The Information Highway and Canadian Education

Discussion of Issues and Policy Recommendations

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"The goal for Canada is to build the highest-quality, lowest-cost information network in the world, in order to give all Canadians access to the employment, educational, investment, entertainment, health care and wealth-creating opportunities of the Information Age . . .

Clearly the strategy must go beyond developing a plan to put more wire in the ground or more computers into offices and homes. It involves preparing Canadians to use the new technologies . . . It means reviewing and updating statutes that unintentionally constrain our ability to use the new technologies . . ."

Hon. John Manley, P.C., M.P., Minister of Industry Canada*

*excerpted from Industry Canada, *The Canadian Information Highway*, (Ottawa: Minister of Supply and Services Canada, 1994).

Table of Contents

Executive Summary

The 1990s is a challenging decade for Canadians. The transition from an industrial to a knowledge-based society affects all aspects of our lives. Opportunities for new jobs, new markets and new businesses are created as developments in information technologies and telecommunications transform our world. It is evident that Canada's economic prosperity is increasingly linked to our ability to succeed in the emerging information based global economy.

Canada's ability to capitalize on the opportunities presented by the emerging economy relies upon "information literate" Canadians using innovation to create business success. Education is central to the future competitiveness of the Canadian economy. It is the wellspring of innovation in knowledge-based industries. Our schools must provide students with the best possible and most relevant education to prepare them to live and work in this rapidly changing environment. Students who wish to participate in the new economy need to be immersed in the effective use of information and telecommunications technologies to compete effectively and successfully for information-related, high productivity jobs. The workforce of the future will face challenges unlike those seen by previous generations and it needs the tools to meet them.

The new economy is rapidly evolving, and today's workers and employers are also challenged to upgrade their skills and knowledge to take advantage of new opportunities. Many Canadians today are changing careers more often than their parents changed jobs. This creates new challenges for our education system as these new learners often hold down jobs and attend to the needs of their families at the same time as they are going to school. They need a learning environment with the flexibility to let them learn at their own pace, on their own schedule and, if necessary, in their own home. Educational institutions, parents and students who recognize these needs look to the promise of the "Information Highway". Through telecommunications-based applications like distance learning, telelearning and educational networking, educators can provide anytime, anywhere education in support of the lifelong learner.

In recognition of these factors, Canada's major telecommunications carriers are working with members of the Canadian education community to supply the underlying telecommunications services upon which these applications depend. The Stentor group of companies share with many other employers and a growing number of educators, parents and governments the wish to see information and telecommunications technologies more effectively and extensively used to meet the educational needs of our nation.

In working toward this shared goal, it is increasingly apparent to both the educators and the Stentor group of companies that new approaches to service packaging and pricing are required and that respective regulations must be changed. While the recent CRTC decision 94–19[1] provided welcome changes to Canada's telecommunications regulatory framework, Canada's telecommunications carriers remain constrained in their ability to develop appropriately priced service packages to meet the needs of Canada's educational community.

For regulatory purposes, educational institutions are classed as business customers, though the needs of the education sector vary widely from the needs of most businesses. This regulatory treatment, together with the inflexibility and asymmetry of the current regulatory environment, forms a barrier that inhibits more extensive and effective use of telecommunications technologies in education.

Together, Canada's education and telecommunications communities jointly propose that federal policy makers and the CRTC exercise the maximum possible latitude afforded by the Telecommunications Act to ensure that Canadian educational institutions have competitive access to customized services and pricing options that meet their unique needs.

[1]Canada. CRTC. *Telecom Decision* CRTC 94–19. "Review of Regulatory Framework" (Ottawa, Sept. 16, 1994).

In recognition of the importance of education to Canadian society, and in recognition of education's actual needs, nature and budget-setting process, the following new policies are recommended:

1. Education telecommunications services should be given distinct status from a regulatory perspective.[2]
2. Educators should have access to competitive choices of educational services that are matched to their specific telecommunications needs.
3. Educational telecommunications services should be treated in a manner that stimulates their use by educational institutions.
4. Public policy should be used to encourage equitable access to quality telecommunications-based educational opportunities. [3]

The Government of Canada is called upon to provide the leadership necessary to implement these policy recommendations. The Canadian Educational Network Coalition (CENC) urges the government to act, through the power of direction provisions of the Telecommunication Act, to provide policy direction to the CRTC to allow the necessary flexibility for all telecommunications service providers to develop services suited to the needs of the education community in Canada.

[2]As distinct from "business" or "residence" customers. For a proposed definition of eligibility, see Appendix B.

[3]With government support , if necessary, to reach extremely remote communities.

Introduction

Over the last five years, electronic educational networking has grown from a technological curiosity to an important and desirable tool for teachers. For example, from its inception in 1993, the federal, provincial, territorial SchoolNet initiative grew from a target of 300 schools to more than 3200, one fifth of the Canadian base of secondary and elementary schools. Thus far, most of these schools are in urban and higher income areas. Despite the success of SchoolNet, there is a concern that, without more suitable telecommunications rates, educational networking will not be accessible to many schools, teachers and students in Canada.

During this same time, several rural Canadian school districts have identified distance learning as a solution to the complex challenge of providing equitable access to quality education while concurrently reducing costs and continuing to attract qualified teachers. In Saskatchewan's Eston-Elrose School District and Manitoba's Evergreen School District, through Contact North in Ontario and in the provinces of New Brunswick, Nova Scotia and Newfoundland distance learning has successfully met these challenges. There are also initiatives underway in the other provinces. But in almost every case, the educators and the Stentor companies are struggling to make the "square peg' of business telecommunications services fit the "round hole" of educational needs. The mismatch includes features, flexibility and reach as well as pricing rates and structures.

