by Industry Canada was both necessary and legitimate in the eyes of affected parties in the educational system.

- SN has demonstrated leadership in achieving its objectives by developing an interesting and important mix of programs (GrassRoots, Computers for Schools, Network of Innovative Schools, Campus Connections, SkillNet, LibraryNet, First Nations, etc.), and partnerships between federal, provincial, organizational and private sector actors that, given the constantly changing nature of knowledge and technology in the modern context, will require continual renewal into the future.
- Achievement of SN goals would not have been sustainable without federal involvement from Industry Canada. The federal role has been crucial, especially in the areas of acting as a focal point to develop a collaborative national vision, and in addressing some technical issues within the information and communication technology (ICT) that are within the federal mandate.
- The role of IC in the Youth Employment Strategy, S&T program, is considered relevant in that through this program the department helps Canadian youth generally to get the ICT work experience, knowledge, skills and information they need to prepare for, and participate in the knowledge-based economy. This program also helps employers in providing and preparing a cadre of technically competent workforce, capable of contributing to the competitiveness of Canadian enterprises.
- The YES (S&T) program assists youth with specific information technology training and work experience, while at the same time helping small and medium-sized organizations make the most of information technology.
- It has been difficult for the NIS program to gain provincial support, as the Ministries of Education cannot be viewed as favouring one school over another in its jurisdiction. However, the role of Industry Canada in fostering innovation is seen as a legitimate role, and some have suggested that the NIS program should achieve what the Prime Minister Award has achieved for teachers, in that schools should be aggressively striving to gain acceptance into the NIS program, similar to teachers who currently strive to receive the Prime Minister Award.
- The Learnware program is commendable in that it introduced a mechanism of sharing risk between government and recipient organizations, but this program is not as clear about how risk-sharing between recipient partners is to take place. This is an important factor for Industry Canada to consider in the program design and criteria, if the benefits of developing sustained partnerships for learnware development in Canada are to be realized.
- The Learnware program delivery model through CANARIE Inc. is considered successful, providing value for money in the form of leverage and matching funds, and provision for return on investment from program activities.
- While the role of Industry Canada in supporting and delivering Canada's Digital Collections program is recognized as relevant to the Connectivity Agenda, it is also suggested by key informants that the relevance of digitizing Canada's collection is more appropriately placed in other federal/provincial departments/agencies more directly responsible for Canadian culture and history. The option of forming broad

partnerships among these departments/agencies to oversee and deliver the program with the participation of Industry Canada is a consideration.

- The NetCorps Canada International program complements and does not duplicate other federal and provincial/territorial initiatives. While there are other federal programs that offer youth opportunities in international development, NetCorps is unique because of its focus on ICT. In this sense, the program being situated in IC is valid, and falls within the mandate of the department.

Key Findings on Role of Industry Canada

- The SN program has stayed well within the connectivity/innovation mandate of Industry Canada, with a clear focus on technology applications and the role of ICT in progressing Canadians towards an economy with rapidly changing skills and knowledge requirements.
- Focusing efforts on connectivity is a continuing and relevant goal for Industry Canada and for SN. However, interviewees in this study generally agree that there is a more complex set of issues that need to be addressed by IHAB and Industry Canada, including the strategic use of e-learning technology, in a very broad sense, for preparing the current and future Canadian workforce for the evolving knowledge-based economy. This broadened scope includes a complete and holistic view, of learning as a lifelong endeavour—from K-12, to post-secondary, to on-the-job training, and adult learning.
- The evidence from past evaluation studies, and from the majority of interviewees consulted for this study, agree that IC is in a good leadership position to articulate a clear vision of where Canada needs to be in five years with regards to the application of ICT to education, and to clarify the actionable goals and program designs to get there.
- The infrastructure and network of partnerships that SN has built over the years validates this view, and corroborates the likelihood of a successful re-deployment of the program during, and beyond, 2004.
- The consensus view is that without IC's leadership through SN, in evolving the use of ICT for education and learning in Canada, progress on this front will be slowed. The consequences would be a fracturing of initiatives, and disparities in progress across Canada and between provinces and territories.

VI Lessons Learned and Recommendations

This chapter addresses the evaluation question: *What are the relevant lessons learned from SchoolNet, and what recommendations can be made for future policy and programming needs?* The results for this question from the consultation process and the review of previous studies are presented.

