A Cooperative Delivery System for Distance Education in Mongolia

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Abstract:

The South Dakota School of Mines and Technology (Tech) has offered an MS degree in Technology Management (TM) since 1990. With its early involvement in distance education, the TM faculty has experienced a wide array of technologies and issues surrounding distance education. The program is now one of the largest graduate programs on campus and is made up of both on-site and distance learners. Most recently, SDSM&T has entered into a cooperative agreement with the Mongolian University of Science and Technology (MUST) to offer the program in Mongolia. In this paper, we discuss some of the relevant technological and logistical issues that had to be addressed in a joint development effort. One interesting aspect of the project is multi-media considerations that differ substantially between distance learning needs in the U. S. and those required for delivery in Mongolia.

Introduction:

Like many programs, the distance program in TM began as an outreach service to South Dakota residents who had few opportunities to pursue continuing education. The TM program is available at the master's level only and is specifically designed to meet the needs of practicing engineers and technologists who need a theoretical foundation for quantitative decision-making and modern management techniques. The program requires 32 credits of coursework covering four basic areas: management, finance, operations, and quantitative methods. Students are allowed to transfer up to 12 credit hours provided the hours are from an accredited university and are approved by the student's committee. Program requirements may be satisfied through either a thesis or an independent project option. The program was converted from engineering management in 1991 as a response to changing industry requirements and has since become a popular program of study with South Dakota industry and with Tech alumni in particular.

In 1995, the South Dakota Board of Regents adopted a new statewide initiative to more actively pursue distance education and technology-enabled learning. While this initiative provided a unique opportunity to explore alternative teaching and learning strategies and to engage new students, it was not without its risks. While the literature strongly supports the hypothesis that a

well-designed asynchronous course can be just as effective as a traditional course, it is not without inherent difficulties [5, 6, 13].

In an attempt to avoid a number of these pitfalls, several critical issues were considered in the expansion of the TM program to include asynchronous learners. These included the needs of the market place, the most effective mode of delivery needed to satisfy that need, the level of flexibility that could be afforded within the system, support mechanisms required, and the faculty and department resources available. As a result, Technology Management is currently one of the most productive graduate programs on campus and has experienced an average growth rate of 12% over the last 10 years (see Figure 1 below).

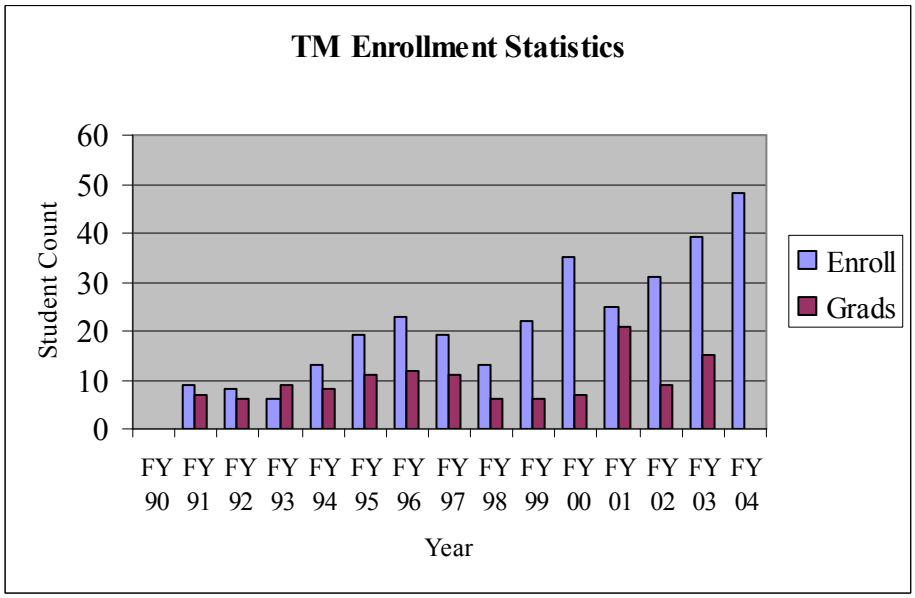


Figure 1. TM Enrollment Statistics from FY 91 to FY 03.

