

A Viable Economic Option

Online Distance Education Plan for Rural Saskatchewan High Schools

Laurie E. Brand

Graduate Student

Dr. Richard A. Schwier

Educational Communications and Technology

802.6

University of Saskatchewan

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Abstract:

The reform plan for Saskatchewan education has been developing for over a decade and faces many challenges. Advice, as early as 1994, in the report *Educational Technology and Educational Reform in Saskatchewan*, recommended a province wide move towards increasing technology integration in all levels of education including distance education (Schwier et al., 1994). This echo of reform reappears in the *Task Force And Public Dialogue On The Role Of The School: School Plus: A Vision for Children and Youth* (Tymchak, 2001). Major stakeholders have identified several issues dealing with online distance education as a delivery option for rural and northern Saskatchewan. Is online distance education a viable option for Saskatchewan rural high schools? What are the identified economic issues and their costs? What is the projected source of funding? Is this source of funding adequate and realistic? What are the unidentified or "hidden" costs? What financial problems, solutions and opportunities have other institutions discovered when implementing distance education? The conclusion of this paper proposes that the benefits and costs for distance education delivery to rural Saskatchewan high schools, particularly sources of funding and future implications, have been underestimated and must be considered carefully by all stakeholders.

Pressure for education reform is increasing. Globalization is expected to create a demand for knowledge and technological literacy. For governments and industry to meet the economic demands of globalization, a workforce with lifelong learning skills and an ability to adapt to the rapid change of technology is required. Education is expected to create learning conditions to prepare students for the twenty first century and meet the needs of diverse individual students (Brown, 1994).

In Saskatchewan, the rural population is declining with a corresponding major impact on education. In the last decade, the rural public school system enrollment declined by 11,277 students. Projected enrollments continue to decline substantially over the next decade with a 34% drop of students entering kindergarten (Saskatchewan Education, 2001, p.20). To provide equity of access and resources to rural areas, distance education has been suggested as a viable delivery alternative to secondary students. "Although there will be an on-going need for text-based Correspondence School programs, there can be no doubt that interactive electronic formats are the wave of the future." and could deliver optional and specialist on-demand courses (Tymchak, 2001, p.89). "Diversifying program delivery is an appropriate response to a convergence of challenges facing education today" and would help to meet diverse needs and circumstances, promote technological literacy and actualize core curriculum (O'Brodovich, 2000, p.8).

Jim McLeod, the Online Learning Consultant for the Learning Technologies Unit, confirms that Saskatchewan Education is in the process of developing a comprehensive online learning strategy. A distance education system for Saskatchewan students is part of the plan. Official policy has not been released to the public about the 'Learning Agency' plan, although the Learning Technology Unit is already piloting online learning projects with various design models (personal correspondence, December 17, 2001). A key issue would be whether a provincial, regional or divisional model of delivery would be followed. A provincial model of distance education would require less funding as duplication of services could be avoided with a 'one stop' shopping model (Tymchak, 2001). Costs are reduced for mass delivery and development. Investment in specialized staff to develop quality courses increases marketability. A centralized model also allows greater standardization of courses, curriculum, credits, teacher accreditation, research and evaluation. A decentralized divisional model permits greater flexibility through the involvement of local teachers to develop courses and respond to individual student learning needs. Local teachers and schools would be adaptive to differences in scheduling, access, support and resources. A regional model would possess a mix of the two models with more central control than a divisional model, but maintaining a higher degree of flexibility than a provincial model.

What Are The Identified Economic Costs?

Stakeholders have identified major infrastructure and operating costs as keys to providing equitable access. A basic standard of infrastructure is needed to support online distance education delivery. Schools in Saskatchewan already have a basic level of technology infrastructure in place including facilities, hardware, software and connectivity. Existing partnerships provide low cost connectivity with SaskTel's CommunityNet high speed Internet and Saskatchewan Communication Network's satellite televised programs. In addition, the Saskatchewan Correspondence School provides services. Operating costs include maintenance, technical support and professional development for staff. Purchasing courses and programs is thought to be more economical than developing made in Saskatchewan products. It is generally agreed that sustainable funding is required and distance education be "available at no cost, or at least a cost that is attractive to rural and northern school divisions" (Tymchak, 2001, p. 90).

What Is The Projected Source Of Funding?

No new funding sources have been announced by either the provincial or federal government to pay exclusively for an online distance education plan. Over a three year period, two million dollars per year to upgrade infrastructure in-school Internet connectivity, and three million dollars per year for development of Saskatchewan made online and classroom

resources, was allocated in the 2001 budget (Saskatchewan Finance, 2001, p.5). Other available finance options include staying within current budgets, incorporating the costs into the existing technology budgets and/or reallocating existing funds from other areas by forging partnerships.

