Enhancing the Content and Delivery of a Distributed Graduate Transportation Management Program

-- A Project in Process --

Innovations in Teaching and Learning

Abstract: This project describes the ongoing experience of enhancing the existing Graduate Transportation Management Program's distance learning curriculum to reflect the restrictions and opportunities provided by a technology-modified learning space. Targeted students are adult career-oriented working transportation professionals who demand and flourish in a highly interactive human learning space. Program courses are being delivered by distance learning in an accelerated format of ten four-hour night classes across an integrated broadcast/webcast network. Graduate teaching faculty enhance the curriculum by developing enriched, varied, web-based computer-mediated curriculum components for existing program courses aimed at transforming the once-a-week, classroom focused course learning experience into a continuous, course-long learning experience.

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Introduction

With the tremendous economic and population growth experienced in California and across the nation, the issues and problems of transportation systems management have reached crisis proportions. Responsibility for ensuring effective planning, development and maintenance of substantial transportation systems falls to the management of the many state and national public transportation agencies. The transportation systems of California and the nation are extremely complex and interwoven with the manifold issues of modern life. Local geography, zoning, utilities, special use areas, governmental finance, environmental concerns, special interest groups, existing transportation infrastructure, governmental planning issues, public safety, population health concerns, utilities, etc. all conjoin to create massively complex development and enhancement projects.

At the same time as transportation management needs have grown, the supply of experienced, trained managers is dropping. For example, the California Department of Transportation (Caltrans) with some 20,000+ employees is facing the imminent departure of many experienced managers due to recently announced improved retirement incentive plans that strongly encourage early retirement. Currently, difficulties exist in reaching across statewide distances to train those urgently needed, but widespread, employees whose management potential must be developed. When looking to replace departing managers, Caltrans finds itself in short supply of suitably trained replacements and is now looking to distance learning to span statewide distances. The Graduate Transportation Management Program (GTMP) is a unique accelerated distance learning program that has been designed to provide just such management education to working transportation professionals.

The GTMP, of the College of Business at San Jose State University (SJSU), offers two courses of study: a Master of Science in Transportation Management (MSTM) and a graduate Certificate in Transportation Management (CTM) (offered to those students not matriculating into the graduate program). The students targeted for the GTMP are current and aspiring career-oriented working transportation professionals. The program is designed to provide them with graduate educational opportunity while allowing them to continue working full time in their existing professional careers. All of the program's courses are delivered to its students entirely by distance learning in an accelerated format of ten four-hour night classes. Course classes are usually originated from the SJSU Academic Technology Network (ATN) studio classrooms and delivered via ISDN lines to the Caltrans PictureTel Concorde broadcast videoconferencing network. From there, they are distributed to up to twelve Caltrans videoconferencing receive sites distributed throughout California. Concurrent experimental class delivery by one-way video/two-way audio through webcasting and POTS has, so far, offered promise for those outside of Caltrans receive sites.

This paper recognizes certain shortcomings in the distance learning technology currently employed to both create the most effective learning environments appropriate for GTMP courses and to provide the most flexible course participation system for working, mobile, adult students. It then continues to examine the nature of the learning processes supported and needing support in the GTMP and describes the ongoing process of improving the GTMP through a series of three technology-based projects that are currently under way. They include:

- Core course enhancement
- Elective course revision & updating
- Web-based course delivery and participation

While the implementation of these projects is continuing, successful conclusion is expected to create a continuous, course-long learning environment that can embrace working professional adult students in a supportive, motivating and challenging learning space appropriate to the needs of the levels of learning targeted by the enhancement program and the needs of the students for mobile access to classes and course information.

Where We Begin

The target population for prospective graduate transportation management students consists largely of working transportation professionals; many of them with undergraduate engineering degrees and/or substantial public transportation agency/industry experience. They are geographically and thinly dispersed throughout the state and beyond to other parts of the Western U.S. The task at hand is to create and maintain an appropriate learning space suitable for nurturing and supporting motivated, working adult students.

The GTMP's MSTM degree requires students to successfully complete ten program courses consisting of a block of six core courses, three elective courses and a culminating capstone course. The graduate CTM requires completion of any four of the same six core courses.

