A Pseudo-Asynchronous Distance Education Delivery System for Programs

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Abstract:

The South Dakota School of Mines and Technology 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. In this paper we discuss some of the relevant issues regarding delivery of a technology-oriented program that is suitable for both on-site and distance learners. Recent advances in technology provide opportunities for improving course organization and efficiency, creating audio or video enhanced content delivery, providing for interactive self-evaluative student experiences, and revising faculty and student interaction. In addition to multi-media considerations for delivery of content, successful faculty will also consider student learning styles, course management, evaluation and assessment, as well as the programmatic support systems necessary for overall program delivery.

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. 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. Many other universities have followed similar strategies with the expectation that the distance education market would become a viable source of additional revenue or that efficiencies gained through technology-enabled learning would eventually drive the new curriculum. 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 [6, 7, 12].

With limited resources and a strong competitive market, a systems approach seemed the best way to avoid some of the inherent pitfalls in distance education. For this purpose, a systems

environmental approach [3] was adapted to a three level sequential model. A conceptual framework for this development is shown in Figure 1 below.

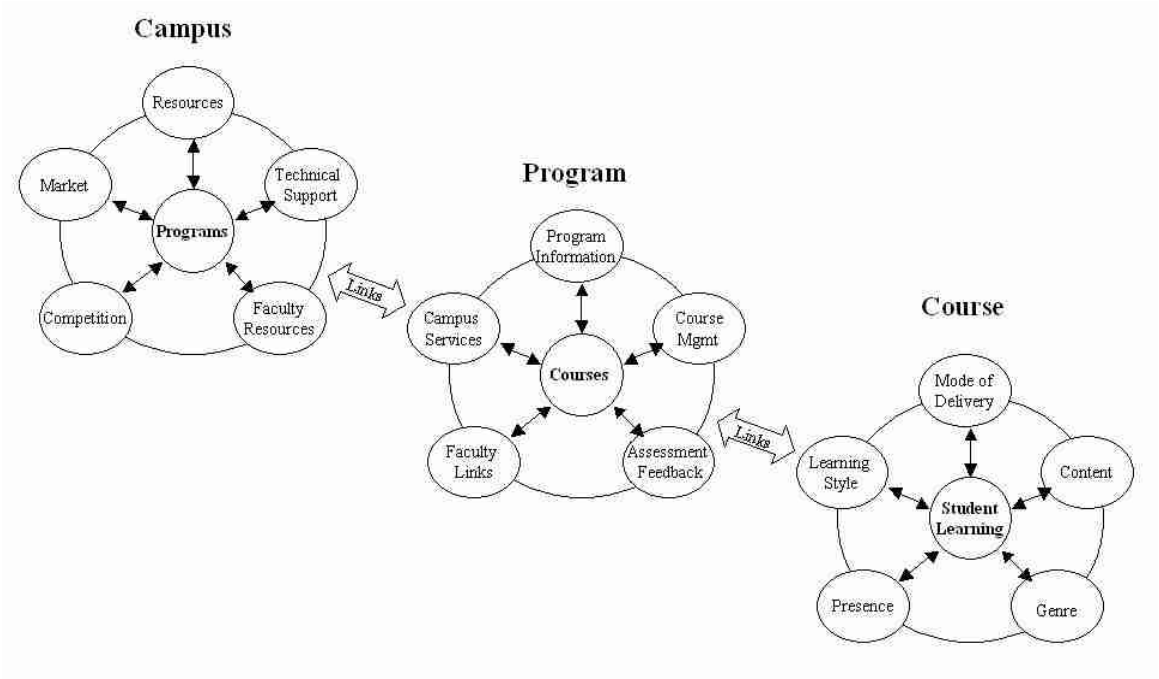

Figure 1. Systems Environmental Approach to Program Design

In Figure 1, a plan at the campus level determines the appropriate market niche based on environmental conditions, probable competition, and available resources. Program and Course development decisions are then made so as to be compatible with an overall campus plan. Links between the program and campus level and the course and program level provide a consistent look and feel for distance learners. While this paper focuses primarily on program and course developments, decisions made at the campus level inherently impact decisions that can be made at the program level. Consequently, more detailed descriptions of program and course level plans follow a brief discussion of the campus level plan.

