

ICT and Education Saskatchewan Experience Major Decision Areas

Background

Saskatchewan is a province with a large geographic area (651,000 square kilometres and a small population (1,000,000). The population is dwindling in rural and northern areas of the province creating problems for the education sector in providing equitable educational opportunities for learners regardless of their geographic location in the province. Technology has been viewed as a tool to support rural and northern teachers and insure that equity to educational programs and equity in benefit from educational opportunities can be provided.

Saskatchewan began in 1991 to use ICT to support teachers by way of a Special Education Bulletin Board System and when the World Wide Web became available to the public across the province moved to the Internet as the vehicle for development and delivery of content and dissemination of support.

Government initiatives to provide services online were used to support the educational use of the Internet and improve access and content development. Eventually a consortium of school divisions was developed to provide support for the ongoing development of both networks and content in the Province.

Throughout the last 12 years of development numerous issues have been debated and decisions taken. These can be generally categorized into five areas:

1. Online Curriculum;
2. Digital Content Development;
3. Teacher Involvement/Training and Ownership;
4. Access and Distribution;
5. Consortium and Partnership development.

I. Online Curriculum

Background

The use of ICT to support learning in Saskatchewan was never perceived as the development of a technology education program but rather was and is seen as a means to support the provision of the best possible educational program for all learners. There were two areas of debate that occurred when the province began support the development of digital resources:

1. Should the emphasis be placed on distance learning or should the use of ICTs be used to support all teachers and learners regardless of the mode of instruction? Digital resources were seen as useful by teachers at all grade levels and in all modes of instruction.
2. Should complete courses be developed or should resources be developed that could be used by both teachers in the traditional classroom and by distance education teachers?

These two debates are interrelated; if one chooses to make courses and not resources then you have also likely chosen to focus on the secondary system where “courses” are taught and not on all grade levels. You are also likely to have chosen to not make the resources available to all teachers, as they would be imbedded in the “courses”.

On the other hand, if you choose to develop resources and not courses then you have moved away from the traditional “distance learning” course and added complexity for the distance-learning teacher. This is because that teacher will now have to build a course from the resources each time the course is offered. This means that the same course taught by two different distance-learning teachers may have unique features in each one. This is similar to what happens when two teachers in the same school teach the same subject and infuse their own distinct styles and approaches. By having resources and not courses it will be easier for teachers to access the resources regardless of the mode of instruction and easier for teachers at all grade levels to access the resources. This was also seen as a way to get the most use out of any developed resources.

Saskatchewan made the decision to provide ICT resources at all grade levels both for the online curriculum and for content. It also decided to make resources and not courses available. There continues however to be individual schools and the provincial correspondence school that develop courses in a more traditional fashion.

The following provides some context for the Saskatchewan situation:

1. There were many small schools with teachers being required to teach numerous subjects, some of which were outside of their areas of expertise. This was particularly true in math and sciences.
2. The number of subject areas being offered in the small schools was reducing thereby penalizing the student when they enter the post secondary or technical training environment.
3. Saskatchewan’s curriculum is based on the principles of resource-based learning.

4. The convergence of technology is seen as assisting in making the distance learning experience more like the classroom experience and vice versa.
5. There was a growing level of dissatisfaction with televised distance learning and with traditional correspondence distanced education.
6. Resource Centres in small schools lacked many of the resources necessary to support resource based learning and the Internet and other digital resources are seen as means to regain those resources.
7. While the need for secondary credit courses was undeniable, the need for the use of ICT to support learners at all grade levels was expressed especially by rural and northern schools.
8. Currently there is a national initiative to cooperatively develop and populate a learning objects repository.

Online Curriculum Development

In 1995 the Department of Learning approved the development of an online curriculum and the Multimedia Learning Strategy and provided some funding for development of resources. While the department approved the development, the responsibility for that development fell to three individuals: an executive director who had overall responsibility for curriculum and instruction, a director who had overall hands on responsibility for the development and a seconded teacher who led the conversion team.

In 1995 the IT branch of the Department was engaged to support the online curriculum development. However their involvement was abandoned within a few months. The reason was that the IT group wanted to develop a complete data model before beginning to do any “work” on the online curriculum. This was such a time consuming effort and so much time was needed to explain to the IT staff what we already knew were our needs that the Curriculum and Instruction team initiated the activity on their own. The IT branch was reengaged some years later when the curriculum was already converted and content development was largely underway.

In 1995 with the help of a Co-op student, the curriculum conversion process began. The first curriculum to be converted was the science curriculum. This was only because of the interest of the teacher leading the conversion team. The conversion was done using HTML and not PDF. This was done because at the time it was much easier to link to an html document to add resources. Also, searching across curricula was possible with html and not PDF at the time.

