

Building Technology-Literate Organizations: Making Virtual a Reality

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Abstract

The keys to success in building a technology-literate organization are threefold: engage faculty early, develop a cooperative network through technology-enhanced learning, and capitalize on early successes to advance institutional goals. This paper discusses how collaboration and partnerships are leveraged at the Saskatchewan Institute of Applied Science and Technology (SIAST) to accelerate the pace of faculty development and the smooth integration of technology.

Achieving a critical mass of champions is essential for institute-wide faculty orientation. SIAST uses a collaborative model of skill transfer within its community of peers and a network of learning labs to familiarize faculty with technology, instructional resources and techniques. During the first year of operation, 47 percent of employees participated in training sessions. SIAST worked closely with partner universities, technical institutes, Aboriginal institutions, government and industry to build a technology-enhanced learning network that features a common policy framework and quality standards for content development. Partnerships with industry and the Saskatchewan Apprenticeship and Trade Certification Commission allowed a demonstration and the delivery of applied and skills-based training across the province as a proof of concept and model.

SIAST is now focusing on refining solid project plans, sound instructional design, high-quality interactive instruction, a consistent look and feel to courses, and rigorous evaluation strategies. In a period of 18 months, SIAST has gained recognition as a leader in the online delivery of technical training through its impressive array of online programs and services. This systematic approach has worldwide application and could assist developing institutions in achieving their goals more quickly with only a modest investment of resources. The strategies developed at SIAST have attracted considerable attention and organizations in three countries are examining them for possible implementation.

Introduction

Advances in information technologies and telecommunications systems are profoundly affecting education and training in the province of Saskatchewan. The growing availability of the Internet, satellite and wireless networks, CDROMs, video conferencing, and multimedia software provide new possibilities to enhance access and quality of education and training.

As part of a major restructuring effort at SIAST, which amalgamated four previously decentralized institutes, technology integration was seen as a key strategy in extending the organization's traditional boundaries as a relevant and modern technical institute. The establishment of a virtual campus, announced in May 1997, was one of the cornerstones of a transformation process that would move SIAST toward a distributed leadership model and create a single provincial technical institute.

Upon examination, it became apparent that the development of a fully operational virtual campus would require a substantive investment in capital, human resources, and training that was beyond available institutional resources at that time. While the notion gained wide acceptance among faculty, staff and stakeholders as a rallying point for creating a new future for the organization, in reality the project could only be successful if it was developed and structured through a collaborative effort.

This paper describes how an entrepreneurial and collaborative approach with internal and external partners is essential in realizing the vision of an organization. The thrust of the paper is on how SIAST leveraged technology to accelerate the pace of faculty development and led to the early adoption of an expanded capability of delivering training that is learning centered, available anytime, accessible anywhere, and responsive to the needs of consumers. The paper chronicles the strategies and the results achieved in all phases of development. An examination of SIAST's development into a successful e-learning institution confirms the importance of developing a collaborative framework, creating a solid technological foundation, building upon a community of champions, and partnering with internal and external stakeholders. The approach serves as a blueprint for achieving a technology-literate organization quickly with a modest investment in resources.

Develop a Cooperative Umbrella Framework

Technology-enhanced learning

Given Saskatchewan's relatively small population dispersed over a large geographic area, the establishment of a technological infrastructure and the development of a province-wide plan were deemed critical as springboards for action in technology-enhanced learning. In order to benefit fully from the advantages of such a strategy, the province had to address several barriers that were limiting the use of technology in post-secondary education. In 1998, with less than 20 online courses, Saskatchewan had the second lowest number of online courses in Canada (TEL Action Plan, 2000, p.22). Insufficient support and limited professional development opportunities for faculty at any one institution precluded progress in overcoming the pressing need for technical and instructional design assistance. Limited resources and a lack of experience in supporting learners in an online multimode environment was an impediment to access and the application of educational technology. No forum was available on a system-wide basis to address the many emerging issues concerning interaction with students, quality of teaching, workloads and intellectual property rights, copyrights and royalties. Clearly, the province needed to address several barriers that were limiting the use of technology in post-secondary education and training to benefit fully from the strategy.

