GLOBALIZATION EDUCATION DELIVERY SYSTEMS

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Abstract

Real time capabilities for delivery of long-distance educational courses have never looked better than what is available today. The growth of the Internet I (and now the Internet II) capabilities is enhancing the delivering of courses (and yes even degrees) long-distance around the globe. Costs of delivery are certainly reasonable and with the advent of high-speed modems, systems are becoming better and the quality is improving.

We at the University of South Florida are beginning to use simulcasts of television courses on HTFS low power microwave systems while at the same time delivering the course live on the Internet with worldwide capabilities. This summer of 2001 all FEEDS (Florida Engineering Education Delivery System) in the Industrial & Management Systems Engineering Department will be simulcast. Test cases have already been done and they were successful. Satellite delivery systems are available, however the cost of such delivery is quite high compared to other systems. If someone wants to pay the cost of satellite use then this system can be used.

Florida Engineering Education Delivery System (FEEDS)

The following description of the FEEDS system was compiled recently when the Auditor Generals' office performed an audit of the FEEDS function at the University of South Florida, College of Engineering. The Director and Associate Director of FEEDS as well as the Deans furnished much of the detail for the report. The Auditor's description bests describe the FEEDS operation.

"The Florida Engineering Education Delivery System (FEEDS) is a state-wide system which provides access to graduate-level and limited undergraduate engineering courses at industrial sites and cooperating university centers throughout Florida. FEEDS is designed to improve the availability of continuing education to engineers working in Florida, increasing their skills and thereby strengthening the State's economic base. A student taking a course through FEEDS must meet the same requirements as a student on campus, and will earn the same credit and academic credentials. Academic programs delivered through FEEDS originate in colleges of engineering at the University of South Florida, University of Florida, Florida State University, Florida A&M University, Florida Atlantic University, University of Central Florida, and Florida International University."

FEEDS began in 1982 when the Florida Legislature provided funds for the delivery of off-campus graduate engineering programs in Florida, and requested that the Board of Regents develop a plan for implementation of this delivery system. Chancellor's Memorandum CM-C-04.00-02/97 outlines the structure of the FEEDS system, and provides direction for statewide operations.

While individual universities produce and facilitate the delivery of engineering degree programs and courses, the FEEDS system is overseen by the following three entities:

- Florida Council of Engineering Deans (FCED) - Consists of the deans of the State University System (SUS) colleges of engineering. FCED reports annually to the Board of Regents regarding the status of FEEDS operation, and, as the need arises, advises the Chancellor and the Board of Regents on matters pertaining to FEEDS. Responsibilities include long-range planning, budget, resource and policy recommendations, and the assessment of needs for facilities and equipment.
- State System Operations Committee (SSOC) - Consists of all the SUS FEEDS directors and a representative from the Board Office designated by the Chancellor. Responsible for managing, coordinating, and facilitating the operations of the FEEDS system. SSOC reports annually to the Board of Regents via the FDEC.
- Regional Advisory Councils - Members are appointed by the SUS deans of engineering. FEEDS directors and coordinators are also considered ex-officio members. There are four separate councils arranged geographically. USF and Florida Gulf Coast University comprise the Southwest Florida Regional Advisory Council. The Councils serve as feedback conduits between industry and individual universities, FEEDS, and the SSOC. The Regional Advisory Councils are charged with enhancing public awareness and support of FEEDS, as well as identifying needs for services in the region, estimating their costs, and reporting these needs to the appropriate deans of engineering.

CM-C-04.00-02/97 assigns the Board of Regents responsibility for setting overall FEEDS policy to the Florida Council of Engineering Deans in conjunction with the Board of Regents of the SUS.

Each year FEEDS receives a specific allocation of State funds from the Board of Regents and/or the Florida Legislature. State funding for USF FEEDS flows through the USF College of Engineering's annual budget, and financial activity is tracked and monitored within that college's central budget office.