Reliance only on existing government funds to finance online distance education is problematic. In Canada, education is the responsibility of each province and territory. The federal government provides transfer payments as a form of equity to provinces deemed to have inadequate annual fiscal revenue. According to the 2000-2001 Public Accounts, the federal education transfer payment to Saskatchewan declined to 5.171 million (Saskatchewan Finance, 2001, p.10) from previous higher levels as in 1996-1997 of 174.3 million (Statistics Canada, 2001). Previously high resource tax revenues collected by the province reduced the level of federal transfer payments received. Periods of federal and provincial deficit budgets increased "off-loading", a term used to describe governments passing on less funding and successively levels of government requiring to collect more taxation revenue from the local tax base.

In Saskatchewan, the rest of K-12 education funding is shared between the provincial and municipal governments. Saskatchewan's provincial education share is allocated through foundation and special purpose grants, chiefly the Foundation Operating Grant introduced in 1972. Its purpose was to provide equity in provincial funding to school divisions with less fiscal capacity to raise money from their local tax base. Provinces may receive revenues for grants through property taxes levied at the provincial or local municipal level. In Saskatchewan, each division Board of Education sets the annual mill rate, which determines the property taxes the local municipal governments levy and collect. Reassessment in 1997 and 2001 increased most agricultural property taxes considerably. In 2001, rural school divisions on average, had the highest assessment per pupil, 34% higher than the provincial average (Saskatchewan School Trustees Association[SSTA], 2001, p.5). The funding share that the provincial government provides for K-12 education shifted during the last decade, so that property tax owners now pay over 60%, and the province pays only 40%. In Saskatchewan Education's *2000 Survey of Provincial and Territory Departments of Education*, Saskatchewan's provincial share of education funding in 1999 was the lowest in all of Canada at 38.4%. The 61.6% share of the education bill for property tax owners was the highest in all of Canada, with Manitoba the next highest at 34% (SSTA, 2001, p.3). As well, the Education Spending Consumer Price Index rose in Saskatchewan from 1997 onward to become the highest in all of Canada (Statistics Canada, 2001). Teachers' salaries grew substantially during this time period. Despite an increase of 37 million in provincial operating grants to schools, grants to most rural school divisions stayed

the same in 2001. An increase in taxable property assessments is weighted in relation to other school divisions and proportionately, the grants from the province to that division decrease. As costs for education continue to rise, the federal and provincial governments have shifted the reliance for revenues on an increasingly smaller local tax base. Even though net revenues for farmers sunk to an all time low, agriculture property owners paid most of this tax increase (Saskatchewan Association of Rural Municipalities[SARM], 2001). A significant point has been reached where there now exists a decreasing ability to maintain even existing education funding from the rural tax base. The projected source of sustained funding for online learning is unclear and compounded by economic, political issues and concerns for education funding in general.

Is The Source Of Funding Adequate And Realistic?

Government Funding:

The federal and provincial governments current fiscal policies and commitments to education, including any form of learning, with technology close range or at a distance, is sadly lacking. Gary Shaddock, president of the Saskatchewan School Trustees Association, referred to rural school division budgets as "bare bones" because in many cases staff have already been cut, schools closed and grades discontinued so "there's nothing left to cut" (SSTA, 2000, p.2). Some rural school divisions have been forced to use a line of credit to operate their budget for an extended period of the year. There is no room to leverage further local monies from the municipals' disgruntled agricultural property tax base. Unless future federal or provincial budgets significantly increase overall spending in education, the small projected 2002 increase in school operating grants from 426 million to 466 million will quickly be eaten up by priority plans. The priorities include Community Schools, early childhood intervention programs, plus teacher salaries and benefits, expected "to attract and retain the best teachers" (Saskatchewan Finance, 2001, p.2).

Reallocation:

The largest cost saving measure in a division is to close a school and bus the students to a larger centre. This measure of fiscal management is the most dreaded and extremely unpopular with the taxpayers in the affected community. Other solutions offered for distance education financing are thought to be cost saving measures, but may in fact be more costly in other areas (see Table 1).

Table 1. Implications of school closure and relocation of students on School Division expenses.