Faced with these challenges, a consortium of universities, colleges, Aboriginal institutions, SIAST and the provincial government's Department of Post-Secondary Education and Skills Training was formed to develop a technology-enhanced learning (TEL) plan for the province.

The consortium created a vision that encompassed the following: “Saskatchewan post-secondary education and training sector works collaboratively to make appropriate use of technology to serve the learning needs of all residents of the province by enhancing the quality of programs and extending access” (TEL Action Plan, 2000, p.25). The action plan defined roles, responsibilities and inter-relationships based on the following principles:

- **Equity** - enhanced access to educational opportunities.
- **Quality** - content and instructional strategies that meet academic, pedagogical and industry standards.
- **Choice** - greater choice through flexible, responsive, relevant and timely programs and services.
- **Coherence** - increased opportunities and mobility for learners through a coherent and integrated delivery system and program array.
- **Sustainability** - long term support by organizations and predictable funding.
- **Partnerships** - working together on the basis of mutual interests, complementary strengths and shared responsibilities.

As part of the implementation of the TEL action plan, five key enabling strategies were identified as necessary to achieve the goals and vision set by the consortium. The strategies included:

Develop TEL content and instructional strategies

Based on the following priorities, a target for developing at least 200 online courses in the first three years of operation was established to provide:

- education and training opportunities linked to industry, employment and research sectors of the province;
- new opportunities that respond to needs in rural and northern areas;
- additional options for adults to develop basic academic, literacy and math skills required for entry in post-secondary education;
- increased flexibility and access to apprenticeship training; and
- enhanced access to and success in education programs for Aboriginal people.

Faculty development and support

The introduction of services available to all faculty members, including:

- onsite and virtual resources in instructional design and teaching;
- established networks to provide professional development workshops, in-service and peer support throughout the province;
- media support and technical support for faculty; and
- funded research and evaluation projects aimed at determining effectiveness of TEL and dissemination of results.

Learner support services and networks

A wide range of academic and technical support is provided to ensure participation in TEL opportunities, including:

- province-wide network of TEL centers;
- upgraded on-campus computer facilities and classrooms to support TEL delivery; and
- enhanced learning resources through a provincial library network.

Management and coordination

A system-wide collaboration among stakeholders, based on:

- governance model that facilitates the management and coordination of TEL activities such as leadership, policy direction, prioritization and planning;
- joint action mechanism for implementing the action plan and leveraging funding; and
- jurisdiction-wide needs identification as a basis for priority setting and developing a collaborative response.

Linkages with industry, communities and other organizations

A strengthened institutional capacity through partnerships with:

- private and public sectors to improve infrastructure and connectivity;
- communities and industry to address education and training needs; and
- local, provincial and national institutions to create new opportunities.

The importance of creating a TEL framework and common vision and direction cannot be overstated as a proven approach to a successful enterprise. Worldwide, there are numerous

examples where post-secondary institutions have formed consortia or partnerships to expand the array of learning options through technology. In most cases, these frameworks facilitated the integration of TEL into the mainstream of institutional programming and as a means of serving both on and off-campus students. “There is no way an organization can adapt to the rapid change in the environment without a sound and solid use of technology; therefore, learning organizations can only be created and succeed with the intelligent application of technology.” (Kearsley & Marquardt, 2001, p.29)

SIAST Virtual Campus model

Extensive research of other jurisdictions suggested that a virtual campus normally performs five main functions as depicted in Figure 1. The adoption of this model supported the channeling of efforts into specific functional areas and allowed the development of existing capabilities in each of the sectors that were integral to this form of program delivery. An obvious benefit of this approach was the ability to begin the process of identifying and pooling resources and existing capabilities in support of the virtual campus. A brief description of the five components is provided:

- **Intellectual property** includes all activities associated with the development of curriculum, online and media courseware, and staff and faculty expertise in the use of education technology and pedagogy.
- **Program offerings** describe all academic courses and services that would be available for online or electronic delivery to subscribers. Included as part of this service is the ability to provide workshops, presentations, short training and seminars to learners and employees.
- **Learner support** includes all support services that must be provided to online registrants. This support is similar to the level of assistance that is available to regular on-campus and continuing education students. It comprises such information as how

to register, pay course fees, access library and student counseling, contact instructors and access a help desk call centre.