With the elimination of communist control and the subsequent move towards privatization, the Mongolian University of Science and Technology (MUST) saw a unique opportunity to provide a key role in economic development in Mongolia through a cooperative program in Technology Management with the South Dakota School of Mines and Technology (SDSM&T). This seemed to be an equally opportune time for SDSM&T which had just finished the last course certification for Technology Management and was now ready to consider additional modes of delivery and alternative markets.

Key Issues:

Developing a cooperative program with another university is never an easy task. There are a myriad of logistical details that need to be ironed out. Differences in campus cultures can also be a significant impediment to successful cooperation. Now consider the task of building a cooperative program with a foreign university where logistical hurdles and cultural differences are magnified several times over. Prior to the advances in technology-enabled learning, consideration of a cooperative program would not have been possible. In this case, however,

much of curricular components were already available in an appropriate format and both universities were highly motivated by the opportunities that a cooperative program might provide.

Nevertheless, several key issues had to be resolved before continued development of the program could even be considered. In the Spring 2003, the President of MUST made an extended visit to the SDSM&T to coordinate directly with the TM program coordinator and appropriate campus administrators. Key personnel from both schools then made subsequent visits to SDSM&T and to MUST to prepare course offerings, consider delivery alternatives, and coordinate other logistical details. Key issues that needed to be resolved include the following.

- Management Structure – The role and responsibilities as well as course offerings for each university needed to be clarified.
- Cost Differential – Tuition and fees at SDSM&T are substantially higher than those at MUST. A rational for marketing a program and providing value added needed to be defined and clarified in order to develop a market for the program.
- Marketing – Once the target market was established appropriate marketing strategies had to be developed in order to sell the program.
- Delivery Method – Current delivery alternatives used by SDSM&T had to be modified for effective delivery in Mongolia. A variety of delivery alternatives needed to be explored and the most effective alternatives need to be selected.
- Pedagogy / Training – Delivery in Mongolia provides for some courses offered from MUST and a MUST course facilitator for courses offered from SDSM&T. Training on course content and philosophy needed to be considered in the overall program development.
- Development Efforts – Curricular modifications and development of additional supplementary materials requires a substantial investment of both time and resources. Program development necessitates a consideration of continued development resource alternatives.

The remainder of this paper is devoted to a description of these issues and the coordination efforts currently underway.

Management Structure:

A multi-university cooperative program has essentially three fundamental forms of governance. The participating universities can form a consortium agreement with all parties effectively contributing to the management structure and course offerings. A single university can take primary responsibility for management of the program but with the final degree offered at any participating university. Finally, one university can take primary responsibility for both management and program standards. In this case, the degree is usually offered only from the managing university.

Based on experience with technology-enabled learning and the needs of Mongolian industry, it was decided that the third alternative would be the most viable alternative for overall program success. MUST will take a primary roll in marketing efforts and student administrative services

including tuition and fee collection. SDSM&T will provide the overall management for the program and assumes primary responsibility for both program standards and course offerings. Mongolian students will be able to complete up to twelve credit hours from MUST providing those courses are approved for delivery by SDSM&T. Onsite requirements may be satisfied at MUST although the options for one, two, or three semester's attendance in-residence at SDSM&T are available.

Cost Differential:

One of the more significant hurdles that had to be overcome is the large tuition cost differential between SDMS&T and MUST (roughly 10:1). However, because of economic development activities and a shift away from the Russian educational model, there is a both an educational and a cultural advantage for Mongolian students to receive a master's degree from a Western university. By participating in a cooperative program, the cost can be significantly reduced when compared to the cost of attending school full time at a foreign university. This has significant economic and political advantages for the Mongolian government that has, in the past, provided the economic support for Mongolian students studying abroad. With the cooperative model, the Mongolian government can provide support for two to three times as many students as are now currently supported. Students currently enrolled in the program are receiving tuition support from the Mongolian government or from MUST with the remainder coming from the individual student. While the level of support varies from one individual to another, most students are required to cover approximately a third of the tuition cost. The cooperative model also offers an advantage to Mongolian industry in that it will allow more students to remain working for at least a portion of their studies. Accordingly, additional industrial support is being actively recruited.