Campus Level Plan

All distance offerings in the state of South Dakota are coordinated through the Electronic University Consortium (EUC). Courses offered through the EUC are required to complete a certification review process that ensures a quality standard for both course delivery and support services. Certification and course listing through the EUC provides students with one-stop shopping and minimizes the problem of unnecessary course duplication within the Regental system. The EUC also provides online survey instruments for student feedback on support services as well as a central point for evaluation and adoption of a course management system to be used by all state universities.

At the campus level, course syllabi are posted online via a locally developed software program coupled to an oracle database. The system is designed to provide a common look and feel to courses offered both on-site and through distance learning. By coupling the software to a database, campus administrative pages and faculty personnel pages can be loaded and maintained with minimal effort. Although the software lacks feedback and interaction components typically found in a course management system, it does allow faculty to easily maintain an online posting of static course materials. A campus distance education link provides links to campus resources as well as a page for posting introductory course information for students.

Both the state and the campus pursued a relatively broad market based primarily on faculty interest. This approach ensured that participating faculty had a strong interest in technology-enabled learning and provided the greatest opportunity for breadth of innovation. The disadvantage is that with limited resources such an approach makes it difficult to concentrate sufficient resources necessary to penetrate a particular market niche.

Program Level Plan

Prior to the distance education initiative, the TM program already had strong support from non-traditional graduate students interested in complementing their technical skills with business/management skills. With limited resources, the best opportunity for developing an asynchronous component seemed to be through an expansion of this same market. Specifically, it was decided that program development incorporate considerations for both on-site traditional learners as well as asynchronous learners. Under this model, important considerations for program development include

- Defining the appropriate market segment
- Developing program information and marketing
- Creating linkages to campus support services and faculty and course information
- Development of appropriate feedback mechanisms
- Course management at the program level
- Development of faculty centered performance measures

Given the need to serve both traditional and non-traditional asynchronous learners, the program is marketed primarily to two groups: 1) alumni who have a need to supplement their technical skills with management skills for their work environment and 2) managers in area industry looking to improve their quantitative management skills. Initial marketing placed substantial effort on logistics support for area industry as well as an exploration of industry short courses.

Program information is provided through a TM graduate handbook as well as through an online program information page. In addition to general program information, it is very important to provide a section covering the basic rules-of-engagement. Ideally, these “rules” provide a checklist format for course requirements, committee selection, comprehensive examination requirements, project requirements, etc. Each course page provides a link to both the EUC and to the TM program web page. Mailings, both hard copy and electronic, include course information and linkages to program information. In general, the more linkages between course information, program information, and faculty the better.

At the program level, effective course management is critical. While traditional learners prefer a large number of courses to choose from during the academic year, non-traditional students prefer a year round program with electives specific to their current industry needs. For program planning purposes, course offerings should be scheduled three years in advance. However, for flexibility purposes, course offerings would be generated based on student needs and interest. For the TM program, a reasonable balance is to supplement annual offerings of core requirements with electives based on student needs.

Program assessment and feedback also differs considerably from a traditional graduate program. In general, student concerns seem to rest primarily with course management and content relevancy. Students have little interest in traditional course evaluations. Evaluation of support services is also of little interest unless such services are not available. In this case, students will register their concern and seek corrective action through the course instructor. Consequently feedback mechanisms should provide an opportunity for systematic collection of both student and faculty input on an ongoing basis.

It is critical that program administrators incorporate faculty considerations in performance measures. The natural inclination is to consider efficiency solely from an administrative cost standpoint; e.g. the cost of technical support services, the cost of delivery of instructional materials, etc. While such measures make sense in a large market, they have a tendency to ignore the cost of the individual faculty member. Consider for example, two alternative delivery mediums one which costs $50 per student per semester and a second alternative that costs $100 per student per semester. From an administrative standpoint alternative one would appear to be the most cost effective. However, if alternative one requires a reduced teaching load or increased development time, then the cost of the faculty member must be included in the cost measure. Since faculty workloads for a distance course are substantially higher [2], cost considerations must be carefully balanced against overall workload plans.