- **Marketing** refers to the function of informing potential learners about programs and services available through the virtual campus. This component also includes the operation and maintenance of the SIAST Web site and the implementation of a portal for communications and access.
- **Distribution system** includes the internal network infrastructure, meta database, and the external telecommunication system required to store curriculum and deliver virtual education and training.

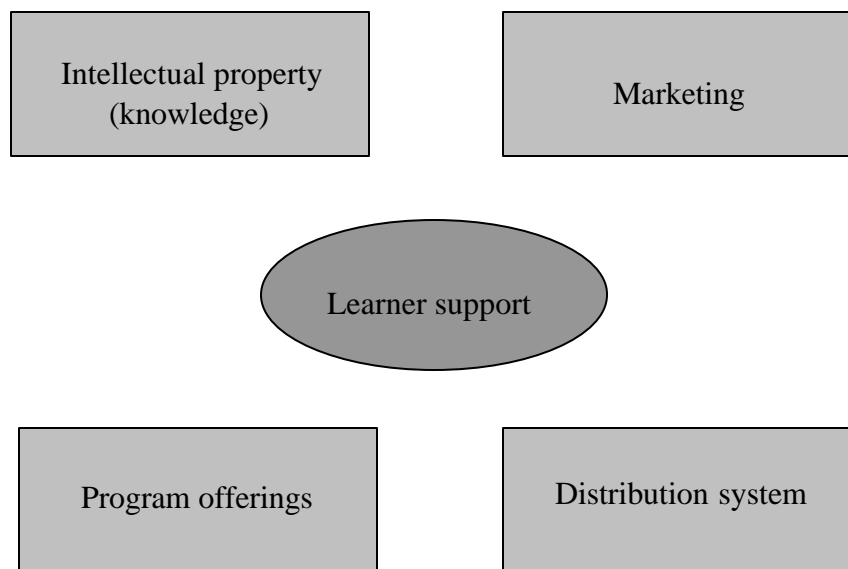


Figure 1. Virtual Campus Conceptual Model

Achieving a Critical Mass of Champions

According to Bates (2000), the key to successful integration of technology lies with faculty.

Bates refers to a survey conducted by the American Productivity & Quality Centre (APQC) in 1999 in support of the claim that faculty development and support are essential when

approaching the use of technology in teaching and learning. The APQC survey found that faculty development seemed to work best when the institution had a culture pervaded by the use of technology and supported by a wide range of strategies. These strategies included the need for a strong action plan in which the use of technology for teaching played a prominent role; an extensive investment in technology infrastructure; support from senior leadership for the use of technology for teaching; support, in a wide variety of ways, for faculty members who wished to use technology for teaching; support for students through computer access (Bates, 2000, p. 99).

Developing plans and a solid infrastructure

SIAST recognized early in the process that the use of technology itself as a medium for teaching was changing the role of faculty and their interaction with students. Consequently, faculty participation was deemed critical in creating an environment that would allow for growth and facilitate change in the use of technology in teaching and learning. That involvement needed to occur from the grass roots level in order to promote a sense of community, teamwork and collaboration. Bates (2000) confirms the critical importance of this strategy,

In many ways the visioning process is more important than the final vision statement itself....It is primarily a process for getting staff to think seriously about and discuss teaching methods in concrete terms, and for getting them to think beyond current limitations and reality, so that quite different goals and objectives can be identified (p.51).

In the initial planning stages, SIAST included representatives from all levels of the organization. Workshops involving board members, senior management, faculty and staff were followed by focus group discussions, which confirmed support for developing the virtual campus within the framework of the TEL consortium initiatives. The outcomes of the workshops and discussion groups were articulated in a five-year business plan in terms of priorities and specific initiatives

key to the establishment of the virtual campus. This step was important not only in communicating to internal and external stakeholders that senior management fully endorsed this project, but also in ensuring that requisite resources and appropriate timelines were in place.