Given the power of these technologies to enhance the learning process, particularly in developing basic employability skills (literacy, numeracy, science, problem solving and teamwork), inequitable access to educational networking and distance learning could have serious adverse effects on the learning and employment prospects of Canadians in rural, remote or economically disadvantaged communities. This concern has been identified as a key priority by the main educational stakeholders in Canada as represented by the Canadian Teachers Federation, the Canadian Association of Principals, the Canadian Association of School Administrators, the Association of Canadian School Trustees, the Council of Ministers of Education Canada, and the Canadian Home and School and Parent-Teachers' Federation.

Many Canadian educators, particularly those who see the potential benefits of educational networking and distance learning, look with envy at announcements from Bell Atlantic, Pacific Bell and other American carriers who have announced major levels of support for schools and colleges, with the backing of state regulators. The regulatory environment in the US offers opportunities for American carriers to work with their state regulatory bodies to offer unique services and special pricing to educational institutions.[4]

Recent announcements from CANARIE, SchoolNet, the BEACON announcement from the members of the Stentor Alliance, and similar announcements from the cable industry promise benefits to the Canadian education community. While these programs are encouraging, their delivery will require greater pricing flexibility to tailor services to the needs of the educational community as a whole. Telecommunications service models like those being implemented in the US cannot currently be provided in Canada. Comparable service will require both greater regulatory flexibility and direct government support to achieve equitable access.

Canada's schools need more and better telecommunications services, customized to their specific needs. This means that new regulatory policies, or new interpretations of existing policies are required. This submission is a request from the education, business and government interests of Canada to provide schools with more affordable means of access to the Information Highway.

[4]See Appendix C for a short synopsis of the US regulatory environment.

Challenges Faced by Education

The transition from an industrial to a knowledge based society is changing the expectations of the Canadian education system. Pressures are mounting on educational institutions to respond to a new set of challenges — to improve both the effectiveness and the efficiency of education today.

- Studies confirm the correlation between a highly skilled workforce and economic growth, yet there is a perception that our education system may not be producing the needed workforce.
- Government and business look to the education system to produce workers with good communication skills, the ability to work in teams and the desire and ability to learn, in addition to more traditional knowledge and abilities.
- Information literacy is a key requirement for employment and schools are increasingly expected to include it as an integral part of the curriculum.
- There is increasing emphasis on equity of access to quality education. The school system is expected to meet the needs of students in rural or remote areas and students with special needs, including both the gifted and the disadvantaged.
- There is a growing demand for post secondary education at a time when budgets are constrained and government support is shrinking.
- Older Canadians are returning to school to update or enhance their skills. They are often juggling work and family, and need learning opportunities independent of time and place.
- Schools, colleges and universities are beginning to recognize the need to share resources and expertise to increase access while reducing costs.
- There is a growing need for teachers to take part in ongoing professional development projects to update their skills and maintain their currency in rapidly changing subject areas and teaching methodologies.

These challenges can only be met by using the full range of available resources. Telecommunications is not a panacea, but it is an important tool that can be incorporated into new solutions and it can foster new approaches which can help to meet the challenges. It can also help mitigate regional learning disparities caused by the uncontrollable realities of harsh climates, sparse populations, varying geography, economic disadvantages and cultural differences.

Information Highway Benefits to Education

The convergence of information technology and telecommunications enables new approaches to solving the challenges of providing cost-effective, world-class education in an equitable fashion. Applications like educational networking, distance education and telelearning provide major opportunities for improving the effectiveness of education in a knowledge-rich world, and at the same time, help educators to meet the increasingly costly challenges they face under tight fiscal restraints. To be successful, however, these new modes of learning need to be accompanied by a rethinking of the learning process itself and of the way education is organized and funded. Educators need to evaluate the role of technology in the overall learning process, set priorities and devise strategies to fund the transition from current modes of operating to the more effective methods enabled by technology. Such strategies may include cost-savings, cost-avoidance, spending substitution, revenue generation, partnering or cost-sharing.

Technology-based Education Applications

Educational technologies enable new approaches to learning which accommodate different learning styles. They are increasingly becoming the tools for lifelong learning.

Educational Networking[5]

Educational networking refers to wide area networking used to support the educational process. It includes private, dedicated networks, public networks, special purpose networks and access to the Internet. It generally supports non-real time applications such as electronic mail, bulletin boards, information access and the like, though it is rapidly evolving to support other applications.

There have been initiatives in every province to develop educational networks for educators and their students. Although other factors have limited their expansion, there is growing recognition that such networks can help improve teaching and learning, can aid curriculum development, and can improve professional development and in-service training for teachers.

Successful student learning depends in large part on the learning environment created by teachers. The many teachers who work in isolation find it difficult to promote a quality learning environment. Wide area networks help reduce this isolation by providing opportunities to exchange ideas and share resources with others, including subject experts. They provide access to world-wide databases of teaching materials, teaching practices and ideas. Educational networking provides an opportunity for principals and teachers to communicate with one another and refine improvements to the learning process.

Educational networking also provides teachers with powerful teaching and learning tools. With Internet access, students see the whole world as a learning environment. Access to this information highway is one of the ways in which today's students can become proficient with the kinds of skills they will likely be using in the workplace:

- gathering information electronically
- collaborating with peers and colleagues in other locations
- accessing materials stored in other sites
- participating in meetings and conferences electronically
- interacting via e-mail with experts in various fields of study
- sharing and comparing information with others
- engaging in continuous skill and knowledge upgrading.

As an example, SchoolNet now provides more than 750 educational services to teachers and students and its service structure is growing rapidly. The reasons: educators are creating what they need to do a better job, and groups able to provide educational support, such as businesses, professional and academic associations and government agencies, now have an inexpensive way of offering services to schools across Canada.

[5]Many terms are being used today to classify educational technologies, and any scheme will suffer from overlaps, gray areas and lack of precision. For the purposes of this discussion, the following terms are used: educational networking, distance learning, and telelearning.

Distance Learning

Distance learning refers to any learning which takes place where the teacher and the learner are separated by distance. Depending on the technology and how it is used, distance learning can be either synchronous (real-time) or asynchronous (delayed time). It may be combined with face-to-face learning or may be carried out with teacher and student never actually meeting each other. Educational networking can enhance any distance learning environment.