6.1 Lessons and Recommendations from Past Evaluations

SchoolNet1 Initiative *[Evaluation dated December 12, 2000—including Computers for Schools, GrassRoots, Youth Employment Initiative, LibraryNet, First Nations]*

- Maintain the SchoolNet, Computers for Schools, and LibraryNet programs.
- Provide ongoing ICT infrastructure investment. This involves providing increased bandwidth, supplying and maintaining higher numbers of higher-quality computers and their associated hardware/software. This investment must be a joint effort of all SN partners as this is a cross-jurisdictional issue.
- Continue to address other ICT barriers.
- Address First Nations SchoolNet problems.
- Nurture important existing partnerships and collaborations.
- Continue to design educational and administrative resources for “real world” relevance. Online SN resources have had mixed success—GrassRoots is highly used and highly useful, but most other applications enjoy more limited use and usefulness.
- Analyze future programming in terms of incremental impact.
- Put more resources into LibraryNet if there are still important library needs that are unresolved, and if SN can play a role.

Youth Employment Strategy Science & Technology Programs (YES S&T) *[Evaluation dated March 13, 200—including SchoolNet Youth Initiative, CFS Technical Work Experience, SkillNet Youth Initiative, and Information Highway/Science and Entrepreneurship Camps]*

- Generally, the evaluation indicated that the IHAB YES S&T programs were a success and recommended that Industry Canada should continue and, if possible, expand these programs. “ICT-related programs in general need to continue and/or grow to meet their increasing need”.
- Several related recommendations include: streamlining the proposal and funding process to support organizations in appropriate time to hire youth and provide early response indicating if funding will be provided; building a more up-to-date database

of employer and youth intern contacts and demographic information; conduct a more detailed assessment of IHAB YES S&T program effects on youth participants and employers in order to generate future information highway impacts of investments; and assess the needs of targeted Canadian organizations to determine the need for possible program expansion.

Network of Innovative Schools Program *[Evaluation dated March 31, 2003]*

- Mentorship activities are required of participating schools. However, many of the past participants were unclear as to what this entailed. Of the schools that undertook mentorship activities, most were directed to fellow teachers within the school or with teachers from schools in the NIS program, rather than mentoring with other non-NIS schools. Ensuring that mentorship activities are being undertaken will assist in increasing program awareness among Canadian schools.
- NIS school success stories need to be more actively communicated. The schools are submitting their annual reports, and NIS should identify best practices and communicate them to its members.
- As the NIS program grows, and pioneer schools remain part of the Institute, more regional coordinators will be needed.

Learnware and Public Access Applications Program *[Evaluation dated April 30, 2002]*

- The Learnware program was inherently on the right track with respect to its objective of improving access to the Internet and the *Connecting Canadians Strategy*. The opportunities were seen by the telecommunications and cable companies to be in this component of the program. However, connectivity and access are being achieved more effectively through other program initiatives—the Learnware program may not have been an effective way to address these strategic directions in the first place.
- There is a need to develop a multi-level coordinated initiative between IC, HRDC, CH, HC and other federal departments, to address e-learning from within a coherent national policy framework—particularly as it impacts on the corporate, non-profit, and academic communities, and the general public.
- IC should undertake an industry needs and benchmarking study, in collaboration with e-learning associations, to map out the current demographics of the learnware industry in Canada—and to identify how the e-learning business infrastructure best works, in terms of streamlined supply chain relationships, partnerships, and strategic alliances.

Canada's Digital Collections Program *[Evaluation dated February 19, 2003]*

- The department/agency ultimately responsible for CDC should increase its efforts to publicize CDC, thus raising the market profile of the custodians and their collections and generating greater public interest in the collections as an educational/informational resource.

- Industry Canada needs to develop a strategy for ongoing maintenance and upgrade of the collections, to prevent the obsolescence of web sites developed, and to protect the original investment in the digital collections, and particularly those involving high quality web sites. A portal for all collections should be maintained, ensuring that existing collections are not lost, and not precluding links to other sites to increase access to collections.