Marketing:

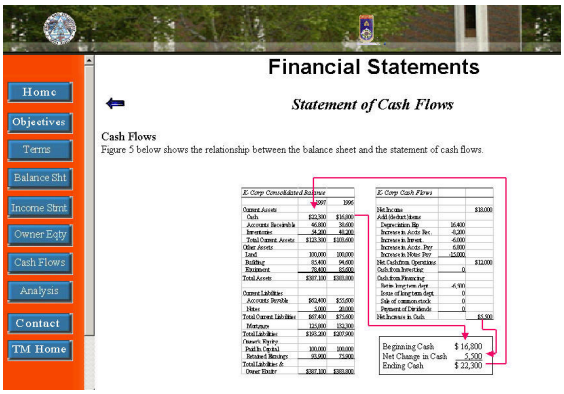
As stated earlier, MUST assumed primary responsibility for program marketing. Partly because of economic development issues and partly because of the cost differential, the two primary markets in Mongolia are the Mongolian government and the mining industry. During the first visit to Mongolia, a seminar on the program was made to industry and government leaders. A subsequent trip included a visit with the Ministry of Education with the express purpose of promoting the program as a cost savings for the Ministry. Subsequent marketing efforts include broadcasts on national television, local seminars, and traditional brochures.

Delivery Method:

The traditional delivery for Technology Management has been a pseudo-asynchronous distance education delivery method. Specifically, distance learners are mailed lectures placed on DVDs. Course lecture notes, assignments, solutions, and supplementary materials are provided online through web-enhanced instruction [7]. The advantage of this method is that, at least for quantitative courses, it works equally well for both traditional and asynchronous distance learners. It also satisfies all of the existing constraints operating on the system; e.g., limited resources, faculty expertise, instructional support, etc.

Unfortunately, language barriers preclude taped lectures as a workable medium for Mongolia. In this case, a more traditional Internet delivery method seemed more appropriate. TM courses are now being modified to incorporate an all Internet delivery option. Courses provide online instruction with embedded exercises incorporated throughout the curriculum. A sample format for TM 661, Engineering Economics for Managers is shown in Figure 2 below.

a. Modularization for TM 661



b. Sample Content for Cash Flows

Figure 2. Modularization (a) and Sample Content (b) for TM 661

While much of the material is text based, linkages, supplementary material, and interactive exercises are embedded throughout the curriculum. Course content is maintained on two companion websites; an English version maintained at SDSM&T and a Mongolian translation maintained at MUST. Currently, Mongolian students can complete roughly two semesters of coursework through available material. Additional courses are under final development for the cooperative program with the remaining elective courses planned for conversion within the next year.

Students enrolling in the TM program in Mongolia must attend a one-week training session on the alternative delivery format. Specifically, training sessions include use of email, downloading course content and interactive exercises, and uploading materials to the course management site. Students are also required to attend one class session with a site facilitator at MUST every three weeks. In addition to providing a faculty presence [10], the site facilitator answers questions and clarifies course material, reviews problem assignments, and, when needed, administers the unit exams. For TM courses, all exams are written and graded by TM faculty. MUST courses accepted for the TM program remain under the purview of the MUST faculty.

One interesting aspect of this development effort has to do with the differences between Mongolian students and SDSM&T distance learners. While taped lectures, because of the language difference, will not work for Mongolia, it is actually the preferred method of delivery for SDSM&T distance learners. For cost reasons, Internet delivery (Figure 2) is the preferred method of delivery by the SDSM&T administration and is the accepted delivery method for MUST. However, SDSM&T distance learners have thus far resisted use of the Internet, as a suitable delivery alternative. Other delivery alternatives are being explored that will reduce the amount of duplicative development efforts.

Supplementary Materials: Although utilizing a text based Internet delivery method minimizes reliance on a primary text, it is nevertheless important that students have access to supplementary materials and reference texts. Like most state universities, access to adequate library reference materials is a significant problem. It is a severe problem for MUST. We have taken a two-pronged approach to alleviate this problem somewhat. For each course, some reference materials are sent to MUST as a means of building a modicum resource library. In addition, most TM courses provide a companion web site with online reference materials.