In February 1999, a project leader was appointed and given responsibility for monitoring, coordinating and providing support to activities and initiatives that consolidated SIAST-wide distance education, online delivery and multimedia training capabilities. Initially the leader successfully undertook the following tasks:

- developing the virtual campus action plan and assisting in the implementation of a funding strategy;
- acting as the focal point for management of the SIAST Web site including its design architecture, publication standards and procedures for use of the medium; and
- taking stock of all program activities and projects that could be linked to the establishment of the virtual campus.

Concurrently, an electronic curriculum project team was established to examine and recommend the most desirable course of action for developing a SIAST-wide capability for the maintenance and delivery of programs and electronic curriculum support. The project team advanced the following guidelines:

- a single coherent and integrated approach to curriculum development within SIAST;
- a single curriculum electronic architecture based on a common curriculum model and pertinent educational technologies;
- a curriculum management support structure for SIAST wide multimedia program delivery capability; and
- a list of software solutions to ensure Year 2000 compliance of electronic testing systems.

Prior to the acquisition and installation of delivery tools, a number of important network modifications were necessary to accommodate the full capability of these applications. Dedicated servers, additional bandwidth and an improved firewall system provided ease of accessibility to learners, and the protection needed for safe delivery of online instruction. In the initial year of

operation, the network infrastructure was expanded to host the virtual campus and TEL services. Similarly, the network configuration was altered to provide for a unified approach to administrative and academic functions, use of learning tools and one access point for online and communication services. This was accomplished through the integration of the student information system, SCT Banner Web information products and the WebCT electronic learning platform. The applications were brought together in a seamless environment through the common interface of the Campus PipelineTM portal as shown in Figure 2. This level of integration was the first in Canada and provided for a single log-on and secure access to the virtual campus from any Internet connection.