Industrial FEEDS sites are established for the delivery of FEEDS programs at the expense of the host organization. The host must provide all necessary equipment, facilities, and on-site administration related to courses offered at that site. Industry partners are assessed a flat cost-sharing fee per course section offered, which depends on whether they offer a live or tape site, at $40 or $80 respectively. Additional industry support, above and beyond the cost of establishing a FEEDS center, is encouraged but not required. Student fees are assessed in accordance with the University's standard tuition schedule, and are collected and processed through the USF Cashier's Office.

The University of south Florida (USF) was established in 1957. Now categorized as a Carnegie Research I university, it is the thirteenth largest university in the United States and the

eight largest urban universities. In 1967, the College of Engineering opened with six disciplines in engineering: Civil and Environmental, Chemical, Computer Science and Engineering, Electrical, Industrial and Management Systems, and Mechanical. In 2000, the college enrolled 3000 students and conducted over 18 million dollars worth of research.

USF FEEDS maintains it's own engineering classroom two studios, transmitting courses live to the industrial FEEDS sites with both video and audio talkback capabilities. USF FEEDS delivered its first live Internet course in the Spring 2000 semester, therefore; each studio has been equipped to encode and stream live courses over the Internet.

The Department of Industrial and Management Systems currently houses five degree programs: Bachelors of Science in Industrial Engineering, Masters of Science in Industrial Engineering, Masters of Science in Manufacturing Engineering (interdisciplinary), Masters of Science in Engineering Management and the Doctor of Philosophy. The BSIE and MSEM ore offered in their entirety through distance education while the MSIE and MSMfg are offered mostly through distance education.

Engineering Management Degree

The Master of Science Engineering Management degree was began in 1985 as a service for the Honeywell Corporation in Clearwater Florida. The management of Honeywell had the foresight to understand the combination of engineering and management so that engineers could manage technological based units, i.e., engineering departments, research and development, projects, etc. Honeywell provided the initial funds to get the program off of the ground. From this humble beginning, the MSEM program grew to be the largest program on all of the FEEDS networks. There were as many as 200+ students working on their degrees.
The initial FEEDS delivery system at USF was ITFS low power microwave TV. This TV program could be successfully delivered for up to 35 miles direct line of sight.

One of the FEEDS concepts was to establish agreements with corporations for delivering of master degree courses to the corporation sites. Courses were not to be delivered to individuals. As a result USF at its peak delivery cycle was delivering courses to 80 different corporate sites. Corporations in fact built 80 classrooms for USF FEEDS all over Florida.

Over 2000 master degrees have been awarded by the total FEEDS organization. South Florida has awarded over 700 of these degrees with the Industrial and Management Systems Engineering Department awarding over 500 MSEM degrees.

So popular and effective is the MSEM degree that other state universities have installed the degree with similar curriculums. Florida University, University of Central Florida, Florida International University, Florida State University/Florida A & M University and the private Universities of Miami and Florida Institute of Technology are now awarding the MSEM degree in some format. As was to be expected the new programs would erode the total students in the USF program. Still there are always around 75 to 100 students working on their degree at any one time.

Performance of FEEDS

A concern that is commonly expressed is "How well does distance education perform compare with traditional means of learning?" Over the years many individuals have attempted to answer this question including members of the Industrial Engineering faculty at the University of South Florida. Papers published over the years (Callahan, Givens, Weaver and Barrett, 1992, 1993; Callahan and McCright, 1994; Callahan, McCright and Bly, 1997, Homrig and Callahan, 1999) show that there is no statistical difference in the performance of students at studio, live broadcast, videotape, and Internet sites. There is, however, a statistical difference in the teaching ratings of the instructors depending on the medium used. These studies have followed over 2000 students enrolled in 13 different classes taught by five faculty members in multiple sections. As expected, studio sections of courses had the highest teaching ratings and the sections of courses that are on delay had the lowest teaching ratings. Details can be found in the previous cited papers.

In addition to comparing grades and teaching evaluation for the four modes of delivery, studies have been conducted comparing the performance of students on comprehensive exams over the various modes of delivery. Seven core courses were evaluated for students taking the exam for the past four years. Courses had been taken as long ago as ten years and through the various media: no statistical difference in their performance was determined. This once validated the value of distance education for the engineering professional showing that there is no degradation in the quality of education simply based on the mode of delivery.

