Graduate Teaching Alliances - Experiences from a Western Experiment

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Abstract

Resources for higher education have become scarce in recent years due to decreased budget allocations from state governments. At the faculty level this has meant that the time available for teaching graduate courses is becoming limited as more time is spent on undergraduate teaching and research. However, training needs for graduate students keep growing to meet technological advances and research needs. Modest-sized graduate programs face the difficulty of achieving sufficient enrollments in graduate courses, further limiting course availability for graduate students. Attracting and retaining graduate students becomes challenging under such circumstances. However, graduate students form the backbone of any successful research program. The experiment presented in this paper was conducted to study the feasibility of forming teaching alliances focused in electrical engineering. These alliances allow several programs to pool their resources.

I. Introduction

Resources for higher education have become scarce in recent years due to decreased budget allocations from state governments. At the faculty level this has meant that the time available for teaching graduate courses is becoming limited as more time is spent on undergraduate teaching and research. However, training needs for graduate students keep growing to meet technological advances and research needs. Modest-sized graduate programs such as those in several state universities in the Northern Rocky Mountain Region and the Pacific Northwest also face the difficulty of achieving sufficient enrollments in graduate courses, further limiting course availability for graduate students. Attracting and retaining graduate students becomes challenging under such circumstances. However, graduate students form the backbone of any successful research program and hence graduate course offerings need strengthening under tight budget constraints. The experiment presented in this paper was conducted to study the feasibility of forming teaching alliances focused in a particular field, electrical engineering. Success in forming such alliances could mean an increased spectrum of course offerings in various universities, cross-fertilization of expertise across campuses, and various other advantages. The experiment involved the sharing of two courses between the electrical engineering departments at Montana State University in Bozeman, and University of Idaho in Moscow. The courses were shared via a videotape exchange program with support over the Internet.

The paper will discuss logistics of the exchange program, experiences from faculty, and students, and other practical considerations. The experiment has now expanded in a program called the Western Virtual Engineering Consortium (WestVEC), which now involves eight universities with the addition of Idaho State University, the University of Nevada-Reno, Utah State University, the University of Victoria-British Columbia, Washington State University, and the University of Wyoming. Early results from this organization and future plans will be discussed in the paper.

II. Background and Motivation

A. The Trials of Low Enrollment Graduate Programs

Modest sized graduate programs such as those in several state universities in the Northern Rocky Mountain Region and Pacific Northwest face the difficulty of achieving sufficient enrollments in graduate courses, limiting course availability for graduate students. The limited availability, or outright cancellation of graduate courses limits the options for graduate students to finish their courses of study in a timely fashion. As a result, attracting and retaining graduate students becomes difficult under such circumstances. However, graduate students form the backbone of any successful research program and hence graduate course offerings need strengthening within tight budget constraints.

B. The Role of Distance Education

Several universities with small to moderate sized graduate programs can pool their resources to 1) increase the number of graduate courses offered each semester and 2) increase the enrollments in courses that are offered. A side benefit of this would be to take advantage of expertise at the other schools, allowing faculty members to teach graduate courses only in the areas of their greatest strengths, and also free up the balance of their time for teaching undergraduate courses or pursuing research activities.

The graduate programs will also be more appealing to potential students because they can offer a wider variety of courses than is now possible.

III. The UI/MSU Trial

Two of the authors, Venkataramanan and Johnson, began discussing the possibility of cross-listing graduate courses in the electric power area several years ago. The objectives were to 1) increase the number of power courses available each semester, 2) increase the diversity of topics available for students, and 3) free up the power faculty at the two schools for other activities. The department heads of the respective electrical engineering programs were approached, and a plan for an experimental exchange of courses was agreed upon. The experiment was also expanded beyond the electric power area. Faculty members at the University of Wyoming were also contacted just prior to the experiment, but there was not sufficient time to work out the logistics prior to the start of the experimental semester.

A. The Courses

The two department heads decided to have each department offer one course to the other for the experiment. The Montana State course was on Nonlinear Systems. The University of Idaho course was a course on Utility Application of Power Electronics. These courses were chosen based on the willingness of instructors to participate in the experiment and the presence of a sufficient number of students on each campus to offer the course. Both courses also covered topics that were not likely to be covered on the receiving campus in the foreseeable future.

B. Delivery Methods

The course originating at the University of Idaho was already scheduled to be taped as part of the University's Engineering Outreach program. The department of Electrical Engineering covered the costs for shipping tapes and handouts to Bozeman plus a fee to cover videotaping expenses.

The department of Electrical Engineering at Montana State had a fairly rudimentary video classroom available at the start of the semester. However, it was deemed necessary to upgrade the video camera to improve the production quality. Again the department in Bozeman covered the expenses for producing tapes and shipping them to Moscow.

The tapes were shipped once a week by express mail in three-tape sets for each course. The tapes were sent to a local facilitator at the receiving institution, who later sent the tapes back after the students viewed them.

C. Local Facilitators

Both locations had local facilitators with some knowledge of the course material to support the students enrolled in the course. The faculty member serving as the facilitator was given one credit of teaching load for involvement with the course. The facilitators normally watched the tapes with the students to help answer questions.

Two different roles for facilitators were tried. The Moscow facilitator for the non-linear systems course used a minimal, "babysitter," approach. His main responsibility was to schedule a time and location for the students to view the tapes. The facilitator also answered some questions for the students and helped them contact the instructor in Bozeman. All of the student work was sent to Bozeman for grading by the instructor.

The Bozeman facilitator for the course originating in Moscow played a more active role in the course. In addition to minimal duties described above, the facilitator also graded local student homework and exams. He also assigned and graded the local students on their class projects.