Distance learning products and services are being developed in Canada and abroad as a means of overcoming distance and time constraints and to enhance the effectiveness of learning. These vehicles include audio conferencing, video conferencing, computer conferencing, audio-graphics, courseware and groupware.

For remote regions, access to distance learning brings many benefits. It reduces discrepancies between rural and urban settings in the quality of education, in the range of educational offerings and in access to learning resources, including library materials. For the disabled, for natives living on reserves, for persons with limited mobility or time, distance learning provides an opportunity to acquire the skills and tools that will help them achieve and maintain equity in Canadian society.

Telelearning

Telelearning is a term which encompasses any telecommunications based learning, including the use of multi-media. It is coming to describe an integrated learning environment which incorporates knowledge building tools, collaborative work spaces and other new concepts together with educational networking and distance learning.

Thanks to the flexibility provided by telelearning, education and training programs can be tailored to deliver exactly what is required by the student. Because individuals do not all learn at the same pace or in the same way, programs can be designed to meet individual learning needs and styles. Multimedia formats also make learning interesting, and because learning with these technologies can be self-directed and self-paced, motivation among learners is often greater. When multimedia formats are accompanied by online access to teachers and other learning resources and access to shared workspaces for team projects, a powerful telelearning environment is created. Widespread availability of telelearning technologies is an important enabler of lifelong learning.

Funding Strategies

Information technology and telecommunications enable cost savings which can be re-invested to help expand their use.

These technologies provide a means to reduce administrative costs by streamlining processes and making more effective use of staff time. Automated reporting systems are used in some educational institutions to maintain student information, streamline the ordering of supplies, administer library acquisitions and catalogues and maintain accounting records. Linking such systems at the district and/or provincial level reduces duplication of effort and improves the timeliness and accuracy of reports. Resulting cost savings can be reinvested in the purchase of additional learning resources including technology.

Automated phone information systems are reducing costs and improving student services at all levels of our education system. At elementary and secondary schools, voice mail systems are used for applications such as homework assignment lines, community notices, absence reporting and parent-teacher communication. Studies have shown that the increase in parental involvement results in improved homework completion rates and improved grades in addition to reduced administrative cost and improved parent-teacher communication. At the post-secondary level, such systems are used to provide access to centralized student services such as course information, online registration, tutorial assistance, campus announcements, "job lines" and other campus services. Such systems improve student access to information, reduce congestion at peak times, reduce related administrative costs and increase the effective hours of operation to better accommodate evening and part-time students.

Distance learning, while providing educational opportunities to a greater number of students, can also reduce the costs of education. For example, a university in BC is using spare classroom space in a local school to expand their course offerings without building new space of their own. Other institutions have significantly reduced student transportation and accommodation costs by implementing technology-based distance learning. Access to online educational resources can contain the cost and expand the variety of learning resources available to individual schools, classrooms or students.

Educational institutions are also beginning to reap the benefits of sharing with one another and partnering with the private sector. In some provinces, school boards are getting together to make bulk purchases. In the Maritimes, Network Nova Scotia and TeleEducation New Brunswick were formed by the provincial governments for that purpose. The objective of Ontario's E5000 project is to provide Ontario schools with access to the "Education Highway." The Information Technology Association of Canada and Industry Canada are partnering to make information technology and software available to schools at preferred prices through SchoolNet.

There are also opportunities to partner with the private sector. The Canadian Advanced Technology Association (CATA), in a recent survey of their members, reported that ninety percent of respondents felt that remote learning and distance education held the greatest economic potential for suppliers related to the information highway. In this context, the development of interactive multimedia educational products provides an opportunity for public education and private business to partner. While educators provide content and instructional expertise, the private sector partners provide design and marketing expertise. Such partnerships form an excellent foundation for the creation of Canadian learning materials and the development of a growing learning and training industry based on the information highway.

Perhaps the greatest benefits of these technologies will come from their support of the educational process itself. As stated in the 1994 Angus-Decima report on Canada's Information Highway:

> "Public school students at all levels, and their teachers, can benefit from a wide variety of programs: e-mail and video contacts with classes in other countries, information searches, access to special school programming.
>
> In this case, the medium is also the message: not only do students benefit from the content obtained over the network, but the activity of computer and network use — and the awareness that information and people are accessible resources, no matter where they are located — is an important educational component in itself . . ."[6]

[6]Elisabeth Angus, Angus TeleManagement Group and Duncan McKie, Decima Research. *Canada's Information Highway, Services, Access and Affordability.* (Ottawa: A Policy Study prepared for New Media Branch and Information Technologies Branch, Industry Canada. May, 1994.) p58.

Educational Networking Benefits Society

The adoption of telecommunications technology and services by the education sector will, over time, profoundly affect all Canadians. As the overall level of knowledge in the effective use of information technology and telecommunications increases throughout Canada, Canada's competitive position in the global economy will continually improve. Our challenge will be to keep pace with other countries.

Global Business Competitiveness

In an open, knowledge and innovation based, global economy, high wage jobs will go to countries whose workforces have a competitive advantage in research and analysis, product innovation and improvement, and high productivity. A recent Statistics Canada study demonstrated that implementation of advanced telecommunications and information technology is the leading strategy for successful small and medium enterprises in Canada. Expanding the base of telecom literate Canadians through the use of these technologies in the schools is likely to lead to the formation of many small and medium enterprises whose use of the technologies will provide them a higher likelihood of success. Students graduating with a good background in the use of telecommunications will not only find high wage employment more rapidly, they will also be able to help their employers use this technology to improve the firm's competitive position.

Canada has a long history of leadership in the telecommunications field. To maintain this lead and remain competitive, Canada's telecommunications and information technology companies need talented employees with a good grounding in the use of these tools as well as the science and technology underpinning them.

Unless we familiarize our children at a young age with information technology and telecommunications and train them in its use, we are depriving them, together with Canadian business, labour and the economy, of a strategic competitive advantage.