DIVISION SPENDING	LOWER	HIGHER
<p style="text-align: center;">FACILITIES</p>	<ul style="list-style-type: none"> -Close the local school and bus students to a larger central facility for all classes. -Local school open part time for online classes and bus students to the larger center some times for face to face classes. -Local school open offering online and face to face classes. -Local school open for face to face classes and online classes taken at home. 	<ul style="list-style-type: none"> -Transportation and depending on ability to absorb extra students, central facility and staffing costs. -Local school may need to be open more flexible hours, transportation and depending on ability to absorb extra students, central facility and staffing costs. -Local school may need to be open more flexible hours. -Costs are now shifted onto parents.
<p style="text-align: center;">HUMAN RESOURCES</p>	<ul style="list-style-type: none"> -Decrease staff and increase student groupings in classes - Decrease staff and increase student groupings offering face to face and online classes. -Cut staff hours and increase student groupings offering face to face and online classes. -Decrease teaching staff and have non-teaching staff facilitate online classes. -Cut hours of staff when students learn online at home. 	<ul style="list-style-type: none"> -Teacher workload increase may result in demand for more salary. - Teacher workload increase may result in demand for more salary. Staff, professional development and support needed at sending and receiving end for online classes. Sending teachers' workload is estimated at three times a regular class (Palloff and Pratt, 1999, p.50). Class size for optimum online learning level is very small at 8-13 students (Aggarwhal and Benito, 2000, p.11). -Extensive professional training is required to be an effective online teacher at the receiving and sending end (Bates, 2000). The most comprehensive trained have typically a minimum of a four years teaching degree, teaching experience and a Masters in Educational Technology and Communications. -Support staff are still needed for online learning. Parents may become human resources.
<p style="text-align: center;">SUPPLIES</p>	<ul style="list-style-type: none"> -Online classes may access resources loaded onto a central web site, reducing need for items such as texts, paper and photocopying. 	<ul style="list-style-type: none"> -Central web sites with online resources may be expensive to maintain as Internet access and support is needed for extended flexible hours. Copyright clearance is required for most items and must be paid for (Inglis, Joosten and Ling, 1999).

Partnerships:

Technology partnerships involve collaborations of corporate, government and academic sectors. Corporate and government sectors may share resources and assets, or invest in technology programs with education institutions. The distinct advantage in pooling resources is a distribution of costs and an increase in access to areas with sparse population or geographically dispersed as in Saskatchewan. When seeking technology partnerships, Saskatchewan rural schools have a major disadvantage with fewer local resources than larger urban centres.

Rural communities may face particular challenges in finding local sources of funding, especially in the form of businesses in their community that are large enough to adequately assist the school community with such a major undertaking. And rural communities may not have access to local businesses or institutions that can contribute their technical expertise to your project. (National Aeronautics and Space Administration[NASA], 2000, p.4)

Some divisions may not have any choice in cost cutting measures or partnerships. Divisions have been allowed to voluntarily choose amalgamation with another division, but only three have chosen to do so. There has been no large scale forced amalgamation of divisions by the provincial government but Saskatchewan Education Minister, Jim Melenchuk, expects there will be 25% fewer school divisions by October of 2003 (Saskatchewan Bulletin, 2001, p.1).

Saskatchewan as a province is, however, in a unique position having previously established several longstanding non-local partnerships, which would be beneficial in providing distance education services to rural areas (Brown, 1994). Canada's SchoolNet and LibraryNet are Canadian national federal programs that partner with the provinces to connect schools and libraries to the Internet. In 1999, Canada became the first country in the world to possess this degree of connectivity (McKeough, 2000). SchoolNet's Grassroots program has allowed students and teachers to create over 20,000 funded Internet based projects. Prime Minister Chretien, Industry Minister Manley and Microsoft CEO, Bill Gates announced the SchoolNet Grassroots National Campaign in 1998. Industries are challenged to match the government contributions:

The campaign offers an effective way for industry to support the development of IT skills necessary for a proficient work force. Up to 5 million students will gain the knowledge and experience needed to contribute to Canada's future competitiveness in the global marketplace. (Licenik, 2000)

The goal of these programs is to increase access, stay ahead and build information technology skills. The cost for the federal and provincial contribution to this partnership is over 15 million (Licenik, 2000).

Industry Canada also administers the Community Access Program first launched in 1994 to rural communities smaller than 50,000, partnering with the provinces, schools, libraries, community/volunteer groups, social agencies and businesses "to establish up to 10,000 affordable public access Internet sites throughout Canada" (Latta, 2000). Rural, remote and urban Canadian communities apply to become "information on-ramps" sharing resources of the partnership "in pursuit of cost-efficiency" and funding from "multiple resources" are deemed as factors of networking success. Unfortunately, "the opened doors to a multitude of possibilities for rural opportunities" with this program has now closed, as the federal government has reached "our goal of 5,000 rural CAP sites much sooner than anticipated" and is "no longer soliciting nor considering new applications for rural CAP. Our efforts will now focus on networking and sustaining established CAP sites in order to improve the quality of access and better address regional issues through combined resources" (Community Access Program, 2002).