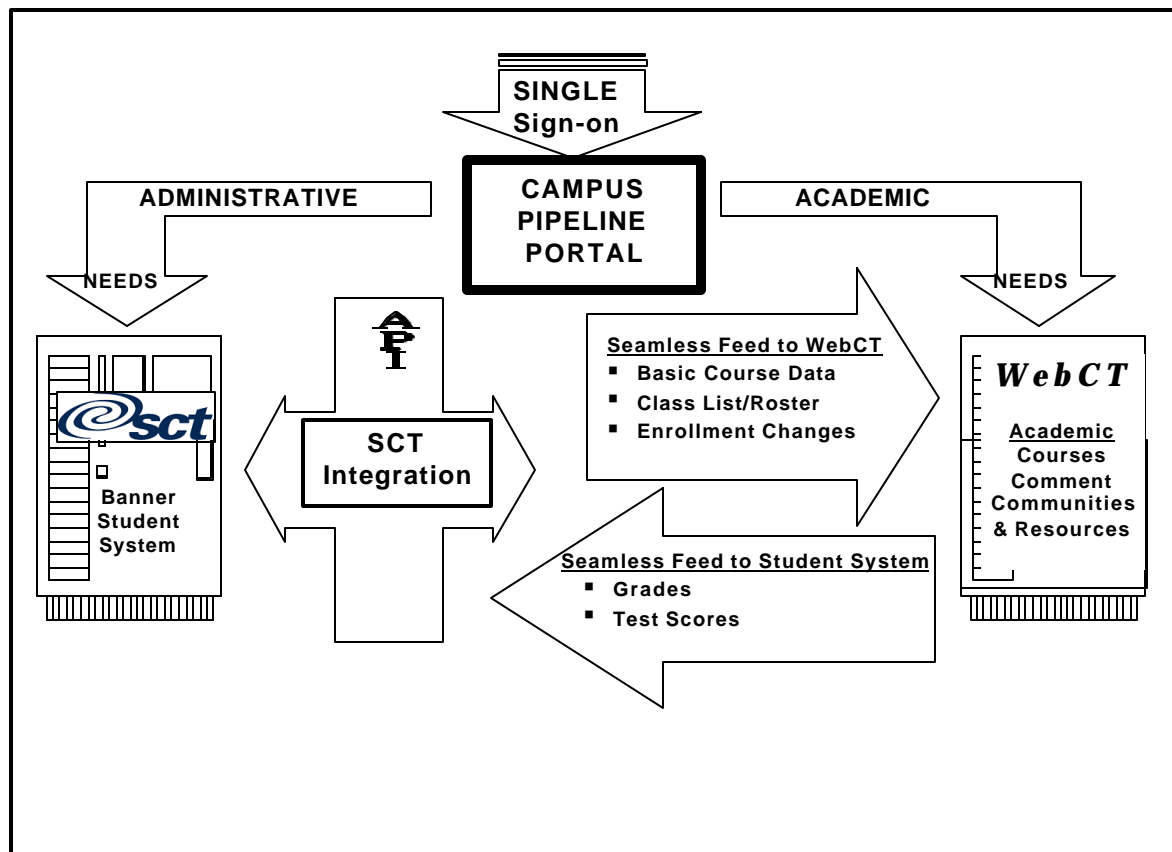


Figure 2. The Integrated SIAST Web Platform Model. ¹

Selection of educational tools

In the early stages, SIAST recognized the task to gain buy-in would go well beyond that of encouraging faculty and staff to undertake professional development activities on their own. The challenge for most was to embrace the technology, integrate it in appropriate ways, and move from the more traditional teacher-centered model to a learning-centered model. SIAST set out to facilitate the shift in attitude among faculty by supporting endeavours to integrate technology into course delivery. It became critical to acquire appropriate educational tools, and provide easy

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access and ample opportunities to train on those applications. With input from several user groups and the knowledge that synchronous software would best replicate the classroom environment, LearnLinc was acquired as the synchronous delivery technology of choice.

The acquisition of LearnLinc was an important first step in providing “hands-on” experiences to faculty members in the use of educational technology and pedagogy. To secure buy-in and wide-based support, instructors at all four campuses from a variety of program divisions were trained in the use and implementation of the tool. In turn, these “change agents” developed and conducted mini-workshops and held information sessions for their colleagues. These sessions not only garnered interest but also created the needed momentum for early adoption of technology-mediated learning. This process is corroborated by Bates’ (2000) finding that, “Faculty members learn best from their peers through show-and-tell demos by faculty ‘stars’ who have developed good examples of technology-based teaching” (p.102). This approach served to introduce faculty and staff to distance technology software, while increasing their understanding of the types of tools and their capabilities in distance delivery. In the first eight months of operation, 227 faculty, staff and partners became familiar with synchronous delivery.

A similar process was utilized for the selection of asynchronous software. The electronic curriculum project team reviewed different software applications and selected WebCT as the asynchronous tool of choice at SIAST. This process took almost two years to complete and included a core group of 25 employees who consulted widely throughout the organization. As a result of the efforts of this core group, the decision to use WebCT was unanimous.

During the implementation phase it became important to limit the number of tools to a minimum number of applications. Consequently, SIAST was committed to using the tools for a minimum of three years with the understanding that they would be reviewed regularly for suitability and desirability. This approach ensured that instructors and students, support staff working in graphics, educational technology, and information resources gained familiarity and confidence in the tools' full capability. This decision provided for system stability and sustainability.

Virtual campus initial cadre development

Throughout the developmental process, the virtual campus coordinator worked closely with internal stakeholders and maintained contacts with other jurisdictions in identifying the type of expertise needed to deliver virtual instruction. The mandate and functions to be performed by the virtual campus staff emerged through the sharing of information and discussion with partners. The first positions to be created, through the internal reallocation of funds were a full-time faculty trainer, two course designers and support staff for media production. As indicated in the APQC study (1999), best practice organizations do not wait for or depend on external funding for their faculty instructional development initiatives.

The experiences of other jurisdictions suggested that support from a full-time faculty trainer and course designers were critical in avoiding the development of online courses that are essentially text online with a minimum of graphics and interactivity. SIAST's experience would suggest that without adequate support, early adopters often tend to work in isolation and spend much of their time on the technology and the tools rather than focusing on developing quality instructional content. Without a high level of support, online courses will not use the medium to its full

potential and students will not be engaged at a level that can be expected in the environment. The survey completed by APQC (1999) further reinforces the concept that a team approach will result in a higher-quality product while preventing “technology overload”.