Regional and Rural Equity

Disparities between Canada's regions and rural/urban populations are a growing concern to Canadians. The implementation of the Information Highway allows for the development of successful businesses at long distances from their major markets. Through telecommunications, businesses can locate based on other factors such as the cost and value added potential of its workforce. To take advantage of these new development opportunities, regional and local economies need access to the Information Highway accompanied by a strong education system and a technology-adept population. To this end, Industry Canada's Community Access Project is intended to provide rural communities access to the information highway through local schools and colleges. Some communities have found that the effective and concerted use of telecommunications technologies in rural schools and colleges can help slow the trend of rural migration to urban areas.

Distance learning technologies improve educational opportunities in rural areas, creating a more favorable climate for new business and job creation opportunities. With good employment prospects at home, students are more inclined to stay in their local communities longer and contribute to the local economy.

Social Cohesion

Sharing ideas and experiences through electronic networking can promote understanding among people and communities previously unable to connect with each other. This can be especially powerful for geographically dispersed or isolated groups or individuals. Through educational networking, Canadian students have an opportunity to discover the richness of our multicultural nation. Students in rural and remote communities deserve the opportunity to participate in this voyage of discovery along with their urban peers.

Quality Education

Education is central to the future competitiveness of the Canadian economy. Our schools must provide students with the best and most relevant education to prepare them to live and work in the information society.

Today's Canadians will change jobs and even careers several times in their lifetimes. Increasingly, skills upgrading and retraining programs are using telecommunications and distance learning approaches to deal with the time and place constraints of students who are juggling learning with working, parenting, or other priorities. People with experience in the use of these technologies will be better positioned to develop and maintain currency in their chosen field.

Educators must also have the opportunity to make effective use of telecommunications technologies, both in the classroom and in their own professional development. Teacher-training and professional development programs need to be updated, and teachers need to be afforded the time to learn about the technology. Governments and private sector companies, including those in the telecommunications and information technology fields, can partner with the education sector to help bring about these changes in a timely fashion.

Summary

A well-implemented telecommunications program in the educational sector will help create a better educated and more cohesive population, increased employment opportunities and improved global competitiveness. Equitable school access to the information highway must be established as an immediate national priority so these important social benefits can be widely enjoyed across regions and social groups

Education Telecommunications Services and Tariffs

"Without appropriate public policies, we run the risk of creating classes of information "haves" and "have-nots", with potentially serious downstream implications."

Industry Canada, *The Canadian Information Highway*, 1994.

Canadian telephone companies have a long standing tradition of supporting education through corporate contributions. These contributions are part of the companies' overall commitment to the communities in which they operate — virtually every community in Canada.

From a service standpoint, however, telephone companies have been constrained by regulation in the degree to which they are able to meet the needs of the educational community. The main issues are the classification and pricing of educational services and the asymmetric nature of regulation as it applies to telephone companies versus other service providers.

For the purposes of rates and tariff setting, educational institutions are classified by the CRTC as business customers. All access, long distance and other services are provided to these educational institutions at business rates as set out in each carrier's General Tariff. Until recently, this arrangement was quite innocuous since most educational institutions generally made unexceptional use of telecommunications in their activities. On average, there were only one or two telephone lines in a school, and the use of computers was generally restricted to administrative applications, few of which were connected using telecommunications services.

With the rapid spread of information and communications technologies in recent years and especially now with the emergence of the Information Highway, educational institutions are being afforded exceptional opportunities to improve the quality, reach and cost-effectiveness of their knowledge resources. As these technologies become a more integral part of the learning experience, a marked change is beginning to occur in the traditional relationship between educational institutions and the telecommunications carriers. Contributions that supported valuable educational activities in the past cannot be stretched to support new technology-based initiatives that are being undertaken in an increasing number of educational institutions across the country. Educational institutions are challenged to find ways to economically justify their access to these new opportunities while carriers are searching for ways to provide the necessary and affordable services to support them.

The Value of Telecommunications Services in Education

While the benefits of educational technology are potentially substantial for students, teachers and society at large, these benefits are neither immediate nor assured.

When businesses use telecommunications, they conduct their transactions so as to maximize profit, and the benefits are normally achieved relatively quickly. Hence, the use of the services has a direct impact on "the bottom line." In fact, some consultants advise their clients that if telecommunications is not among their top three expense categories then they are not achieving the maximum advantage such technology could bring to their business.

In education the context is different. The main users are students. The overriding objective is the development of more skilled or knowledgeable graduates. And the benefits, which flow to society or employers rather than to the school system itself, only materialize after an extended period of time. Students use the services as a means of developing information literacy, or they may use them to access otherwise unavailable learning resources. The benefits of such uses do not translate into a positive bottom line for the school. Neither do students benefit in some monetary way, except inasmuch as they enhance their future economic opportunities.

This is not to say there is no economic rationale for educational technology. Telecommunications can greatly assist in reducing education costs as described in Section

Four. These funds can then be redeployed toward other pressing priorities including the strategic acquisition of learning resources and learning technologies. The latter can not only improve the effectiveness of the learning environment but can, in their turn, create additional savings. Nevertheless, though such benefits create new opportunities for more effective allocation of available funds, they do not translate into profit for the institution. Hence, in an economic sense, the value of the service to the educational institution is of a different nature than the value that service would provide to a business.

The Needs of Educational Institutions

The way that educational institutions are funded also presents an unusual set of challenges for suppliers. Educational organizations must achieve their goals in the face of budgetary and other constraints that are set externally by political and other organizations. As well, they do not have the discretion to exceed their annual budget, even as a means of reducing expenditures in future years. Consequently, educational institutions must be able to plan for telecommunications services in the same way as they plan for other expenses: by translating them into a cost per student per year. Predictability and control are therefore key requirements for all services in education and telecommunications is no exception. However, these requirements are not readily met by a number of the services offered by the telecommunication carriers today[7], and under current regulatory practices, not all potential providers of educational services are able to compete on the same basis to provide services that meet these requirements.