Course Level Plan

As the program evolved, a number of delivery alternatives and curricular issues were explored. One interesting aspect of this evolutionary process was the discovery that new technology isn't always better. Curricular design considerations include faculty comfort with various technologies, the technology literacy and availability of the end user, the learning style of the end user, and the appropriate instructional mode for the type of course being offered. Course development considerations include

- Learning style
- Mode of delivery
- Course content and relevancy
- Genre
- Presence

A number of researchers suggest that student learning style can be an effective predictor of student success in a distance course [5]. Others offer some strategies that may be considered when adapting a traditional course to an online or asynchronous mode [1, 4]. Since the TM

strategy is to accommodate both traditional on-site and distance learners, a difference in learning styles between these two groups is an area of concern.

TM students seem to primarily be accommodators or convergers on Kolb's Learning Style grid. Interestingly, there does not appear to be an appreciable difference in learning styles between traditional on-site learners and distance learners. Indeed, most of the differences seem to be more attributable to social differences and experiential backgrounds than to learning styles. However, student learning styles and social preferences do have several important implications on curricular design. The first of these is that TM students seem to respond well to a curriculum that effectively combines practical theory with relevant applications. A great deal of interaction or independence is not nearly as important as clearly defined objectives and a well-structured course. Indeed, perhaps the most significant modification required is providing applications in a variety of disciplines.

An early concern was that students with differing learning styles would respond better to alternative modes of delivery. Historically, distance learners tend to favor more self-direction and independent learning activities [4]. In general, however, the mode of delivery does not appear to be an area of concern to most TM students. The one exception to this is in the difference between quantitative and qualitative courses. TM students seem to favor the on-site mode for courses involving extensive discussion or collaborative exercises whereas they are more likely to favor the distance section for quantitative courses. Unfortunately, this is also precisely the opposite of the development effort required. Consequently, faculty members are generally more agreeable to consider an online development of qualitative courses.

That TM students have few concerns with media is consistent with a growing body of empirical research that suggests that media seem to make little difference in educational outcomes [6]. Problems that arise in distance education seem to come not out of the media of choice but out of the genres the media permit. Interactive discussion in a traditional class is different from an online discussion made up of a series of short essays. Although essays and discussions may cover the same topic and are similar in nature, they are different genres and may in fact have markedly different affects on learning. And, it is in this area where learning styles seem to matter. TM students tend to shy away from online discussion groups and prefer the face-to-face interaction. Distance learners will respond to collaborative online discussion groups but only if the instructor provides substantial instruction and guidance. Based on this notion of genre, a systematic process for reviewing and modifying online applications and supplemental materials should be implemented.

The value of student-to-student interaction also seems to be dependent on the type of learner. While such interaction is important for some types of courses and some types of learners, it is significantly less so for others. For TM students, student-to-student interaction is not generally valued. What does seem to be more important is the feeling of presence in the professor-student relationship [9]. As an example, while programmed slide presentations cover the same material as other media, they simply lack a feeling of presence by the faculty member. As a consequence students are less positive about course content when this genre is used. Similar results seem to hold when using a formal video format. Although material may be well presented and certainly the faculty member is present, the look and feel of the course just isn't the same. In general,

incorporating a variety of delivery methods that are accessible by both on-site and distance learners seems to be well received.

Program Summary and Improvements

A number of 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 2 below).

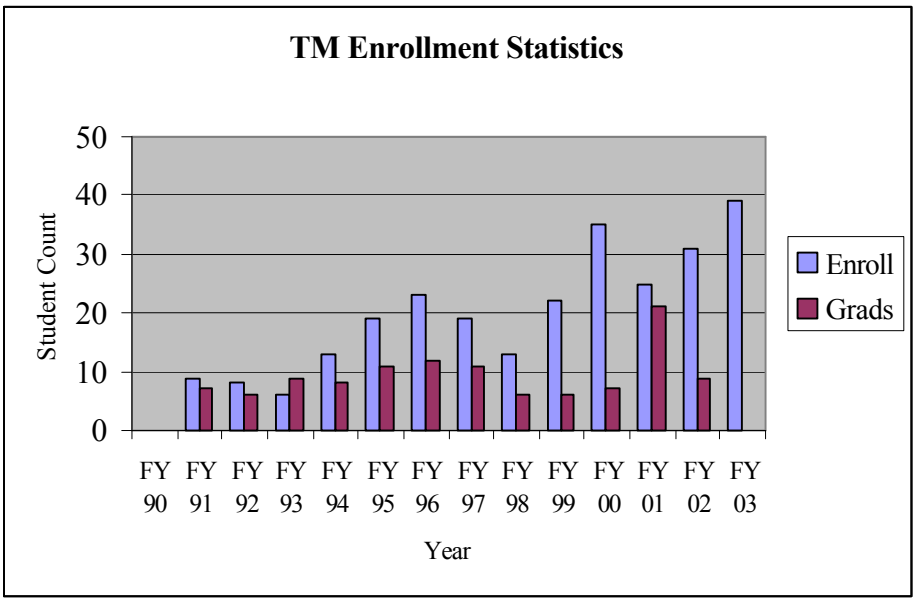

Figure 2. TM Enrollment Statistics from FY 01 to FY 03.