One of the most noteworthy advanced and comprehensive connection partnerships in the world involves the Saskatchewan and federal governments, the Saskatchewan Crown corporation, SaskTel, and the Saskatchewan Communication Network (Brown, 2000). Telecommunications and infrastructure combine to produce CommunityNet, an initiative to network government, health and education sectors producing one large customer, decreasing costs and increasing high speed Internet access. High speed may increase rural access rates from the average 33 Kbps that allows downloads of information at three pages per second, to a rate of 384 Kbps - 100 Mbps which allows downloads of 550 - 5500 pages per second.

Over the next years, \$70.9 million will be spent developing the high speed network. Provincial funding will come from a combination of new money and a reallocation of existing resources. The Government of Canada is contributing \$5 million toward the project. (CommunityNet, 2001)

Although over 61% of Saskatchewan's population is within reach of high speed access, not everyone will be connected. Rural and northern communities basic telephone services delivery is already subsidized by \$70 million per year. Communities connected must first meet SaskTel's "economically viable" agenda to provide services "of a commercial offering, coupled with the number of potential customers likely to subscribe to those services in an individual community" (CommunityNet, 2001).

Schools not in highly commercial areas may be able to receive a combination of digital satellite and telephone line access. The Saskatchewan Communications Network (SCN) and SaskTel have successfully tested digital transmission with the Digital Transmission Network (Saskatchewan Communication Network[SCN], 2001). The advantages to rural and remote northern communities are the potential to receive education and training by an online "virtual classroom" without " the expense of traveling or moving to a larger centre" (CommunityNet, 2001). Besides SCN's nine "live, interactive televised secondary school courses to select rural high schools", future online delivery is being tested through the development of CENTRALiSchool projects. Saskatchewan Education partners with school divisions or groups of school divisions to create web-based instructional resources, professional development and teacher resources (CENTRALiSchool, 2002).

What Are The Unidentified Or "Hidden" Costs?

A complete set of guidelines, structures and costs does not yet exist for Saskatchewan Education's online learning strategy. The CENTRALiSchool online pilot projects have different delivery and design models from each other and would have different cost structures. The online teacher may visit the students on site several times or, all the students may be together in one school and the teacher in another school (CENTRALiSchool, 2002). The difficulty of predicting costs for online learning with any measure of precision is complicated by various factors:

1. few long-term costs data studies available on any type of technology costs

" there has been very little hard data collected on the long-term costs associated with operating and maintaining technology in schools" (Consortium for School Networking, 2001, p.3-4).

2. comparison of electronic delivery to face to face teaching

"Traditional delivery depends on physical plant facilities, electronic delivery depends on communication infrastructures. These systems are usually cost recovered in different ways making conversion from one delivery mode to another artificially difficult" (Jackson, 1999, p.2).

3. type of electronic delivery modes available and used

"Costs of some technology delivery modes 'scale' differently. This scaling effect requires careful study when reflecting the appropriate delivery method for an academic program" (Jackson, 1999, p.4).

4. the institutions choice to produce their own learning materials or to purchase from another provider

"Sums of \$50,000 upwards are required to develop programs" (Bates, 2000, p.24). Substantial start-up costs need to be averaged over time as "The cost for the second and subsequent offerings of the course decreased substantially" (Bartolic and Bates, 1999, p.10).

5. what cost per unit ratio is used

School divisions in Saskatchewan are funded according to their numbers of full time student equivalents or FTEs based on calculations of face to face teaching. Many distance learning cost estimates use A.W. (Tony) Bates' research, which calculates costs per study hour or student contact hour, which are different and depend on course design (Collis, 1996).

6. varied instructional design

Different instructional designs for online learning will have different costs associated with the levels of interaction and type of media used. Generally, the higher the level of interaction, and the more complex the media required, the higher the cost. "Well designed online learning materials that engage learners in meaningful experiences and provide opportunities for collaboration are costly to develop, maintain, and deliver" (Killion, 2000,p.42).