In August 2000, orientation of the initial virtual campus staff and early adopters was provided. The orientation consisted of a three-day training session, facilitated by a certified trainer, aimed at developing content using WebCT. A three-month period was provided for designers and the faculty trainer to complete the reference manual for designers and a “getting started” tutorial supplied by WebCT. The staff then began to design and develop trial instruction material. At the completion of the orientation phase, projects were assigned to teams comprised of a project manager, subject matter expert, designer, specialists in graphics, educational technology, information resources, and as required, the assistance of library and counseling staff.

The approach to instructional design used by SIAST begins with the development of a comprehensive blueprint followed by the production of a prototype and, finally, the in-depth review by the project team and external experts. Through regular meetings, members ensure the project is on track and meets all design expectations. In some instances an advisory committee, made up of external stakeholders, provides input into course content and presentation.

SIAST faculty development plan

A comprehensive training plan was developed to expose as many SIAST employees as possible to various instructional technologies. The plan involved a two-stage, long-range training approach in which faculty and staff would become technologically literate and confident technology integrators. This was a critical developmental step as observed by Reiser and Salisbury (1995), “Those who enter teaching have spent many years as students, sitting in classrooms in which instruction was presented primarily, if not exclusively, by the teacher. Few of those entering the teaching profession have experienced situations in which technology played a major role in the delivery of instruction” (p.257).

Numerous training events including hands-on workshops, synchronous and asynchronous online training modules, presentations, demonstrations, and drop-in working sessions are scheduled throughout the academic year. The goal is to increase the number of professional development activities and workshops available at all four campuses. Each activity is designed to enhance the understanding and appropriate use of technology, as well as develop skills required to meet the needs of students.

Specifically, the faculty training plan targets:

- increasing the needed skills in technology to enhance learning experiences for students;
- accessing a wide range of professional development workshops and activities related to the appropriate use of technology in teaching and learning;
- using the Internet and World Wide Web to enhance the teaching and learning process;
- accessing instructional design, educational technology, graphics and information resources services to develop and deliver quality programming;
- gaining a better understanding of technology and its applications;

- increasing knowledge in the use of computers in distance education;
- acquiring a better understanding of the capability of distance technologies;
- gaining basic technology skills through hands-on experiences; and
- experiencing technology as a distance student.

In the academic year 2000-01, more than 1300 faculty, staff and external partners participated in some form of training. This participation rate corresponded to 47 percent of all employees at SIAST (see Table 1). During the first four months of the current academic year 2001-02, 800 individuals including 310 external visitors/partners participated in workshops or demonstrations developed and delivered by virtual campus staff.

Table 1

Faculty development participation rate AY 2000/01

Participants	Number of attendees
Non-instructional faculty	283
Faculty	756
Administrative support	202
External attendees	70
Total attendees	1311

Support networks

In addition to the faculty workshops and development opportunities, SIAST created four learning laboratories to familiarize faculty, staff and counsellors with educational tools and resources necessary to develop online learning content, electronic learning material and communication material. The facilities, commonly called “greenhouse rooms,”² are configured to foster a collaborative environment where employees feel comfortable experimenting with technology and seeking assistance from virtual campus staff in developing electronic learning and service material. The establishment of the greenhouse rooms has been a key factor in accelerating the development of course content and online services to learners.

Similarly, technology learner support centres are to be established at the four SIAST campuses to enable learners to take full advantage of this form of delivery. The centers, which will be accessible to both students and the public, will provide computer and Internet access for technology-enhanced courses, proctoring services, library access and access to network learning opportunities. At present, one technology learner support centre is in operation. Eventually, the four centres will be linked to a TEL learning network that is currently under development at partner institutions across the province. The initial investment in capital and infrastructure consists of renovations to existing facilities, the acquisition of furniture, computer hardware, software applications, and connections to the Internet.