NetCorps Canada International Program *[Evaluation dated April 30, 2003]*

- NetCorps for the most part is being successfully implemented as intended, and it has had some beneficial impacts during its four years from 1999 to 2003. At the same time, NetCorps could benefit from some suggested improvements as follows.
- The objectives of the program need to be more clearly defined. This includes the NetCorps objective of promoting a connected Canada to the world, and the objectives related to international development.
- The program could encourage the participation of more interns from all regions and client groups across Canada—particularly Northern Canada, Atlantic Canada and the Prairies, as well as from Aboriginal persons and (if feasible) persons with disabilities.
- The pre-departure orientation could benefit from some minor refinements in terms of procedures and content—e.g., clarifying roles and responsibilities, advance notification of internship details for planning purposes, provision of more detailed information on host organizations and countries, compiling and sharing information on experiences of former interns.
- NetCorps could also provide more post-internship debriefing and assistance to interns.
- Industry Canada should increase the promotion of NetCorps in Canada, to help to improve Canadian employers' awareness of the value of NetCorps' interns (possibly helping interns to find employment), as well as encourage participation of interns from all client groups and parts of Canada.

6.2 Management Response to Previous Recommendations

Along with a review of the findings from past evaluations, the current evaluation of SchoolNet also examined the responses provided by the management of Information Highway Applications Branch and Industry Canada to the issues raised and the recommendations presented by the past evaluation studies.

The current evaluation has concluded, based on consultations done, and the review of follow-up strategic and policy documents, and other studies, that the IHAB responses to the issues raised and recommendations presented have been appropriate and comprehensive, providing additional rationale and mitigating strategies to address risks or misconceptions about program intents and delivery mechanisms.

In addition, the SchoolNet program has achieved significant clarity with the issuance of its *Results-based Management and Accountability Framework* (RMAF) (most recently updated in February 2003), and its *Risk-based Audit Framework* (RBAF) (most recently updated in June 2003). These documents are comprehensive and represent a significant achievement in establishing appropriate structures for program performance and financial accountability. The challenge remains, however, to establish an effective and ongoing information gathering mechanism that feeds into the reporting scheme of program management.

6.3 Lessons Learned and Current Recommendations

The lessons learned and recommendations presented in this section of the report represent a synthesis of the results from consultations and analysis of this and six previous evaluation studies of SchoolNet program components. The recommendations presented cover a broad policy and program spectrum, based on feedback and evidence from multiple sources. This evaluation report is intended to provide one source, amongst others, that informs future policy and program priorities, in response to lessons learned and recommendations emanating from the evaluation work undertaken. It is the prerogative and responsibility of Industry Canada and the Information Highway Applications Branch to provide an appropriate management response to the findings and recommendations, and to establish priorities, for future connecting Canadians program initiatives.

Flexibility of the program—The SN program is generally deemed to be a flexible program delivery mechanism in that it has relied on building extensive participation of partners, and in that it has been successful in responding to various opportunities in different jurisdictions, within the bounds of IC's mandate as a catalyst and facilitator of innovative technology applications, and within the context of the departmental agenda for progressing Canadians towards an economy with rapidly changing skills and knowledge requirements. The Canadian education system varies from province to province, and the flexibility of the SN program in responding to these differences has served its purpose well by allowing it to adapt to changing needs and situations between and within provincial/territorial jurisdictions. ***Recommendation:** For future programming design needs, it is recommended that SN retain a flexible delivery approach that responds to the different requirements of the varying provincial/territorial and First Nations education systems across Canada.*

Mission—SN was served well by an original, consensus-building long-term connectivity goal for implementing ICT in schools. There is currently a need to articulate a similar, consensus-building steady and long-term mission for SN. In other words, there is a need to clarify the role of SN as it relates to where Canadian education should be five years from now with respect to the use of ICT. ***Recommendation:** The SchoolNet National Advisory Board could be recruited for this purpose—with a special working group from within SNAB commissioned to address specific challenges and workable solutions. The "Foresight" document prepared by SNAB in this respect is an appropriate foundation to build on. Active representation on this working group from educational institutions,*

private sector stakeholders, and federal and provincial/territorial government departments is required.