Bork (2001) states:

Costs of development are not the most critical costs in considering distance learning, although they are the most frequently mentioned item. From the standpoint of both the individual and the society (the country or the world) the most important factor is the cost for a student hour, including development, delivery, possible profit, and administrative costs. In calculating the cost for a student hour of learning it is important to consider all costs, even those sometimes hidden. (Chapter 3, p.10)

The decision making process is complex, but decisions still have to be made. Richard Parker (Leach and Smallen, 1998) suggests using the "grandmother hypotheses." He believes in becoming as informed as possible and then using the facts that even your grandmother would know to be true:

Economies of scale--The unit cost of a service will decrease as the number of units increase.

Outsourcing--The unit cost of providing services decreases with the degree to which they are outsourced.

You get what you pay for--As service levels increase, the unit cost of providing the service increases.

Complexity--The unit cost of a service increases with the complexity of the environment in which that service is provided. (p.3)

The importance of making informed technology decisions rests with those accountable to local taxpayers for the school budgets. Urban school divisions on average already spend \$750,000 of their current annual budgets on technology without the addition of online distance education. Division trustees have referred to this technology spending as a 'black hole' (Tymchak, 2001, p.88-89). A minimum of approximately an additional \$50,000 would be required to start-up a division's own online course development. At this time, Saskatchewan Education will pay for a division teacher's release time to develop and teach approved online classes for CENTRALiSchool, but then shares copyright with the division. School divisions may receive funding from Saskatchewan Education for their teachers' release time of \$15,000-\$30,000 for production of professional development and teacher resources, and \$60,000 for web-based instructional resources. Funding for these projects depends on the annual provincial budget (CENTRALiSchool, 2002).

Table 2 illustrates a hypothetical division budget without an increase in technology funding, but receiving a distance education component. Percentages are obtained from the National Center for Supercomputing Application's *Building the 21st Century School* web site and are calculated in Canadian dollars, averaged to the nearest dollar. The enrollment for the urban school division is based on 2800 FTEs. The rural school division enrollment is based on 1000 FTEs. Technology spending is averaged at \$267.86 per FTEs. The figures are calculated for a year one cost distribution for an average K-12 school and for a five year cost distribution for an average K-12 school. A three percent inflation rate is factored into the five year cost distribution.

TABLE 2

Average Saskatchewan School Division Technology Budget Estimate

Technology Budget	One Year			Five Year (3% inflation rate)			
		URBAN	RURAL			URBAN	RURAL
Distance Learning Equipment	14%	\$105,000	\$37,500	11%		\$92,855	\$33,163
Data Network	10%	\$75,000	\$26,786	7%		\$59,089	\$21,104
Internet Connection and WAN	2%	\$15,000	\$5,357	2%		\$16,833	\$6,030
Telephone System on Premise	3%	\$22,500	\$8,036	2%		\$16,833	\$6,030
Spares and Other Equipment	1%	\$7,500	\$2,679	1%		\$8,441	\$3,015
Training	4%	\$30,000	\$10,714	10%		\$84,413	\$30,147
Support	9%	\$67,500	\$24,107	20%		\$168,826	\$60,296
Building modifications	36%	\$270,000	\$96,430	17%		\$143,502	\$51,251
Furniture ergonomics	11%	\$82,500	\$29,465	6%		\$50,648	\$18,089
Computers and Peripherals	10%	\$75,000	\$26,786	24%		\$202,592	\$72,355
Total Technology Budget		\$750,000	\$267,860			\$844,132	\$301,479

(National Center for Supercomputing Application[NCSA], 2001: Graph/Spreadsheet, 1997: using Canadian Dollars).

The majority of high school students feel social interaction of a student to student and teacher to student nature extremely important. To retain online secondary students, an interactive learning environment with a sufficient level of access and support may require higher costs than most current studies indicate. The 1999 dropout rate for Saskatchewan K-12 traditional classroom students was seven percent (Statistics Canada, 2002). Distance education has a much higher dropout rate of approximately 10-20%, but studies generally involve university adult learners. It would be expected that secondary students would have a rate of retention lower than adults, and a baseline estimate would, therefore, be a minimum of 17-27%. A study of K-12 school children found, "Electronic delivered programs have an estimated discontinuation rate of approximately 25.7%" (Province of British Columbia, 1999, p.53). The number one reason almost half of the students, 49.5%, discontinued online courses in the British Columbia study was because they returned to the conventional classroom. Factors provided in the study are not age dependent and supported by the research literature include a lack of social interaction, time to complete the course requirements and motivation. Isolation and technical issues easily lead to frustration. Parents also found the program structure unsatisfactory including their own time required helping their child (Province of British Columbia, 1999, p.iii-iv).