In addition to library and online reference materials, SDM&T provides a supplementary foundations site that provides student information, review material and online interactive exercises. Review materials included on this site include exercises in operations research, probability and statistics, technical communications, and financial management. Examples of supplementary review materials are shown in Figures 3-5 below. Review materials follow the standards outlined by SDSM&T [8].

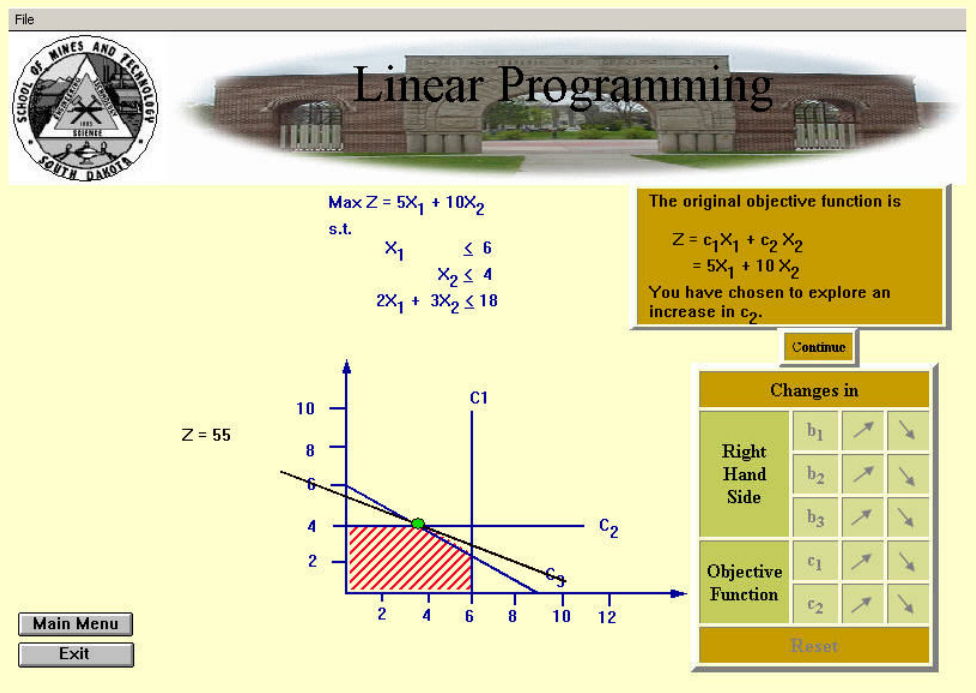


Figure 3. Sensitivity Review Module in Linear Programming

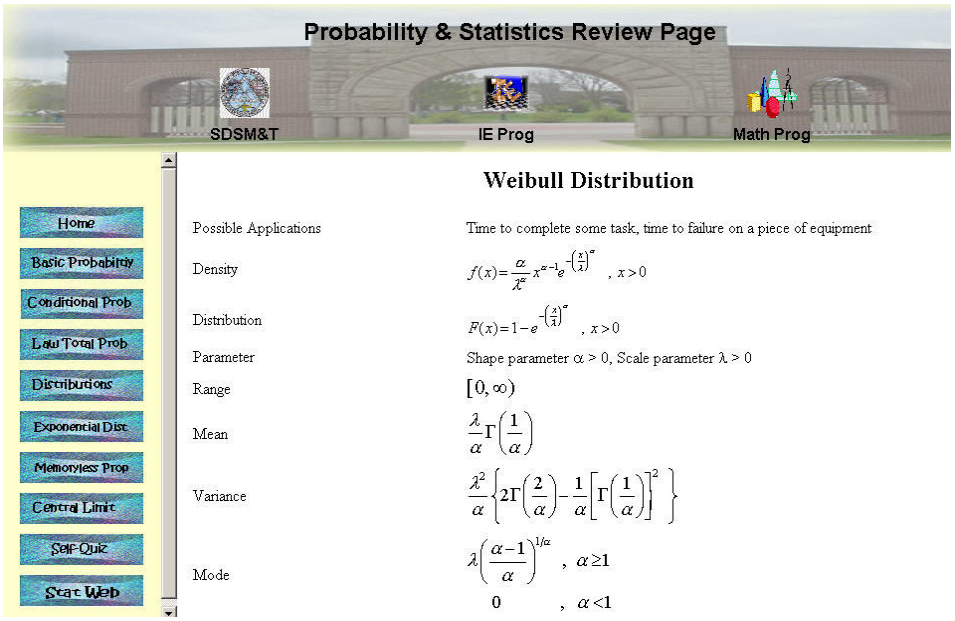


Figure 4. Review Unit on Distributions in Probability and Statistics

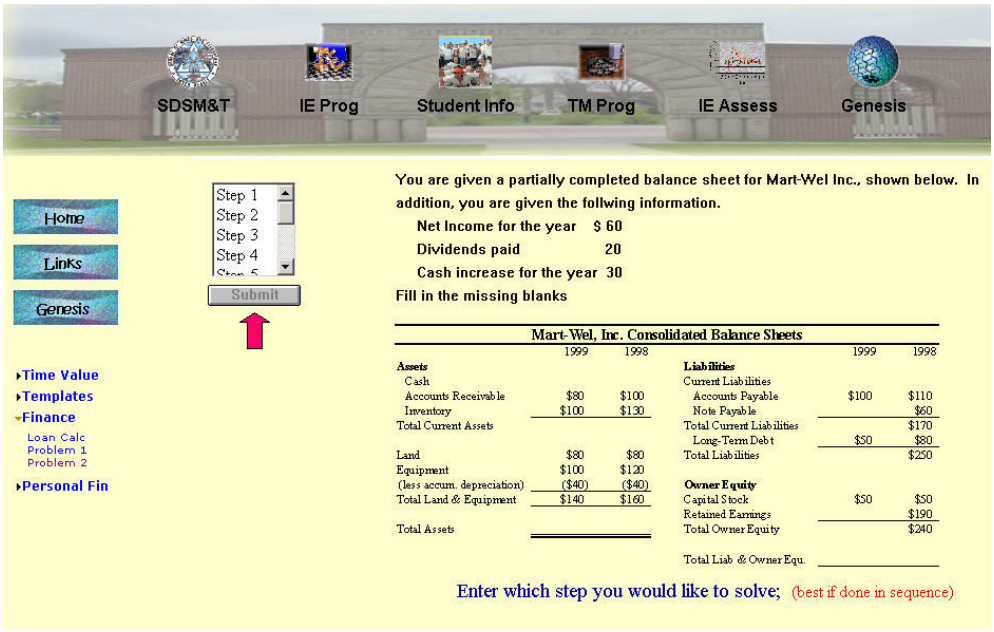
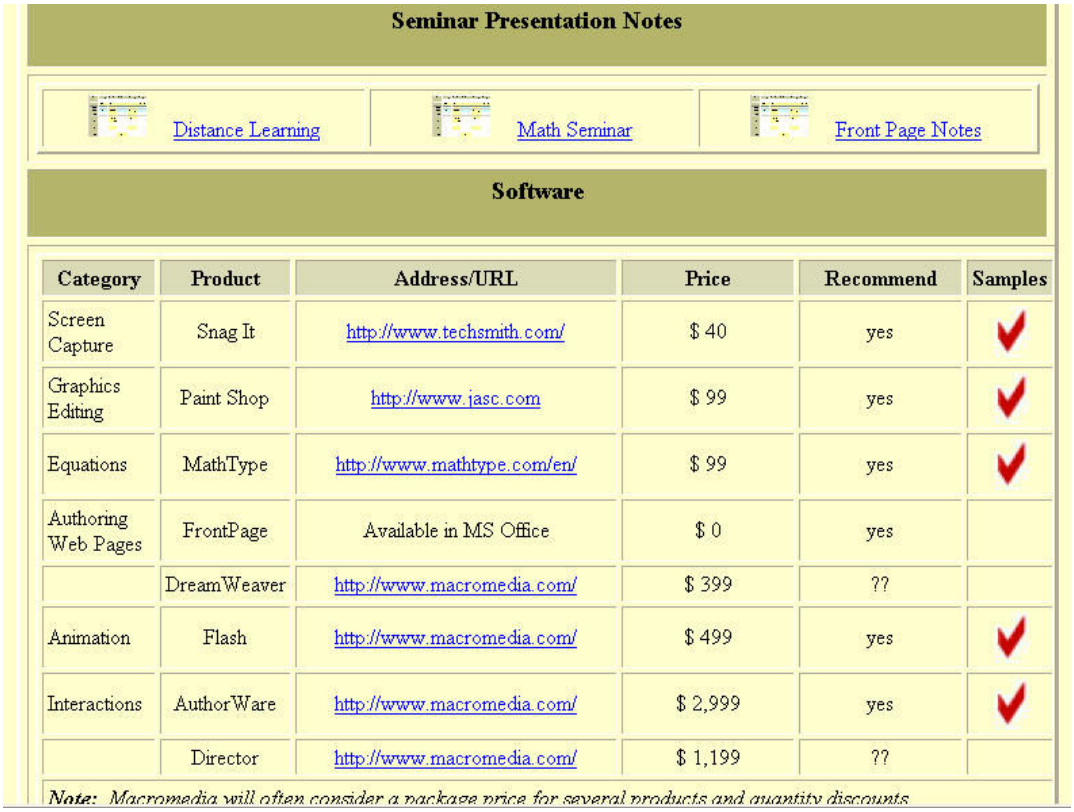