Within a year several curricula had been converted and while the conversion process continued there was a need to add links and resources to make the online curriculum more useful. This process of adding links continues today.

At first the links were added directly to the web pages but it was soon apparent that having a database of links would make maintenance of the links easier.

There was/is also a paramount need to encourage teachers to use the online curriculum. The two needs -- i.)building links and resources and ii)teacher use were combined. In-

service training sessions were held according to discipline and teachers were invited to cooperatively search the web and find resources that could be added to the curriculum. When a teacher located a site, the other workshop participant reviewed the site and if there was consensus a link was added. This was done immediately and the teacher was able to see their contribution to the online curriculum.

All in-service trainings and projects like “Grassroots” had to be directly linked to a curriculum objective or outcome. This was done to insure that the activities were seen as an instructional support and not an “add on” to a teacher’s workload.

During the process of curriculum conversion it became apparent that the process of curriculum development needed to change so that new resources could be easily placed on the Web.

During the first few years of online development the teaching community expressed several concerns:

1. Will the checks and balances currently in place to insure that a curriculum is appropriately reviewed be short circuited in this new environment?
2. Will teachers have access to databases of questions? Will students have access to question databases?
3. What will be the criteria for linking other resources and web sites to the curriculum? Who will make those decisions?

By 1998 these concerns had been allayed and the online curriculum was positively perceived across the education sector.

By 1998 most of the curricula had been placed on line and the emphasis shifted to additional resources and online instruction. The need for a relational database was growing and the department’s IT branch were reengaged to support that activity. This work has not been completed and may become a part of the national “learning objects” repository project. Fiscal restraints have delayed the database development.

Questions for discussion

If Egypt embarks on the development of online curriculum and resources what format will be used and who will lead the process? Will a relational database be used from the beginning and what are the issues surrounding tagging of items to permit search and retrieval by teachers and students?

How will the development of online resources impact current curriculum and resource development processes?

What criteria will be used to insure that linked resources are of high quality and relevant to the curricula to which they are linked? Who will approve these resources? How will high quality be maintained?

What type of content currently exists in digital format in Arabic? What would be strategies to increase the amount of Arabic content?

How will assessment and assessment items be handled in an online environment? What impact will on-line resources have on examinations?

II. Digital and Online Content Development

When Saskatchewan began the development of the online curriculum, the focus was on teacher support and therefore indirectly on student support. The first digital resources developed in 1995 were CD-ROMs. They were stand-alone products that support a portion of the curriculum. By 1998 the levels of access and level of use of online resources was such that Saskatchewan moved to the support of smaller digital resources that would be server based and linked directly to the curriculum.

At the same time the federal government was supporting the “GrassRoots” program that consisted of online collaborative projects that resulted in the development of a web site. Saskatchewan negotiated an arrangement to administer the program in Saskatchewan and required that the projects be directly linked to a curriculum objective or outcome. The rationale for this arose from concerns that teachers expressed regarding their workload and need to teach the curriculum. Additional tasks not related to their primary objectives were seen as add-ons and were not well received. The GrassRoots program in Saskatchewan required 9 classrooms to collaborate on a project and build a web site as part of the project. Upon satisfactory completion of the project, the schools received \$5,000.00 to be spent for the benefit of the school. The end result of this process was increased use of technology, additional resources linked to the curriculum and the monies were used to support the school program. Typically the funds paid for Internet access or the purchase of new hardware such as digital cameras, printers, computers and educational software.

In 2000, additional funds from the province’s contribution to schools were targeted for online content development. The amount of funding was \$2,500,000.00. Having this amount of money now available raised a number of issues some of which are:

1. What should be developed?
2. Who should develop the material?
3. Since this money is from the funds allocated to schools what should be the role of the schools in the development of the resources?
4. What will the criteria be for the resources and what will the format be for the resources?
5. Who will make the quality assurance decisions?

These issues were not entirely resolved in the first year and improvements have been made each year with the experience that comes from practice. In order to resolve these issues the following procedure was utilized:

1. Schools were invited to indicate what they perceived as the most needed resources. This information was compiled and the results were then provided back to the schools with an invitation to submit a proposal for the development of those resources.
2. Guidelines were provided regarding the amount of funds that could be received for a project. A resource that represented 100 hours of instruction could receive \$60,000 in development funding. A critical requirement was that the developing

- teacher team receives release time to develop the materials and to attend mandatory provincial workshops as part of the development process. These criteria continued to be developed over the next few years and the current project specifics can be found in your handouts.
3. The proposals were then received and a department of learning committee comprised of curriculum writers, the learning technology team and regional office staff reviewed the proposals, made recommendations to the deputy minister and the projects were approved.
 4. The teams worked with department staff over the year and developed the materials.
 5. Department staff reviewed the material and in some cases made suggestions for further development before it was linked and made publicly available. There were a few instances where project teams insisted on developing materials within proprietary software packages and as a result were not able to be used provincially.