One of the largest factors to produce equity in providing online education is physical and social access to the technology, so that learners have 24 hour, seven day per week flexibility of connecting to their course any time, anywhere. Computer access in all of Saskatchewan schools is one computer to seven decimal five students, one Internet connected computer to every nine students and one multimedia computer to 15 students. As many as 64% of the teachers felt access to computers was inadequate in their schools (Saskatchewan Education, 2001, p.89-90). Without high speed Internet connections and multimedia computers, some of the video and graphic capabilities reception are limited. The younger the student, the more critical image quality and the closer to the home "entertainment" quality desired (Minoli, 1996, p.256-258). To complete the course requirements on an equal level and interact with peers or the instructor, facility access to the technology beyond basic school hours would be needed for students without the technology at home. Another method that institutions may use to increase access, is a dual mode of delivery so that online and print-based materials are available to all students.

Although some resources are available at local libraries or "free" on the Internet, online learning would involve purchasing some copyrighted print and electronic material. Even if a school division develops its own online courses, copyright clearance for reference articles could be as much as \$700 per year for a course (Bartolic and Bates, 1999, p.4).

Saskatchewan Education has only developed three online databases with rights cleared and providing full text journal articles: Canadian Business and Current Affairs, Info Trac and Repere. (Saskatchewan Education, 2001, p.87). More learning resources would need to be offered online and accessible to students. Commercial publishing has limited academic electronic materials available as it begins new business expansions to Internet markets and profits. To provide student support and manage copyright limitations and restrictions, a large scale electronic library would need to be developed with an electronic reserve collection of material and links to online documents (Ingliš, Joosten and Ling, 1999).

An important area to consider is the type of support provided. Rural Saskatchewan school divisions generally employ only one technology consultant or computer coordinator, who has been hired from the teaching staff. The job duties vary, but usually it involves all technology technical support, although repairs may be outsourced. "In addition to computer science and information processing teachers, there is currently one computer and technology consultant for every 600 teachers" (Saskatchewan Education, 2001, p.34). Each school also employs one computer teacher as part of its instructional staff, who may also provide some support or service depending on their training. The ratio for technical support could be based on the number of computers, but perhaps more appropriately should be based on the number and types of students. Their previous knowledge level, computer literacy and comfort level with the technology influence the level of technical support needed.

If a school is not delivering courses, or paying an instructor from their staff for teaching online, providing onsite student support is still considered necessary. The type and duties of these support personnel is significant. Should these support personnel be a less costly facilitator teacher assistant or a certified professional teacher or a certified professional teacher with special training? Salary could be as low as \$6600-\$16,500 for a teaching assistant, which is consistent with the tutoring Bates found necessary at \$7040-\$8800 per year for adults (Bartolic and Bates, 1999, p.4). A minimum higher salary might be \$46,776 if a teacher were hired that possessed a minimum of a Saskatchewan Class V with 5 years of teaching experience and two degrees (Boards of Education, Government of Saskatchewan and Teachers of Saskatchewan, 2000, p. 3). The Saskatchewan Teachers Federation is concerned that there is "the potential for school divisions to view distance education as a less costly alternative to hiring staff for 'on site' instruction" (Saskatchewan Teachers Federation[STF], 1997, p.4). Their policy position is that teachers have no extra increase in workload, adequate preparation, professional development and that "A teacher must be present when students enrolled in distance education courses attend a distance education site" (STF, 1997, p.8-10). Untrained teachers would need ongoing

training and professional development at an additional expense to a school division. Not only would there be the cost of hiring training instructors, but "one of the largest components of the cost of staff development can be substitute teachers, when it is determined that the teaching staff needs to be trained during the regular work hour" (NCSA, 2001, p.13).

If extensive professional training is required to be an effective online teacher at the receiving and sending end, it would be more feasible to hire someone who already possesses professional training and experience such as an Educational Technologist. Collis (1996) defines their role:

Educational technologists are:

Designers, developers and adaptors of courses or episodes for tele-learning

Specialists in the design, development or adaptation of specific materials and environments in tele-learning

Professionals involved in the delivery of tele-learning courses or episodes

Teachers of those who will be or who are already tele-learning professionals

Learners themselves in a rapidly changing field

Reflective thinkers about tele-learning (p.434).

Tele-learning "Making connections among persons and resources via communication technologies for learning related purposes" (p.602).

The most comprehensive trained have typically a minimum of a four years teaching degree, teaching experience and a Masters in Educational Technology and Communications, which may be obtained at the University of Saskatchewan and various other universities. Invaluable human resources, with their knowledge, experience, expertise and professional contacts, Educational Technologists should be necessary personnel for any distance education plan.