One interesting, but inadvertent, side effect is the enrollment demographics in TM courses. While TM enrollment has had some gains in terms of distance learners, even larger gains tend to come from on-site students who prefer enrolling in the distance section. For an average course of 35 students, 18% of the learners are true distance learners while 29% are on-site students who, for a number of reasons, prefer to take the course in distance mode (Figure 3). Even more interesting is the fact that the bulk of these learners come from majors other than TM. Schedule conflicts, compatibility with work hours, and course relevancy seem to be the primary reasons a number of students prefer the distance to the onsite section.

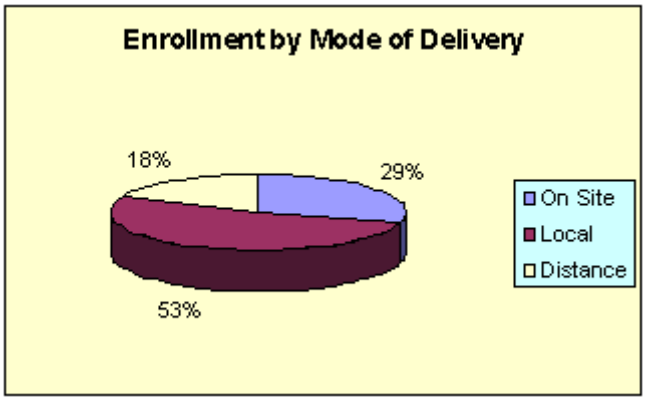

Figure 3. Course Enrollment by Mode of Delivery

While many universities are experiencing this same phenomena, it is not without its ramifications. First and foremost is the quality issue. To evaluate this, final exam scores were collected in three courses over a year's time. Analysis of final exam scores showed no statistical difference between the three groups during that time. While distance learners seem to perform as well as traditional on-site learners, it is also clear that the time frame in which they take to accomplish course requirements can be extensive. This has a number of implications in overall course management and is currently the most significant area identified for program improvement.

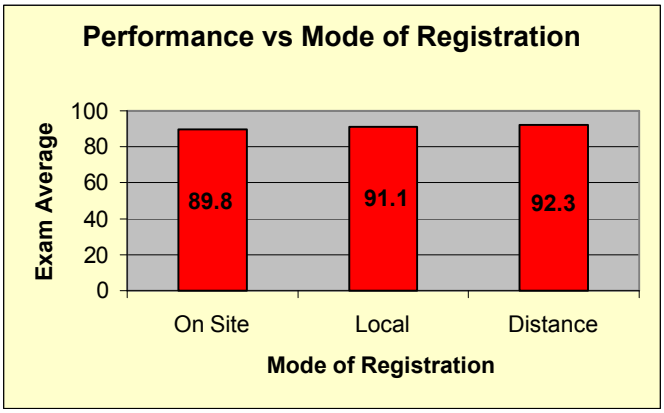

Figure 4. Performance on Final Exams for On-site, Local, and Distance Learners

Conclusions and Recommendations

Distance education requires considerable effort. There is no such thing as a free lunch. But, by carefully considering a systematic approach to program development, many of the pitfalls commonly encountered in distance education can be avoided. At the same time, the rewards can be substantial. While there is no clear evidence to suggest that student learning is substantially improved, faculty perception points to a number of advantages. Well-constructed quality modules can be used in a variety of course applications. Identical technology coupled with redesigned modules can be integrated in a just-in-time fashion with undergraduate courses.

Trade-offs in optimally addressing alternative learning styles is more than offset by efficiencies gained by serving both types of learners simultaneously.

The role of technology-enabled learning in the education product mix is only going to increase. Those that are actively engaged in the process now are more likely to find approaches that can improve student learning as well as being substantially more rewarding.

Acknowledgements

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