The issue of avoiding the use of proprietary learning environments is an important one and goes back to the issue of whether to develop complete courses or resources.

Not all of the areas of need were instructional. Schools identified the need for e-business software-student tracking and library software; online professional development for teachers was also an area that was identified. Resources have been developed in all of these areas. Resources were identified that would be used by all schools and provincial licenses were purchased for online databases that could be used by all in the province. This approach resulted in major cost savings over the purchase of individual licenses.

Intellectual Property

By 1998 the type of resources being developed to support the curriculum shifted from CD-ROMs to server based resources that were then linked to the curriculum. This again raised intellectual property issues and changed the relationship with the private sector developer from that of a partner to that of a contractor. The issue was that if the resource were linked to the curriculum then the developer would not be able to sell the resource in other jurisdictions. The province retained intellectual property rights and made the materials publicly available.

In 1999 when teachers began developing resources for the curriculum the issue of intellectual property was raised again. Initially the agreements with schools and teachers were not specific enough and a few teachers maintained that they held the intellectual property and wished to exercise that right. It became important to be clear as to the ownership of the intellectual property from the very beginning of any development.

Clear statements in the initial contract with the school division resolved the issue of who hold the intellectual property rights. The agreement reached in Saskatchewan was that the copyright for content would be jointly held by the developing school division and Saskatchewan Learning. The teacher does not hold copyright of the materials.

Questions for discussion:

What are the most critical areas of need for content development?

Will the resources be developed for additional teacher training, aimed at students or other administrative uses?

What will be the format of the resources? How much consistency across resources is needed?

Who will make the determination as to whether or not the final resource is of sufficient quality to be linked to the curriculum and become a part of the educational program?

Who will develop the resources?

What will be the position regarding the use of open source or proprietary software?

Who pays for the development and how much is paid? Is there an opportunity to cooperate and purchase licenses for resources across the sector or across several sectors?

What will be the incentives for use of the resources in the classroom?

Who owns the resources being developed for Egyptian schools? Will this change in an online environment?

Who should have access to resources and curricula developed for Egyptian schools?

Who will own the resources developed for Egyptian schools?

III. Professional Development: Teacher as Content Developer

Saskatchewan has a long history of teacher involvement in the development of curricula. Since the mid 1980's the curriculum development process has involved secondment of teachers to write the curriculum, piloting of the curriculum by teacher teams and revision of the curriculum by seconded teachers.

A second early decision was made to not teach technology but rather to focus in-service training on subject areas and use technology in the in-service. Technology skills were taught as needed but technology was not the topic of the in-service. This was done by inviting teachers to a subject specific workshop and having staff available to support teachers during the workshop to acquire the necessary computer skills. The focus however was always on the subject area not on the technology in isolation. Our experience was that if the skills learned were not immediately applicable then they would not be well retained and if the teacher could not see the benefit of the application of skill in their instruction then there was little reason for them to use the newly acquired skills.

A major problem has been the perception that the use of technology is an add on to the teacher's already heavy workload. A perception that they will not be judged by the use of technology but by the test results of their students and if the two were not intertwined it is difficult to obtain the desired results. For these reasons Saskatchewan has carefully linked ICTs to curriculum objectives and outcomes. Additionally some resources like question databases are being developed to support the teacher to prepare students for examinations.

When the decision was made to provide funding for teachers to become content developers in 2000 there were other decisions that were made to insure teacher support. One such decision was that monies provided to the school divisions for the development of content had to be provided for teacher release time. This accomplishes several things: i) it grows the knowledge base of teachers; ii) it develops materials; and iii) it builds teacher ownership for the resources and online curriculum.

School divisions were invited to suggest what resources were needed and then were invited to develop those resources. There was also an implication that the teacher team that developed a resource or set of resources could subsequently apply to be the online teacher for the course that used those resources.

This process is labour intensive for the provincial department personnel. They must lead workshops across the province, provide support to teachers as those teachers develop their skills, nurture a quality product and sometimes have animated discussions with schools and school divisions that have taken a different view to teacher support and content development.