² Greenhouses are normally construed as a nurturing environment in which plants have optimal opportunities for reaching maturity in the shortest possible time frame.

Instruction quality standards

Throughout its development as a technology-literate organization, SIAST has attached great importance to establishing rigorous quality standards and processes that guide the planning, prioritization and approval of online courseware. SIAST believes this framework is critical in preserving the academic integrity and reputation of online courses. Consequently, the online course development process adopted by SIAST reflects these priorities:

- **Validation of need** - confirm the online medium is appropriate for the target audience, the course is not available through other sources, and the cost of development is fitting for the level of demand.
- **Implementation and maintenance plan** - present a brief description of the rationale for the project, target audience, the suitable medium of delivery, resource requirements and learner support needs. Identify what functions are required for ongoing maintenance and demonstrate procedures are in place for continuous improvement.
- **Prioritization and selection** - verify whether the course meets institutional priorities for development and increased accessibility.
- **Plan project** - develop a detailed blueprint and schedules.
- **Develop course** - create a prototype, design instruction, create scripts and storyboards, obtain copyright, produce and assemble elements.
- **Conduct pilot** - perform trials with expert reviewers, peer reviewers, project manager, and test students prior to full release.
- **Evaluation/quality control** - evaluate course quality, appropriateness of navigation and tools, and content integrity.

Demonstrate the Full Potential of Technology through Partnerships

Early opportunities for partnership

Prior to the launch of the virtual campus, SIAST's online education initiatives fell into the "lone ranger" category: projects that were funded externally as pilots and not adequately supported during the planning, development and conduct of the trial. While these projects could not be classified as successful ventures, they served as a basis for forging future partnerships and supplied a wealth of knowledge in confirming the need for a more structured approach to

planning and prioritization. As Kearsley & Marquardt (2001) suggest, “To obtain and sustain a competitive advantage in this new technology-based environment, organizations will have to learn better and faster from their successes and failures” (p.29). The following examples provide a sample of earlier attempts and outcomes.

An entrepreneurship and small business program was developed in collaboration with several external partners and with the support of government and private enterprises. With a core group of students from northern Canada as a test group, the project was unsuccessful due to a lack of necessary infrastructure and inexperience in development and delivery, which resulted in numerous revisions of the instructional materials and modifications to the navigation tools.

The emergency medical technician advanced program theory was developed online in response to a need for health training in the province. The lack of design support, limited online knowledge by those involved in the development of the curriculum, and the lack of technical support made this experience problematic. However, the program was well received by faculty, students and the health staff. Upon significant changes to the navigation tools and content, with the help of a support team, the program has continued to gain in popularity.

A farm business management course was developed in partnership with three external agricultural companies as a result of a perceived need to reach out to farmers in rural population. The course was not successful because of an improperly validated needs assessment.

The importance of early demonstrators

The first major project under SIAST's virtual campus involved the participation of the Saskatchewan Apprenticeship and Trade Certification Commission and the Electrical Trade Board in the online delivery of level one electrician apprenticeship training. Synchronous delivery was chosen because of the nature of the training and the type of student-instructor interaction required for successful learning. The approach blended self-study of print course material with regular classes offered using LearnLinc technologies at learning centers across the province. Consequently, the joint project used a combination of print based material, scheduled web and Internet mediated classes, and practical stages conducted in the electrical shop at one of the campuses. For the first phase of the project, two groups of "day-release" apprentices received training under controlled conditions designed to replicate the work-based environment. The instruction was provided simultaneously to seven different communities in the province.

Based on student feedback and achievement, the project was successful and demonstrated the feasibility of conducting trades training via the Internet. As well, SIAST had an opportunity to test all the support and service functions associated with this form of delivery, including student academic assistance; helpdesk technical support; server support; firewall and network requirements, including that of the Internet service provider; and course design support. The following testimonial from a student who participated in the pilot project attests to the capability and flexibility of the medium:

I was very impressed with its capabilities. My job takes me to all parts of North America, and on a couple of occasions I was away from home when classes were scheduled. The virtual campus allowed me to log on and take part in class time when I was in Brownsville, Tennessee and in Halifax, Nova Scotia.