Program components—The GrassRoots and Network of Innovative Schools (NIS) program components have proven to be successful program models for delivering ICT to the classroom—specifically referring to the project-based program support design and concept (GrassRoots) and the professional teacher development aspects (NIS) underlying these components. *Recommendation: Future program designs of SN should continue to incorporate project-based delivery and professional teacher development schemes as a means to effectively engage partners and to implement innovative ICT solutions for education.*

Partnerships and voluntary participation—The partnerships and voluntary nature of the many SN initiatives has had very strong appeal to educators over the past decade. SN was not a compulsory program for any participant, and was not built into a curriculum-based framework. This character of the program enabled active partnerships and participation of provincial, municipal and other federal government departments, as well as volunteer groups, school boards, and private sector organizations. The recent RBAF for SchoolNet (June 2003) stipulates that the number one risk associated with the program is “the loss of partners and availability of volunteers” for which various and ongoing mitigating strategies have been developed and implemented. *Recommendation—SN should continue to implement its stated goals through program initiatives that are based on voluntary participation of partners, providing value-for-money financial and in-kind incentives that contribute to the adoption and use of ICT by educational institutions and learning environments.*

Program alternatives/options—Continued federal government support for the proliferation of ICT for learning through supply program delivery mechanisms (such as Computers for Schools) and capacity-building programs (such as GrassRoots and NIS), may not be sustainable in the long-term. This is particularly the case in times of resource constraints and alternate government priorities, and when dispersion of federal-provincial government tax dollars is involved. Therefore, identifying options for sharing most cost and outcome effective practices that respond to particular requirements of provincial/territorial and First Nations education systems is needed, and is a responsible initiative to undertake. *Recommendation: A study of the most cost and outcome effective practices for different provincial and territorial education systems will contribute to determining if there are appropriate alternative delivery mechanisms that meet present and future challenges. In addition, cost-effectiveness comparisons of Canada's SchoolNet program to other national SchoolNet programs in other countries would provide valuable insights. Industry Canada should initiate a comparison study to identify the most cost and outcome effective practices for continuing to integrate information and communications technology in learning environments.*

Innovation—Fostering innovative applications in education has been a main goal of the SN program. However, what is considered to be innovative has evolved with the advent of new and more robust technologies, including wireless and rich media. There is a need to redefine what is considered innovative and what is now state-of-the-art (e.g., the design and proliferation of web pages in itself is hardly an innovative *raison d'être* for SN any more). *Recommendation: Any new SN policy and program design, that focuses*

on early adopters and innovators, needs to "raise the bar" on what constitutes innovation. Naturally, the relevance and impact of innovative initiatives also need to be considered.

Entry levels—The ICT competency levels of educators and students varies across Canada, within provinces, schools, and even classrooms. ***Recommendation:** Future SN program designs need to consider different entry levels for participants in the program—e.g., based on different skill levels, age groups, geographical distributions, cultural differences, and provincial/territorial school systems and characteristics.*

Networking opportunities—Educators see opportunities for networking, created by SN program activities and events, as a major benefit of the program. Without the networking opportunities created by SN many successes in ICT applications would not have otherwise occurred. ***Recommendation:** SN should plan and budget for frequent networking events (both virtual and face-to-face) to bring together participants and partners in the program, particularly educators, to learn from each other and share results of their initiatives.*

Regionalization and devolution—The regionalization and the devolution of SN program initiatives to local responsibility centres are considered by program participants as a positive characteristic of the program. This, for example, is considered a very strong point of the First Nations program. ***Recommendation:** Industry Canada and the SN program should continue to rely on a decentralized delivery mechanism for its program components, while retaining overall budget control and oversight responsibilities, as well as policy and program design and delivery decisions.*

Collaboration with schools and school boards—The SN program overall has received high marks from schoolteachers and principals, and school board representatives across Canada. ***Recommendation:** Collaboration with schools and school boards is essential, if the program is to continue to succeed.*

Role of Industry Canada and the private sector—The role of Industry Canada as a promoter of ICT for education is valid and should continue, but a current gap is the absence of drive to foster partnerships with the private sector. ***Recommendation:** Research should be supported to understand the appropriate business model and incentives to engage the private sector in future SN initiatives.*

Issues scan—The timing seems right to do a broad issues scan of what is needed and what needs to be done for future applications of ICT in education in Canada. ***Recommendation:** Industry Canada is in a position to provide leadership to oversee such an issues scan, and therefore should consider undertaking this initiative.*

Absence of a national strategy for ICT in education—Results from SN initiatives often evolve slowly and the process of fostering innovation and innovative uses of ICT in education requires a long-term commitment, by all stakeholders, and by federal/provincial governments. In the absence of a national strategy for the use of ICT in education, it is very important to at least articulate a clear vision that creates consensus for action. ***Recommendation:** Industry Canada, with the participation of the SchoolNet National Advisory Board, should play a leadership role in articulating this vision.*

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