This process also requires the provincial department to give up some control of both the process and the product. The changes that are required in this new environment are not just for the teachers in the field but for the beurocracy as well.

Distance learning is changing in Saskatchewan. There has been traditional correspondence distance education since the 1920's. This type of distance education has been offered by a provincial Correspondence School. In the 1980's televised distance education came into use and continues today but on a limited basis.

Digital technology has opened new opportunities for distance learning and for the blending of distance and face-to-face instruction. An issue for Saskatchewan and its many small rural and remote schools is having specialist teachers in math and science. Often the specialist teacher moves to the larger center where he/she can teach their specialized area exclusively. There is also a need to support the non-specialist teacher who is required to teach subjects outside of their major area of training.

Additionally there are many educators who believe that current classroom teachers may be better suited to distance learning than teachers who have for years only taught at a distance.

Saskatchewan teacher led development of online resources has opened the door for classroom teachers to also be distance-learning teachers. This is increasing the number of course opportunities for students and building a growing number of ICT competent teachers across the province.

Questions for discussion:

How are teachers involved in professional development and content development now?

Are teachers involved in the curriculum review process? Are teachers qualified to develop resources? What will be the impact on quality of resources?

Does the involvement of teachers in content development make sense in the Egyptian context? What are the barriers to increased teacher involvement?

Saskatchewan focuses on subject areas and then teaches technology to support those subjects as needed. Does this approach make sense for Egypt? If not what are some alternate solutions?

What needs to be put in place to begin a teacher led online content development initiative?

What are the cost and time trade-offs of involving teachers versus using professional content and curriculum developers?

IV. Access and Distribution

Internet Access

In Saskatchewan Access was initially outside of the Department of Learning. The local Telco provided Internet access. Dial up access was provided at a monthly cost. Higher speeds were available in urban centers with dedicated Access and additional Internet Services providers began to appear. In spite of the fact that costs for dial up went down and dedicated access was increasingly available there was always a disparity between what was available to rural and northern schools and what was available in the urban centers. Cost for access was always higher in rural and northern areas and in some cases non-existent. The issue for Saskatchewan Learning was how to provide equitable access.

Prior to the provincial network, the cost of access was the responsibility of each school. In 1997 the federal government began to provide funding for community access points to the Internet in order to insure that government services could be delivered electronically across the country. Saskatchewan negotiated an agreement for schools to become access sites as a means to help fund the costs of Internet access in the schools. Approximately 250 rural and northern schools became public Internet access sites. This assisted some schools but the basic issues of equity and sufficient access remained.

In 1998 Department of Learning consulted with representatives of the provincial school divisions and agreement was reached to pay for Internet access from the provincial funding for schools by taking the money from the school grants allocation before distribution of the grant. This decision removed the burden of cost from the small school and greatly improved Internet access in the province.

A new issue emerged as a result of this provincial network. There was still and would always be a finite amount of funding available for Internet access and the need for more access continues to grow. How would decisions be made regarding who gets what level of access and when do they get it?

Several options were available:

1. The Department of Learning could make the decisions and mandate them provincially;
2. The Department could turn over the decision making to the provincial Information Technology Branch that oversees the network and let them make the decisions;
3. The Department could turn over the decision making to the ISP providing the network or to one of the provincial school associations like the Saskatchewan School Boards Association or the Saskatchewan Teachers Federation.

Maintaining control provincially either within the Department of via the IT Branch was clearly the simplest and would provide for efficient administration and the ability to develop the network in concert with the other provincial sectors like health. However it would also place the province in the position of never fulfilling everyone's needs and being held accountable for any perceived inequities.

Turning the responsibility over to a provincial group would remove the responsibility from the province but would have the danger of the decisions being based on the needs of a much more narrowly focused group and that group in turn would be held responsible for inequities. At the same time the province would remain ultimately responsible, as the network was a provincial network with the education portion paid from provincial monies.

In order to make those decisions and others regarding the provincial network a decision was taken in 1999 to engage schools in decisions regarding the ongoing development of the provincial network via an Educational Technology Consortium. This consortium is comprised of representatives from the schools and the educational organizations and is charged to work with the IT branch in meeting the needs of the schools for Internet access. While the consortium is at arms length from government, the Department is involved and the Director is an employee of the Department of Learning.

Access to Technology in Schools

The location of technology in schools plays an important role in determining how those computers are used and who uses them. Initially computers were typically found in labs in the schools. This however is not the best situation for use of the computer in day-to-day instruction and truly integrating technology in the curriculum.