Providing equitable access to quality education is a priority objective of the education system. It is widely believed that telecommunications services can greatly assist in meeting this objective, particularly with services that are universally available. Ironically, schools that stand to benefit most from the use of distance learning technologies, those in rural or remote areas, cannot afford the high costs of the time or distance sensitive services that come closest to meeting their requirements, such as long distance service or private data lines. Though current rates in many cases reflect the reality of the higher costs of providing these services, they do not offer the predictability or control that educators need to balance fiscal realities with their desire to use new information technologies. Neither do they reflect the relatively different value educational institutions obtain from the services as compared to business users. Lower rates, pricing structures more sensitive to the needs of educators, and a competitive choice of suppliers are required to enable the education system, in a time of shrinking budgets, to prepare Canadians for the challenges and opportunities of the information age.

Options

Because of the substantial long-term economic and social benefits that the use of telecommunications in education will provide, it is imperative that educators, no matter where they are located in the education system or geographically, have access to telecommunications services that are packaged and priced to meet their needs. Several means currently exist to achieve this goal but none of them provide an equitable, system-wide solution. An overall solution requires regulatory change and policy direction. Elements of such a solution include the following:

Unregulated Services

Services that are not subject to regulation can be priced or packaged according to the needs of the customer, in this case the educator, assuming they provide a return to the service provider. Presently this is possible in two ways:

Forbearance

Current telecommunications regulations permit certain services which can be demonstrated to be "subject to competition sufficient to protect the interest of users" to be forborne from CRTC regulation under the Telecommunications Act.[8] Forbearance has been granted to terminal products and the Commission has encouraged applications in the near term for enhanced and packet data services from the Stentor companies while initiating a proceeding for non-dominant carriers[9] to apply for forbearance on all their services. The CRTC could decide to expand the scope for the Stentor companies as a result of

[7]For example, long distance services are often required for schools to access online educational resources or to link classrooms together for distance learning. Educators need service rates which allow for budget predictability without discouraging usage.

[8]Telecommunications Act, 1993. Section 34 (2).

[9]CRTC Public Notice 94-44.

this proceeding or the proceeding now being conducted on the appropriate environment for the information highway in Canada.[10]

Services Offered Outside of Regulation

Several carriers already offer education services outside of regulation through affiliate companies. Examples include NB Tel's TeleEducation and BC TEL's Community Connections Network. These services are priced and packaged to meet the needs of the schools they serve but costly overheads are involved to set up the affiliate. As profit-driven entities, the need for equity or ubiquity in the education system may not be consistently met. Nevertheless, absent greater regulatory flexibility, this option will likely grow.

Partnerships

Another approach to meeting the needs of the educational sector is partnerships. These can be in the form of industry partnerships or education partnerships where school boards or entire jurisdictions pool their resources, or partnerships between industry and government. A good example of this at the present time is the SchoolNet initiative which is an endeavor of the federal and provincial governments along with industry to connect schools to the Internet. While SchoolNet has so far been very successful, its very success is beginning to undermine its overall objective of connecting all 16,000 schools in the country due to unacceptably high and uncontrollable connection costs in schools that cannot connect to a local Internet host computer. Nevertheless, partnerships like this could be part of an overall solution to the affordability issue.

Public Financing

A third approach is for government to subsidize the cost to education of purchasing telecommunications services. This is happening already through government subsidies to the regional and national backbone networks of the Canadian Internet to which SchoolNet connects. Another example is Ontario's E5000 project which, through government funding, plans to connect all the school boards and eventually all schools in the province. Funding can be to intermediary agents or to end users directly. It can be supplementary to current funding or reallocated from existing budgets. Supplementary funds are not a realistic proposition in the current fiscal climate and redirecting existing budgets may be equally challenging, unless tied to a larger policy of educational technology deployment. While this option favorably meets the tests of equity and predictability, fiscal reality may make it unrealistic at this time.

Business Incentives

Regulated carriers could be encouraged to provide services to educational institutions that cannot afford regular business rates by providing them with various forms of business incentives such as tax credits or an educational voucher system. President Clinton has been promoting tax credits as a way to encourage US carriers to link up schools, libraries and hospitals. In New Zealand, the equivalent of a voucher system where customers donate bonus points from their long distance bills to the school of their choice has met with considerable success in linking up schools and offsetting their costs of purchasing equipment. The difficulty with a tax credit system is again likely to be the current fiscal climate. The bonus points approach would not easily meet the equity test and may, in fact, increase the current inequities in the system.

Special Education Class of Service

As noted in this paper, current regulations act as barrier to tailoring services to meet the needs of educators. Although the Stentor group of companies have been working closely with educators and government in an effort to devise such services, current regulations do not afford sufficient freedom to price and structure them effectively. The regulations governing customer specific and special facilities tariffs are too restrictive, and a general tariff approach is not financially viable if, as is presently the case, the same service must be offered equally to large business customers as well as to small rural schools. To provide services to educators within the confines of regulation and as an integral part of a carriers' operations would require the creation of a new class of service, distinct from the current categories of

[10]CRTC Public Notice 94-130.

"business" and "residence". Such a class would have to be carefully defined to avoid the criticism of being seen as "unjust" or "discriminatory".[11] Properly crafted, however, it would provide the necessary flexibility for regulated carriers to tailor services to meet the needs of educators regardless of their location in the system or the country.

The Preferred Approach

Recent polls suggest that educational services are high on the list of what consumers want from the Information Highway. It would be ironic if consumers were able to access such services in their homes while teachers and students accessing them from schools, colleges and universities could not. Resolving this anomaly from a policy and regulatory standpoint would entail two things.

First, fair, equal and sustainable competition among all education service providers must be encouraged. This could be achieved through accelerated forbearance of regulation for competitive services and through a speedy resolution of related issues now before the CRTC. Such an environment would provide all service providers with maximum flexibility to tailor their services to meet the needs of the education community.