Required Core Courses

MTM 201	Fundamentals of Transportation Management
MTM 202	Accounting, Finance, and Business Systems
MTM 203	Transportation Markets and Business Development
MTM 214	Transportation Policy and Regulation
MTM 215	Transportation Systems Planning and Development
MTM 217	Leadership and Management of Transportation Organizations

Typical Elective Courses

MTM 222	Transportation Data Collection and Analysis
MTM 286	Project Management
MTM 297	Current Topics in Transportation

Capstone Course

MTM 290	Strategic Management in Transportation

Shortcomings of today's GTMP distance learning technology infrastructure are largely a reflection of heightened expectations. As today's students are increasingly pressured with the professional demands of their jobs and families, they come to their GTMP classes each week tired and stressed. Classes generally begin with a prolonged sign-in process followed by lecture, Q&A, occasional guest speakers, student presentations and student-student discussion.

Normally, these class activities take place over the videoconferencing network with site switching being interrupt controlled by voice takeover or local camera technician. Instructors and students, both, try to run the class as a synchronous, live, face-to-face meeting and miss out on the many advantages available to them. These projects are intended to introduce the benefits of teaching technology to an already distinctive graduate business program.

Determining Distance Learning Technology Needs

A variety of well known technology options exist to establish and maintain the learning space requirements of specific distance learning courses and programs. Without attempting to be comprehensive, there are group and desktop-based audio and video conferencing for synchronous interaction (point-to-point and multipoint), other synchronous and asynchronous web-based interactivity tools such as e-mail, bulletin boards, mailing lists, white boards and application sharing, and many other computer mediation tools available either separately or included in various non-commercial and commercial platform packages (McCormack & Jones, 1997)(Horton, 2000).

The well known Bloom Taxonomy (Bloom, 1956) was developed as "a classification of levels of intellectual behavior important in learning" (Distance Learning Resource Network, 2001). It consists of six learning behavior levels describing the cognitive learning activities students are expected to use during their course experience. The learning levels are described as (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis and (6) evaluation. Based on the nature and design of a particular course, it should be reasonably straightforward to identify the taxonomy levels at which the students are targeted to operate. Examination of the graduate level GTMP program courses, students and faculty suggest that cognitive behavior learning levels 4-6 (analysis, synthesis and evaluation) are those appropriate for planning the technology infrastructure of the program.

In addition to using the learning level criteria discussed above, it is important to consider the nature of in-class and between-class activities among students and between students and instructor. The degree to which aural and visual sense data are important elements in effective cognitive processing for analysis, synthesis and/or evaluation, the more important it is to provide technological infrastructure support to convey such data between and among students and instructor. If course learning activity requires intensive student interpersonal interaction (both in and outside of class sessions), then full aural and visual sense data, in the form of vocal, verbal, nonverbal communication between and among course participants must be provided. Attempting to reduce sense data channels in such cases simply impoverishes ongoing communication and reduces learning effectiveness. Again for the GTMP, the importance of collaborative learning activities in analyzing, synthesizing and evaluating course topics and assignments strongly recommend the development and use of appropriate technology to establish and maintain the requisite course learning space.

Core Course Enhancement Project

The Core Course Enhancement project responds to the need to enhance the present distance learning curriculum of the existing GTMP to create a more extensive and effective

teaching and learning environment needed for more meaningful graduate management education. Completion of this project will ameliorate the relatively impoverished interactive environment currently available through four-hour weekly classes delivered over a dedicated two-way broadcast videoconferencing network. It will also expand the range of learning tasks and teaching methods available to richly address the large variety of course topics incorporated in the GTMP.

The GTMP in cooperation with SJSU Continuing Education Department, was awarded a CSU CEE Grant entitled: "Enhancing the Distributed Graduate Transportation Management Program." This $55,500 grant (free of overhead charges) is being used to enhance the Program's six core courses by developing/creating web-based, computer-mediated curriculum components (e.g., computer-based tutorials, exercises, self-assessment quizzes, etc.), for each of the existing six core courses. Student learning opportunities will be enriched in variety and made available upon demand over a web-enabled computer system. The ultimate result of implementing the grant's objectives will be a dynamic, interactive management learning environment that drives students to a deeper understanding of transportation management and policy. The graduate teaching faculty of the SJSU GTMP will (where possible) individually revise and enhance their own courses to create improved/enriched/varied teaching/learning environments in which they will teach. This process will involve both individual and group collaborative effort which will help build and nurture strong faculty commitment to the GTMP.