Future for the FEEDS and MSEM Programs

FEEDS has contributed much to the economic welfare of Florida as any other education program. FEEDS has assisted corporations to hire and maintain excellent engineers. Feeds however is evolving. New delivery systems are being tested everyday. The Internet is now functioning as a delivery system. All of the six colleges of engineering are implementing the new technology. However, older delivery systems will continue to have their place in the continuum of education delivery. As long as there is a need and as long as the State of Florida continues to support the FEEDS system, the engineering consortium of FEEDS will play its role in the economic value to the state and its citizens.

There will be new on demand courses on the Internet. This delivery system will fill a niche and be part of the evolvement of Florida's Long Distance Education system. Other systems, live TV, video tapes or CDs, live Internet, On-Demand Internet, and satellite will continue to be used to deliver college course work to students. It is believed that courses will be delivered to the individual students at their home sites.

The advent of courses on the Internet has changed the faculty's attitude towards distance education as well. Until recently, all courses were offered to students in studio, live broadcast, tape, or Internet mode. Faculty now encourages all their students to enroll in Internet rather than tape delay. This allows all students to participate in the course on a real time basis. From a faculty perspective, it means they only need to keep one lecture in mind rather than three (last week, this week, and next week). The benefits of real time participate have out weighed the technological problems encountered with firewalls and slow speed connections. This also allows students to "attend" course when away on business.

The MSEM program will stay modern and be the program to assist engineers to bring their companies into the 21st Century. Engineering Management will help engineers in the globalization of their products and their companies. The MSEM program will be enhanced by adding a doctorate degree and perhaps even a BSEM which is an ABET accredited degree. The Engineering Management curriculum integrates well with the Industrial Engineering degrees and each adds a synergistic effect than makes each degree better than if it were the only one.

The MSEM program has reached beyond the borders of the state of Florida. Although was originally intended to serve the place-bound engineer in the sixty-eight counties, students have completed their degrees from as far away as South Carolina, North Carolina, Ohio, Colorado, California, Colorado, Washington, Connecticut, and Israel. Requests for information on the program arrive daily from countries including India, Chile, Columbia, Venezuela, and China. It is truly becoming a global degree.

Test cases on the Internet were conducted in Peoples Republic of China and in Costa Rica this past summer. All indications are that they were successful. Success was measured by the student's satisfactory completion of the course material within the required time frame. The Internet is not without its growing pains. Bandwidth problems associated with foreign country utilities will have to be surmounted. As technology progresses, algorithms will get better and bandwidth will become more consistent from continent-to-continent. The Industrial & Management Systems Engineering Department is looking forward to delivering short courses, college credit courses and the truly long-distance degrees. Maintaining the integrity of the degree becomes primary to provide an ABET (American Engineering Accreditation Group) accredited degree virtually anywhere in the world.

The next area of research and testing of new ideas will come in the joint ventures among the education community to augment and to take advantage of some of the world's best minds through collaboration. Accreditation problems will have to be solved so that consistency along with integrity can be maintained. There is no reason that some of the best teaching by some of the world's best educators can not be used universally to develop some of the worlds best engineers that will and can solve some of the global problems, i.e., global warming, eradication of species, famine, potable water, etc.

Management indicated that there are two key challenges facing the USF FEEDS program (Long-Distance Delivery System):

1) Reaching potential industry partners and students through marketing efforts; and

2) Developing new funding sources which will support additional growth in the face of increasingly expensive technology

System-wide FEEDS issues presently being considered by the Florida Council of Engineering Deans includes:

- Modernizing distance learning program delivery
- Providing anytime, anyplace delivery
- Improving marketing
- Improving statewide infrastructure
- Conducting a needs assessment

- Conducting a tuition survey for out-of-state delivery
- Evaluating enrollment problems
- Improving Regional Advisory Council Involvement.

Since the FCED is responsible for establishing overall FEEDS policies, they are the appropriate group to be undertaking this review.

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