Second, where competition is not viable and regulation is still necessary to serve the public interest, all carriers should be subject to the same regulatory treatment and provided additional regulatory flexibility to structure customized education services. This could be achieved by creating a new class of service for education, as distinct from business or residence. Eligible institutions would be non-profit, public educational institutions accredited by government.[12] Within the new class of service, standard regulations would still apply. This arrangement would help maintain the goal of equity in the educational system. It would also benefit service providers as much as educational institutions because it would offer the opportunity to stimulate more extensive use of telecommunications and, therefore, offer opportunities for suppliers and content providers, including educators, to build new educational applications.

This approach does not rule out the viability of the other options mentioned above. Companies may still wish to offer services to educational institutions through affiliate organizations, and partnerships between education, government and industry offer many distinct benefits for achieving a system-wide solution. Without a more competitive environment, however, and without special regulatory measures to address the real needs of the educational community, a solution to the issue of affordability of telecommunications in education that is comprehensive and self-sustaining, will continue to elude policy makers.

Conclusion

A combined approach of increased competition between service providers and reform of the current pricing regulations offers Canadians the best possible environment to ensure the educational sector can play the role required of it in the Information Age. It also provides an opportunity for the telecommunications industry, its shareholders, and the government to jointly invest in the future of the country.

[11]Telecommunications Act, 1993. Section 27 (2).

[12]See Appendix B for a proposed definition of eligible education institutions.

Policy Recommendations

The Federal Government's Information Highway Advisory Council has identified lifelong learning as one of the four key operating principles around which Canada's Information Highway should be designed and built. This paper has outlined some of the opportunities and the challenges associated with the practical implementation of that principle. It has argued that the most pressing issue in bringing about the widespread adoption of learning technologies in Canada — and reaping the potentially enormous rewards from them — is the inflexibility and asymmetry of the current regulatory environment.

The Canadian Educational Network Coalition (CENC), together with the SchoolNet National Advisory Board (SNAB) and the Stentor members, believes that no significant gains will be made in the widespread adoption of educational technologies in Canada until the regulatory issues are resolved.

The Government of Canada is therefore urged to take a leadership role in creating a more flexible regulatory environment as regards educational services. The federal government is urged to provide the necessary policy direction to the CRTC to allow all telecommunications service providers to develop services suited to the needs of educators and to establish education as a unique class of service.

Specifically, in recognition of the importance of education to Canadian society, in recognition of the potential for communications technology to improve the cost-effectiveness of education and in recognition of the special needs, nature and budgeting process of the education sector, it is recommended that:

1. **Education telecommunications services should be given distinct status from a regulatory perspective.**

   By declaring education as a unique "class of service", distinct from "residence" and "business", the Government of Canada and the CRTC would enable telecommunications providers to better meet the needs of the education sector. Eligible institutions would be non-profit public educational institutions accredited by government.[13] Provision would need to be made to guard against use by others for whom the services are not intended.

2. **Educators should have access to competitive choices of educational services that are matched to their specific telecommunications needs.**

   The education community has unique needs that are not adequately met by today's business telecommunications services. In particular, educational institutions need services which will allow them to predict their costs with greater certainty. Such services could be provided if Canada's telephone companies were given the regulatory freedom to work in partnership with the education community, as is the case for Canada's cable companies.

3. **Educational telecommunications services should be treated in a manner that stimulates their use by educational institutions.**

   Service pricing that is structured appropriately will stimulate the adoption of telecommunications services in our educational institutions.

[13]See Appendix B for a proposed definition of eligible education institutions.

4. **Public policy should be used to encourage equitable access to quality telecommunications-based educational opportunities.**

   Quality educational opportunities should be available to all Canadians, no matter where they live or work. Government contributions may be needed to provide equitable access to education in remote communities where carriers cannot economically provide a level of service consistent with accepted standards.

Conclusion

While many factors affect Canada's education system, there is no doubt that the use of telecommunications — in the form of educational networking, distance learning and telelearning — has the potential to revolutionize education in Canada for the social and economic benefit of all Canadians. Whether this potential is realized very much depends on resolving the current regulatory challenges associated with the delivery of educational technology. The means for resolving these issues readily exist in the powers contained in the new Telecommunications Act and the federal government's process to develop an Information Highway strategy for Canada. Ultimately though, it is a matter of whether a technologically sophisticated education and learning system is a priority for Canada. The CENC, along with SNAB and the members of the Stentor Alliance, respectfully submits that it is and the time for the government to act is now!

Excerpts from the Canadian Telecommunications Act, 1993

- It is hereby affirmed that telecommunications performs an essential role in the maintenance of Canada's identity and sovereignty and that Canadian telecommunications policy has as its objectives (a) to facilitate orderly development throughout Canada of a telecommunications system that serves to safeguard, enrich and strengthen the social and economic fabric of Canada and its regions; (b) to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada; . . . (h) to respond to the economic and social requirements of users of telecommunications services; . . .

  Section 7

- The Governor in Council may, by order, issue to the Commission directions of general application on broad policy matters with respect to the Canadian telecommunications policy objectives.

  Section 8

- The Governor in Council may require the Commission to make a report on any matter within the Commission's jurisdiction under this Act or any special Act.

  Section 14

- Every rate charged by a Canadian carrier for a telecommunications service shall be just and reasonable.

  Section 27 (1)

- No Canadian carrier shall, in relation to the provision of a telecommunications service or the charging of a rate for it, **unjustly** discriminate or give undue or **unreasonable** preference toward any person, including itself, or subject any person to an undue or **unreasonable** advantage.

  Section 27 (2) (Emphasis added)

- In determining whether a rate is just and reasonable, the Commission may adopt any method or technique that it considers appropriate, whether based on a carrier's return on its rate base or otherwise.