Project Plan

The plan of operation to revise and enhance a GTMP core course has six steps: (1) completion of a teaching technology workshop, (2) videotaping of existing course delivery, (3) instructor analysis, with a self-guiding analysis methodology, of course videotapes, (4)revision/updating of existing course teaching/learning methods and development of new computer mediated course enhancing teaching/learning methods (the new toolset), (5) delivery of the enhanced course and (6) assessment reporting of results with recommendations and further revisions and improvements.

The process is as follows: As each core course class is delivered (taught), it is videotaped. At the end of the ten-week course, the trained course instructor analyzes the course s/he just delivered. S/he uses the self-guiding analysis protocol methodology provided and develops additional complementary and supplementary teaching/learning tasks that can be added to the course curricula to enrich both the in-class and between-class course environments. The assigned instructional technology professional works with the instructor to implement the new teaching/learning task/tools in an appropriate, web-based, computer mediated technology development platform. Finally, the instructor teaches the course again, pilot tests the newly enhanced course, reports the results of the teaching/learning improvements and makes any necessary revisions to the course structure.

<u>Deliverables Payment Schedule</u>:

Faculty instructors are paid for enhancing their courses. Payment for each core course enhancement project will be made according to the following schedule:

1. Completion of the E-web University Teaching Technology Workshop & submission of the course completion certificate: $500

2. Completion of the guided self-elicitation class tape review exercise (using the protocol provided) & the submission of a written report describing the course enhancement opportunities that were identified: $750

3. Elaboration of the course enhancement opportunities identified in #2 above into a linked course plan; a network of specific learning tasks & submission of a written descriptive list of said learning tasks and their relevance to the course: $750

4. Select and identify specific computer mediation tools for each learning task identified in #3 above & submission of a written report identifying, sourcing and describing each tool proposed: $750

5. Compose the "lesson" plan for the entire core course sequence of classes, using the results of your research described in #1-#4 above & submit as a written descriptive report: $750

6. Develop an "embedded" assessment tool for the course and develop a research program to test its appropriateness for ongoing course evaluation & submit a written proposal of the intended research: $1,000

The enhanced course learning environments will be assessed independently during and after their first performance to assure that their use will maintain high program quality and better meet student's needs through the following:.

1. conducting a pilot study of student satisfaction, instructor satisfaction, and delivery methods for each core course.

2. analyzing study results with an eye toward improving curriculum design and delivery; making changes to these and the other courses as necessary based on study outcomes.

Elective Course Revision and Updating Project

As a logical extension to the enhancement of the program's core courses, the Mineta Transportation Institute (MTI) is funding the revision and enhancement of three of the most popular GTMP elective courses (see above).

Project Plan

The process of revising and enhancing a GTMP elective course is a simplified version of that applied to the core courses. It includes having the instructor (1) complete the Teaching Technology Workshop, (2) analyze the existing elective course materials, (3) revise and update the existing course teaching/learning methods and add/develop new computer mediated course

enhancing teaching/learning methods (the new toolset), (4) deliver the revised/updated course and (5) provide assessment reporting of results with recommendations and further revisions and improvements. A similar deliverables payment schedule will be used to pay electives instructors for their work.

Web-based Course Delivery and Participation Project

A third project, proposed to be supported and funded by MTI as a research project (Web-Based Interactive Communication Systems for Transportation Management) is expected to provide the basis for expanding the range and reach of GTMP classes. It will enable the GTMP to expand student access to program classes through the conversion of the existing private videoconferencing network into a hybrid combination of private broadcast videoconferencing networks and relatively inexpensive Internet-based webcasting. This will extend the reach of the program to prospective students with Web access, enabling us to offer educational opportunities to many underserved constituent groups. It will transform the current, limited-reach, conventional distance learning-based MS program, using a standard, dedicated video-conferencing network with relatively traditional "low-tech" pedagogy, into a modern "technology-based" virtual classroom environment that can be attended by both working transportation professionals and currently under-served aspirants to graduate transportation management education. When complete, this project will make the GTMP ubiquitously available throughout all internet-worked areas of California and the adjoining western states.

References

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