"For the public education system as a whole, technological literacy means adapting to the new reality of market competition. Virtual K-12 schools are springing up all over North America and beyond. Home-schooling registrations across Canada are rising" (O'Brodovich, 2000, p.12). From 1995-2000, home schooling almost doubled from 995-1640 students and there were over 5,525 course registrations in the Saskatchewan Correspondence School (Saskatchewan Education, 2001, p.22). Even with professional support and access, it may be difficult to not just retain rural online high

school students, but to encourage them to enroll in the courses. Besides school personnel, students and parents would need information and a willingness to participate in the courses. This would involve marketing, as information is increasingly viewed as a competitive commodity and advanced telecommunications technology heightens people's expectations of learning (Porter, 1997). Parents who have had bad experiences with older print-based correspondence would want to be assured their child is receiving a quality learning experience. Marketing a distance learning program would involve "evaluating the program, setting objectives, identifying personnel and equipment, analyzing the target audience, identifying your market role, and selecting media for marketing" (Porter, 1997, p.184). The costs of a professional media advertising campaign could add as much as \$3000 per year to each course (Bartolic and Bates, 1999, p.4).

Of greater concern is the rise of Virtual Schools, independent entirely of physical classrooms or buildings, and increasingly built in cyberspace, learning is transported to the student. Students in Saskatchewan might choose to abandon a school division and enroll entirely online. If these schools are able to entice enough market share of students, they should eventually be able to cost effectively operate without facilities, extensive use of faculty, transportation or real estate expenses and by producing economies of scale. In other countries, other Canadian provinces, the building of these schools has begun and students have enrolled unconfined by time or place. Kate O'Brodivich (2000) suggests the Saskatchewan education system has two choices: " try to preserve its 'market share' by limiting access to alternatives through legislation and policies" or:

The alternative is to proactively protect the integrity of public education by extending the capacity to serve all learners, including those who choose home-based and distance learning. While other provinces and countries are in the process of developing distance learning opportunities, Saskatchewan has an immediate window of opportunity to participate in partnership initiatives. (p.12-13)

What Financial Problems, Solutions And Opportunities Have Other Institutions Discovered When Implementing Distance Education?

At this time, Saskatchewan has limited online programs to evaluate successes and weaknesses. In order to learn from the past and plan appropriately, other institution's financial problems, solutions and opportunities can be examined "taking into account current trends in technology, education, and training, you also can anticipate where you want your

program to be in the future" (Porter, 1997, p.185). The current literature reveals lessons learned in the online distance education reform quest.

The World Wide Web, interactive multimedia and computer-mediated communication convergence over three decades have created a "watershed" for education and online learning. Education and training providers are making the transition to the knowledge media for three main reasons: "The knowledge media offer the possibility of delivering courses in ways that are cheaper; faster; better" (Inglis, Joosten and Ling, 1999, p.34). These should not be the reasons for transition.

Delivering online courses may not be cheaper, but as or more expensive than existing instruction. Inglis et al. (1999) studied the economies of scale rule and found several notable misconceptions and variances, dependent on previous distance education delivery. The Saskatchewan Correspondence School has operated a highly successful print-based system for over 75 years. Many institutions erroneously attempt to follow the success of the UK open University model. Their high cost of development of learning materials and delivery systems is balanced by reproduction and spreading the cost to a large number of students. If economies of scale are already realized, "then the scope for achieving additional economies of scale through a change of mode may be small" (p.43; Bates, 2000). Shifting from classroom to electronic resource based delivery is likely to be greater where a well developed system of print based distance education does not exist. Australia, which had already developed a dispersed cost effective model of distance education combined with face to face teaching, would receive limited cost savings by switching to online delivery. United States, historically, did not have a national distance education system established, and a switch from classroom to resource based delivery has a greater potential of cost savings. Increasing the average annual intake of number of students does not guarantee increased income, as the economies of scale diminishes and reaches a saturation point. The substantial marketing costs of attracting each additional student rises, reducing any economic benefit (p.46). As well, maintaining the fixed costs of delivery infrastructure and development of learning packages, but cutting the variable costs of administration, student support and assessment, also reduces "the extent of student-tutor interaction which is generally considered to be detrimental to the quality of the student's learning experience" (p.55).