Figure 5. Interactive Review Exercise in Financial Statements

All review materials contained on the foundations web site may be accessed through a front page containing download information and a concept map for linking to appropriate materials. Alternatively, most TM instructors include direct links from the course schedule to complement material to be covered in the course lecture. It is interesting to note that, while the site was originally established as a supplementary review site for TM students, it is actually more frequently accessed by undergraduate students at SDSM&T.

Pedagogy/Training:

While most universities in the U.S. have been actively promoting technology-enabled learning and distance education for some time, it is a relatively new element in Mongolian higher education. Much of the initial training included seminars on building web pages, developing an applications oriented curriculum, and workshops on distance education. A training site for software and delivery alternatives was developed as part of the ongoing training efforts. A sample page from this site is shown below in Figure 6.



Seminar Presentation Notes

Distance Learning | Math Seminar | Front Page Notes

Software

Category	Product	Address/URL	Price	Recommend	Samples
Screen Capture	Snag It	http://www.techsmith.com/	$ 40	yes	✓
Graphics Editing	Paint Shop	http://www.jasc.com	$ 99	yes	✓
Equations	MathType	http://www.mathtype.com/en/	$ 99	yes	✓
Authoring Web Pages	FrontPage	Available in MS Office	$ 0	yes	
	DreamWeaver	http://www.macromedia.com/	$ 399	??	
Animation	Flash	http://www.macromedia.com/	$ 499	yes	✓
Interactions	AuthorWare	http://www.macromedia.com/	$ 2,999	yes	✓
	Director	http://www.macromedia.com/	$ 1,199	??	

Note: Macromedia will often consider a package price for several products and quantity discounts

Figure 6. Software and Delivery Alternatives for Distance Delivery

Through a supporting grant from the Japanese government this past summer, MUST christened their new e-learning center in October, 2003. In addition to providing development software and a broader bandwidth, the new e-learning center provides course management software that enables MUST faculty to effectively manage curricular components and asynchronous learners in Mongolia.

One of the goals of the program is that it will eventually provide a long term opportunity for MUST faculty to engage in a different pedagogical paradigm through visiting professorships at SDSM&T. In the long term, mutual exchanges of faculty at both universities will enhance cultural diversification as well as highlight the most effective strategies for cross-cultural distance education.

Continued Development Efforts:

Currently, one of the most significant hurdles impeding program progress is limited resource availability for conversion of the existing curriculum to an alternative delivery format suitable for Mongolia. Currently, some resources are available through South Dakota Reinvestment monies but the bulk of that is earmarked for general education and large section courses. The search for alternative external funding sources and for off the shelf curricular components remain one the most immediate concerns for continued program development.

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