  Section 27 (5)

- Notwithstanding subsections (1) and (2), a Canadian carrier may provide telecommunications services at no charge or at a reduced rate . . . (b) with the approval of the Commission, to any charitable organization or disadvantaged person or other person.

  Section 27 (6)

- The Commission may, for the purposes of this Part, (a) approve the establishment of classes of telecommunications services and permit different rates to be charges for different classes of service, . . . (g) in the absence of any applicable provision in this Part, determine any matter and make any order relating to the rates, tariffs or telecommunications services of Canadian carriers.

  Section 32

- The Commission may make a determination to refrain, in whole or in part and conditionally or unconditionally, from the exercise of any power or the performance of any duty under sections 24, 25, 27, 29 and 31 in relation to a telecommunications service or class of services provided by a Canadian carrier, where the Commission finds as a question of fact that to refrain would be consistent with the Canadian telecommunications policy objectives.

  Section 34 (1)

- Where the Commission finds as a question of fact that a telecommunications service or class of services provided by a Canadian carrier is or will be subject to competition sufficient to protect the interests of users, the Commission shall make a determination to refrain, to the extent that it considers appropriate, conditionally or unconditionally, from the exercise of any power or the performance of any duty under sections 24, 25, 27, 29 and 31 in relation to the service or class of services.

  Section 34 (2)

- The Commission shall exercise its powers and perform its duties under this Act and any special Act (a) with a view to implementing the Canadian telecommunications policy objectives and ensuring that Canadian carriers provide telecommunications services and charge rates in accordance with section 27; . . .

  Section 47 (a)

Definition of Eligible Educational Institutions

For the purposes of defining education as a distinct class of service, it is proposed that eligible educational institutions include public schools, public colleges, and universities as defined below:[14]

- A *public school* is an organization or a part of an organization that is established and operated otherwise than for profit, and that operates as an elementary or secondary school in which it provides instruction that meets the standards of educational instruction established by the provincial or federal government or aboriginal band authority.
- A *public college* is an organization or a part of an organization that is established and operated otherwise than for profit, and that operates a post-secondary college or post-secondary technical institute

  (a) that is funded by a government or municipality,

  (b) that is accredited by government, and

  (c) the primary purpose of which is to provide programs of instruction in one or more fields of vocational, technical or general education.
- A university is a recognized degree granting institution and an organization or part of an organization that operates a college affiliated with such an institution or operates a research body of such an institution.

[14]The proposed definitions are adapted from the Annotated Excise Tax Act, Part IX, GST.

The US Regulatory Environment[15]

The telecommunications regulatory environment in the U.S. consists of regulatory bodies at each layer of government. The Federal Communications Commission (FCC) regulates interstate communications and certain nationally mandated policies. Whereas the CRTC in Canada also regulates local facilities, in the U.S. each state maintains control of communications within its borders, usually through a Utilities Commission. The role of municipal governments is generally related to the placement of facilities.

Regulations govern the rates and services that can be offered to customers. As in Canada, customers are classified into two main classes: business customers and residential customers. Governments, including educational institutions, generally pay the same tariffs as businesses.

At the national level, President Clinton has described a vision of the public and private sectors working together to "connect every classroom, every clinic, every library, every hospital in America into a national information super highway by the year 2000."[16] Several bills were introduced in Congress during 1994 in support of this vision. For example, HR3636, the "National Communications Competition and Information Infrastructure Act of 1994", Section 103, provided for special treatment for "Telecommunications Services for Educational Institutions, Health Care Facilities, and Libraries."[17] This section would have required the FCC to establish rules providing preferential rates and connection provisions for such institutions. It would have been up to the FCC to determine, through its inquiry process what rates and provisions should be in place to promote the widest possible connectivity for schools and other "public" institutions. Although this bill failed to pass both houses of Congress, a similar bill has been introduced in the 104th Congress (1995).

While this legislative activity has continued at the federal level, there have also been several endeavors on behalf of Local Exchange Carriers (LECs) at the state level to try to meet the needs of educational institutions. Although some of the initiatives celebrated by the media are trials for which final rates have yet to be established, others are legitimate cases where educational institutions are benefiting from "special treatment."

In California, Pacific Bell has announced its intention to provide ISDN (Integrated Services Digital Network) service free of usage charges to public schools.[18] Pac Bell has asked for and received from the California Public Utilities Commission (CPUC), special rate treatment to finance the deployment of ISDN throughout the state. As part of this rate treatment, Pac Bell has agreed to provide the service at no cost to public schools. They have also asked the CPUC to waive the End User Common Line Charge[19] for ISDN lines installed in public schools.

In another instance demonstrating state support of schools, California's Telecommunications Infrastructure Report suggested the creation of a Schools and Libraries Information Technologies Grant Program. The goal of the program is to provide additional funding for planning, training and equipment to spur statewide development of advanced telecommunications technology throughout California's K-12 schools and libraries. Funding may come

[15]This appendix summarizes the contents of Bellcore report, "A Brief Examination of Special Regulatory Treatment for Telecommunications Services Provided to Educational Institutions in the United States", produced by Bellcore, Regulatory and Public Policy Consulting for Stentor, December, 1994.

[16]State of the Union Address, delivered before Congress assembled, January 25, 1994, by William Clinton, President of the United States.

[17]House of Representatives (HR) 3636, A bill introduced in the 103rd Congress of the United States of America, House of Representatives. Sometimes referred to as the Dingall-Markey Bill.

[18]This announcement was part of Pac Bell's response to Assembly Bill No. 1385 (9/10/93) Amendment to Sec. 709 of the Public Utilities Code, which requires local exchange telephone corporations to deploy an ISDN infrastructure no later than December 31, 1996.

[19]The End User Common Line Charge is a flat charge levied each month for each voice equivalent line. It was originally established as a means of compensating the LECs for lost toll revenues when the new regulatory environment was established under the Modification of Final Judgement (MFJ) that ended the antitrust case against AT&T.

from a variety of sources, including issuance of state bonds, a small surcharge on all telecommunications services, a direct appropriation of state funds, or using money that would otherwise have gone to price cap reductions for Pac Bell and GTE California. The concept of a grant program is currently being investigated by the CPUC.