Delivering online courses may not be faster for all individuals. Time and expense is required for increasing access and also development of faculty and courses, and time can be expensive. The Internet can deliver electronic learning

materials almost instantaneously, but in order to receive access one must be connected. Inequalities, economic, educational, and social, may amplify unless action is taken (p.54). Increased physical and social access means an increase in expenditures. Offering a dual mode delivery system, that still includes mailing print based resources to some students, would not be any faster for them than the current Saskatchewan Correspondence School system. Electronic delivery modes have higher start-up costs than traditional classroom delivery. This additional expense can be as much as two decimal five to four times higher, mostly due to faculty preparation time. This may be because of differences in presentation including an increased display of graphics (Jackson, 1999, p.1-2). Instructors have also found a 3 times larger time commitment to teach an online course resulting from the amount of frequent immediate feedback demanded from the students (Palloff and Pratt, 1999, p.50).

Delivering online courses may not be better, but this depends on the comparison and quality. Better than what and better for who? As in any traditional school, the quality of the course and instructor are paramount to a successful online learning experience. Online learning is considered better than print-based correspondence because of its presentation diversity and interaction capabilities (Inglis et al., 1999, p.35). Students still feel that online distance education courses may not be better than traditional face to face instruction. Students who participated in online learning though, were generally satisfied with their learning experience. As more research and evaluations of secondary online learning become available, the answers will become clearer. Until then, we can only consider online learning at best, equal to face to face teaching and examine it in regards to any known benefits or opportunities it offers students (Simonson, Smaldino, Albright and Zvacek, 2000). "Distance education should be guided by sound pedagogical principles that support an effective teaching and learning environment, rather than determined by particular technologies or economic circumstances" (STF, 1997, p.8).

Conclusion

The benefits and costs for online distance education delivery to rural Saskatchewan high schools, particularly sources of continuing funding and future implications, have been underestimated and must be considered carefully by all stakeholders. The proposed reform plan for Saskatchewan education will be implemented on a diverse population, over a large geographic area and involve a variety of stakeholders. Examination of implementation of other education institutions' online distance education plans reveals that the compelling reason to adopt this transition should not be economic, as it may not be cost-effective. Many educational institutions' online ventures have required substantial start-

up funds and sustainable funding over the lifetime of the course. Difficult to budget for, these plans often ended up more expensive than predicted. The most compelling reason for choosing online distance education should be the students and to provide them with equality of education by offering a quality, equitable learning experience. Rural students have the right to equity of access to education but, what is the bill, who will or can afford to pay it, and why should they? Rural school divisions struggling with current funding policies and low enrollments don't have enough money and resources for their current programs. In 2002, thirteen school divisions will not receive any provincial funding from the Foundation Operating Grant and property tax owners will be paying 100% of the costs of educating their children (SSTA, 2001, p.8). Rural taxpayers, including the parents, are already paying the burden of the costs of educating their children through payment of high property taxes. The SSTA (2001) has clearly stated their position:

There is no evidence beyond small differences in spending that the variations in local fiscal capacity have produced significant differences in program delivery. At present, there are some differences in spending related to assessment per pupil but not necessarily differences in opportunity. There is, however, legitimate concern that if this issue is left unattended that such differences may result. (p.11)

If governments and industry want lifelong technologically savvy workers to better compete in the global marketplace and increase economic productivity, then they should pay more of the overall costs of educating these future workers, including the development of online distance education (Bates, 2000).

A. W. (Tony) Bates, a prominent distance education researcher from the University of British Columbia considers online learning an investment whose success and worth depends on the values and goals of the organization. " It is important not only to focus on the costs of developing and delivering an online course or program, but also focus on potential performance and value added benefits to both the institution and more importantly the student" (Bartolic and Bates, 1999, p.16). There is also a high cost of not investing in online distance education. Our province is rich in natural resources, but also human resources. Saskatchewan grows more than just what many feel are the best grain crops in the world; we also grow good crops of people. We have as much talent as anyone else, anywhere else in the world. If our farmers are the most productive in the world, each one feeding 200 people, why can't we develop world class quality online distance education for not only our rural high school students, but to feed the hunger for learning in the rest of the world? Saskatchewan has one of the best telecommunications infrastructures in the world and international distance

education expertise, but instead of exploiting our potential and becoming world class leaders, we have been too cautious. We have allowed our neighbors to develop, research and exploit this market. If we remain in a developmental stage, we will become lost in the evolving competition. All education stakeholders need to work collaboratively together; there is no investment worth more value than our children. With the development of quality online distance education, Saskatchewan rural high school students could:

- learn at their own pace
- receive current information
- improve their technology skills
- enroll in courses not offered at their local school
- stay in their own community instead of traveling long distances
- connect, communicate and collaborate with other students, teachers and experts from Saskatchewan and around the world.

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