The decisions regarding the location of computers and the number of computers in schools is the decision of each school. As a result the situation varies widely from computers in Resource Centres only, in labs only or in some cases in classrooms and connected to a local area network. The decision regarding the number of computers obviously affects the level of access for individual learners but it also affects the speed of access of the connection to the Internet required to make the use of the Internet functional in the school setting.

The decision regarding location of computers will have a direct effect on how the computers are used and directly relates to the basic decision regarding the goal of this activity.

Questions for Discussion

How does the provision of Internet access differ in Egypt from that in the jurisdictions of the presenters? Are there any other options for provision of Internet in Egyptian schools?

How are computers distributed within Egyptian schools? What is the predominate location? Who should determine this location – schools or central authority? What is the affect of this distribution on the use of the computers in the school? Are there any means to nurture additional configurations of computer locations in the schools? Does the location of computers in the school affect the use of the computer by gender?

What choice would you have made with regard to the institutional arrangement for Internet provision if you were in Canada? What choice did Egypt make and why?

V. Consortium Development and Private Sector Partnerships

The development of a provincial network, an online curriculum, the development of digital resources for that curriculum and introduction of online learning led by teachers across the province represented a major change for Saskatchewan. A critical event which necessitated consideration of a different approach to the management of these initiatives was the decision to fund these activities provincially using funds from the provincial grant to school divisions. Prior to this time individual school divisions purchased resources and Internet connectivity.

While there was benefit to this approach there were also some inherent dangers. The responsibility had been shifted to the province and now the schools were consumers. There was a danger that there would be a clamoring for more services and more access without consideration for the overall need. Rural schools that still did not enjoy the same level of access as the urban schools might complain that it was not fair and urban schools could complain that funds that had been targeted for their schools were being diverted to meet the needs of small rural schools, both in terms of access and in content development.

Saskatchewan has a long history of establishing Cooperatives and Consortia to develop organizations based on consensus building and shared responsibility. This new educational environment seemed suited to such an undertaking.

In 1999 and 2000 a series of meetings was held with stakeholder groups with the goal of establishing a consortium to guide the ongoing development of resources and to examine how partnerships across school divisions might assist in reducing costs and developing compatibility of networks and software programs.

A decision was taken to formalize a consortium and -- while still supported from within government -- to establish it at arms length from government. This permits it to respond more quickly and to raise funds directly with other partners.

The consortium established committees to deal with the Provincial Network, E-business and Administration, Content Development and Online Learning. The department provides staff to administer the consortium and the consortium makes recommendations regarding the use of the funds allocated for these activities.

The consortium has become a legal entity, at arms length to government to permit it to raise funds and make decisions more rapidly than may be possible within the provincial government structure.

The end result is that the committees perceive themselves as problem solvers, supporters and owners of the initiatives rather than consumers without input or control.

This method of governance does however require a significant amount of time to arrive at sufficient agreement on decisions to proceed with implementation. Additionally while

the consortium is at arms length, the province continues to have a vested interest and is ultimately the funder of the activities. This means that the activities of the consortium need to have alignment to provincial goals or at some point the disjoint between government and the consortium will have negative impacts on these important undertaking.

In 1995, when the province first established a multimedia development fund, the fund became a vehicle for seeding private sector partnerships and supporting the development of the new media industry in Saskatchewan. The development of educational resources, software and other products can be an important economic development tool. While the province moved to a server based development of resources and retention of the intellectual property, private sector partnerships continue to be important both to insure that resources are developed that have a good fit to the curriculum and to support the new media industry in the province.

Other private sector partnerships have been developed as well. Industry organizations often have a desire for communities to understand their industry and seek out the education sector as a means to provide that information. Quality resources regarding forestry and the mining industry for example have been developed in Saskatchewan as a result.

Local industry has a need for skilled labour and schools in the province have partnered with local industry and developed training programs that provide for development of a local workforce to the benefit of both the industry and the school.

Other industries have a need to be perceived as giving something back to the community. In Saskatchewan this is particularly true of large multinational corporations whose main operations are outside of the province. Northern schools have partnered with Uranium Mining Companies to obtain support for special programs and scholarships. It is important in these situations to understand that a partnership is not a charity, but rather an arrangement that must benefit all parties involved. This is sometimes difficult for schools to understand and when misunderstanding occurs the partnerships can fail.

Partnerships with television and telephone companies have been used to provide infrastructure for schools or through promotion programs to provide fund raising opportunities for the schools.

Questions for discussion:

Does a Consortium approach to management of Internet Access and resource development make sense in the Egyptian context?

What other models might be appropriate for Egypt?

Have private sector partnerships been exploited fully in Egypt? If not, what are some opportunities? What are the pros and cons of these partnerships?