Following the trial, SIAST was recognized with an award from the Saskatchewan Apprenticeship and Trade Certification Commission for its training innovation in the delivery of electrician training.

Develop International Portfolio of Accomplishments

SIAST's virtual campus model has captured the interest of several international partners. The City of Knowledge in Panama is about to embark on the development of an Information Technology Resources Centre to service the needs of its various clients in the areas of curriculum and learning materials development, Web-based training, video-conferencing and other services. Client groups are expected to include educational institutions, businesses, technology park residents, and research groups. The centre anticipates providing many services that SIAST currently provides, such as development of curriculum guides and learning materials in a variety of formats; development of a virtual library; development of a distance education centre using Web-based training; training in computer usage; and training in Web-based curriculum development and delivery, videoconferencing and other technologies. Recognizing that SIAST has successfully attained technological literacy in a short period of time, the City of Knowledge is seeking input on methodology and implementation of a similar model. Similarly, organizations in several other countries have expressed an interest in adopting this model of distributed and technology mediated learning for the delivery of post-secondary education and training in their own jurisdictions. The appeal of the SIAST model appears to stem from the systematic approach used, the modest level of investment required, and the ease of transformation in moving toward a technology-enhanced learning environment.

Next Steps

The ability to access instruction, information and other resources from on- and off-campus sites, offices and regional partnerships will be critical to building a significant electronic learning community. Technological solutions designed to improve internal and external connectivity will produce a higher level of customer service at a constant or reduced cost.

Wireless mobile learning centres

Consistent with the goals identified in the virtual campus and TEL initiatives of expanding access to remote and rural regions, SIAST is investing in wireless delivery capability. Wireless technology provides a timely response and an affordable alternative to the growing demand for courses requiring access to computer labs or learning centre facilities in support of the delivery of instruction. Conventional networking infrastructure is simply not flexible nor affordable for short-term, fast-response course delivery at remote locations. The wireless mobile learning centre is a stand-alone facility for computer based training and can be connected to the Internet via LAN, XDSL or satellite depending on location and access to telecommunication services. The mobile learning centre enhances accessibility to online courses, procedural trainers, simulation, as well as the facilitation of group learning particularly in northern and remote communities.

Conclusion

SIAST's virtual campus represents a major achievement in enhancing access to skills and technical training across the province of Saskatchewan. More importantly, it responds to the need of integrating technology into the learning environment through the development of a technologically literate organization. SIAST began with a plan that required the development of a framework of guiding principles. Enabling strategies and a definition of the functions and model for the virtual campus resulted from extensive research and consultation. The involvement of both internal stakeholders and external partners helped shape a vision and produce a basis from which to expand the institution and its capabilities.

The acquisition of tools was a critical step in beginning a journey to technological literacy. Early adopters and champions provide peer-to-peer training that serve to create momentum in the institution. The virtual campus hired qualified staff based on the vision and framework developed by the involvement of all - from grass roots to management and board members. The significance of having buy-in at all levels cannot be underestimated. The virtual campus staff developed structures and teams and began an aggressive training plan for faculty and staff. Virtual campus staff then advanced and implemented support labs for faculty, staff and students followed by the creation of development teams. SIAST established quality-control measures and best practices to ensure that faculty and staff receive appropriate support.

Partners play a key role in advancing the virtual campus and international opportunities. SIAST's virtual campus is helping to expedite Saskatchewan's responses to economic challenges by

expanding access to training and increasing choices for students during a period when the economy needs to restructure and diversify. SIAST continues to capitalize on partnerships and joint programs to develop training opportunities in growth sectors and deliver them at a time and place that meets the needs of business and industry. In addition, the virtual campus is helping to develop a knowledge-based economy by integrating technology into the learning environment. SIAST will continue to give serious consideration to extending its reach beyond individual learners and workplaces, and beyond the borders of Saskatchewan and Canada.

Through a systematic approach, SIAST has been able to successfully develop as a technology-literate institution and to achieve its goals quickly with a modest investment of resources.

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