In another interesting case in North Carolina, the Public Utilities Commission has allowed BellSouth, GTE and Carolina Telephone to enter into a Special Service Arrangement (SSA)[20] with the State of North Carolina to construct and operate a broadband network based on ATM and SONET technology. The LECs have obtained approval to continue the SSA to meet the needs of public schools on an interim basis. The rates charged in the SSA were determined by extensive negotiations, meet the requirement of the state legislature for additional connection for educational institutions, and reflect funding levels approved by the General Assembly.

"There have been other well publicized efforts to provide advanced connectivity to schools . . . Most of these efforts, like the Mississippi 2000 project and several proposals in Tennessee, do not involve direct regulatory intervention. In most cases, this type of effort involves partnerships between the state and the LEC in obtaining outside funding sources to reduce the burden on the schools rather than some sort of rate relief.

As a general conclusion, it would appear that the examples of local efforts to provide assistance to schools in obtaining the latest in telecommunications technologies fall into three broad categories:

1. Rate relief that targets certain services (such as ISDN) with special rates for educational institutions;
2. General rate relief for schools in exchange for regulatory concessions in other areas, and;
3. Partnerships between the school systems and the LECs designed to obtain external funding for such services that do not involve any form of special rate treatment for the schools involved."[21]

It is apparent from this short summary that a variety of approaches have been adopted in several American States to provide the benefits of telecommunications technologies to schools. Since all intra-state services in the U.S. are regulated at the state level, it is possible to implement programs at the state level even without clearly legislated direction at the federal level.

Since telecommunications is under federal jurisdiction in most provinces in Canada, federal policy direction will be required to foster improved access to telecommunications technologies to Canadian educational institutions.

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[20]In this case, the SSA is a contractual agreement outside the normal tariff structure, NCPUC Docket No. P-100. It went into effect August 16, 1994 and is subject to final approval by the NCPUC. The Docket is still under consideration.

[21]Bellcore report, "A Brief Examination of Special Regulatory Treatment for Telecommunications Services Provided to Educational Institutions in the United States", produced by Bellcore, Regulatory and Public Policy Consulting for Stentor, December, 1994.

Supporting Organizations

The Telecommunications Committee of the Canadian Educational Network Coalition

The Canadian Educational Network Coalition (CENC) is comprised of the coordinators of educational networks from across Canada in partnership with government representatives and members of the information technology and telecommunications industry. It was created in the spring of 1993 to seek innovative approaches to bringing the Canadian education system onto the Information Highway.

The CENC has identified the issue of telecommunications rates and service structures as critical factors in terms of a school's ability to access educational networks. This paper was prepared by the Educational Telecommunications Committee of the CENC, comprised of the following core members:

Harvey Weir, Memorial University of Newfoundland, Co-chair

Brian Milton, Stentor Telecom Policy Inc., Co-chair

Doug Hull, SchoolNet

Mary Beam, Ontario Teachers Federation

Mark Schofield, Canadian Association for Distance Education

Ken Stief, North York Board of Education

Kristin Charlton, SchoolNet

Nazim Panju, Stentor Resource Centre Inc.

Deb Reidlinger, Stentor Resource Centre Inc.

The SchoolNet National Advisory Board

The SchoolNet National Advisory Board (SNAB) was formed to give direction to SchoolNet and the coordination of educational networks across Canada. The goal of SchoolNet is to have every Canadian school, library, college and university connected to the Internet by 1998 and to ensure Canada is the most effective user of telecommunications and information technology in education and learning. The SchoolNet National Advisory Board is comprised of major educational stakeholders, including the following:

Ministry of Education, New Brunswick

Ministry of Education, Nova Scotia

Ministry of Education, British Columbia

P.E.I. Department of Education

Alberta Education

Saskatchewan Education

Manitoba Department of Education

Education, Culture & Employment, Government of N.W.T.

Department of Education, Yukon

Council of Ministers of Education Canada (CMEC)

Alberta Education Technology and Research Foundation (AETRF)

Association of Canadian Community Colleges (ACCC)

Assembly of First Nations — Director of Education

Association canadienne d'éducation de langue française (ACELF)

Association québecoise des utilisateurs d'ordinateurs au primaire et secondaire

Association of Universities and Colleges of Canada (AUCC)

Awareness — Science and Technology Education Program Inc. (A-STEP)

Canadian Association of Deans of Education

Canadian Association of Principals

Canadian Association of School Administrators (CASA)

Canadian Education Association

The Canadian Home and School and Parent-Teacher Federation

Canadian School Boards Association

Canadian Teachers Federation

Faculty of Education, Queen's University, York University

National Network of Learning (NNL)

OISE — Ontario Institute for Studies in Education

Ontario Teachers Federation

Science & Technology Education and Mathematics Network (STEM—Net)

Society for Educational Visits & Exchanges in Canada (SEVEC)

Société de gestion du réseau informatique des commissions scolaires (GRICS)

The Stentor Alliance

Stentor is the alliance of the nine major telephone companies in Canada: BC TEL, AGT, SaskTel, Manitoba Tel, Bell Canada, New Brunswick Tel, MT&T, Island Tel, and Newfoundland Tel, and associate members Québec-Téléphone and NorthwesTel. It is comprised of three organizations.

Stentor Canadian Network Management manages the national core telecommunications network and its North American interconnections on behalf of the members of the Stentor Alliance.

Stentor Resource Centre Inc. is the product and service development organization for the Stentor Alliance. It also provides engineering, research and development, marketing and national customer support. It includes an Industry Marketing organization which is dedicated to developing services for specific sectors or industries in Canada, one of which is education.

Stentor Telecom Policy Inc. provides policy direction for the Alliance and maintains a persuasive presence and continuing level of policy communications with government and other influential bodies to maintain Canada's leadership position in telecommunications worldwide.