D. Logistics

Since the initial exchange was performed as an experiment, each department covered its own expenses for delivery of the course. No money was exchanged between the departments in this instance.

Some of the logistical problems present with distance education were avoided since the students were located on university campuses. The students were able to order books through their local university bookstores, although there was also the option to have a book shipped from the bookstore of the institution where the course originated.

The students had access to similar levels of computer facilities and software packages needed for their course work. They also had good access to library facilities and the Internet.

To simplify issues related to the transfer of course credits, each course was assigned a "Special Topics" course number by the receiving institution.

IV. Evaluation of Trial

The initial course exchange proved to be a success. In fact, neither course had sufficient local, on-campus enrollment to have been offered otherwise. The addition of the off-campus video students made both courses large enough to survive cancellation. In addition, neither department had the staff resources to offer the course they received from the other school.

The Nonlinear Systems course from Montana State had three students in Bozeman and three students in Moscow. The Utility Application of Power Electronics course had three students in Moscow, two students in Bozeman, and eight students through the University of Idaho Engineering Outreach program. The reviews from students were all positive. For example, University of Idaho students enrolled in the MSU course rated that course and its instructor at an average of 2.05 on a 1-to-5 scale (with 1 being excellent and 5 being poor) on their evaluation forms.

The experiment also pointed out some potential problems that will need to be addressed in future course exchanges. Although both universities are on the semester system, they have slightly different starting and ending dates. Montana State University started classes more than a week after the University of Idaho during the semester in question. This combined with the one week delay associated with shipping videotapes created a few minor complications with completing the course by the end of the semester.

V. The Western Virtual Engineering Consortium(WestVEC)

Several other universities expressed interest in participating in the next phase of the experiment after hearing about the results of the initial trial between the University of Idaho and Montana State University. Six additional universities became involved in the spring of 1996. A planning meeting was held at the University of Idaho on March 29, 1996, where the organization was named the Western Virtual Engineering Consortium (WestVEC). WestVEC consists of electrical engineering programs at the following universities in the western US and Canada: University of Idaho (UI), Idaho State University (ISU), Montana State University (MSU), University of Nevada-Reno (UNR), Utah State University (USU), University of Victoria-British Columbia (UVic), Washington State University (WSU), and University of Wyoming (UWyo). Fig. 1 shows the geographic locations of these universities.

The experiment was continued during the 1996-7 academic year, with the EE programs making courses available for delivery by videotape to the other members in each semester. It was also agreed upon to charge a fee if $600 per course to cover videotape production costs and the costs to ship tapes out by express mail after each lecture.

Another outgrowth of the MSU-UI experiment was the use of WestVEC as a vehicle to deliver microelectronics courses to several semiconductor companies in the region. A total of 32 UI and 4 WSU students attended these classes live and on compressed video in Moscow, Boise, and Pullman, Washington. In addition, there were off-campus students who view videotaped lectures mailed to four different receiving sites: 6 at American Microsystems (AMI) in Pocatello, Idaho, 6 at Micron Technology in Boise, Idaho, 4 at Zilog Corporation in Nampa, Idaho, and one at the campus of WSU Tri-Cities in Richland, Washington (lectures received via microwave).

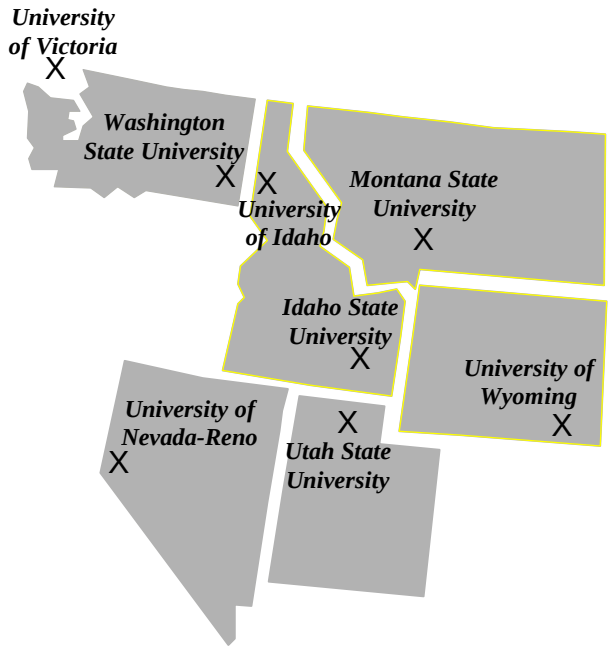

Fig. 1 WestVEC Member EE Programs

VI. Future Concerns

As the potential for graduate teaching alliances are recognized by more and more universities, such teams are expected to become popular in the future. However, there are several concerns that need to be addressed to bring these within a strong framework. These are briefly outlined here.

A. Faculty Loading

It was noted that some of these courses could be very popular and calling for enrollment limits to be set. Training of faculty for video instruction needs to be performed to ensure that the quality of presentation is uniform. Faculty teaching courses from other programs may listed as affiliate faculty at host institutions. Proper remuneration mechanisms and credit recognition must be devised to provide incentives for faculty to participate in distance instruction programs.

B. Program Coordination

There are a number of issues which need to be addressed to ensure that the maximum potential of graduate teaching alliances is realized. These include setting prerequisites for courses, assignment of credits, transfer of credits, number of remote credits counted towards degree, on-campus residency requirements, timing of offerings--such as quarters and semesters, and differences in start/ending dates of terms and other term breaks. Other issues which needs attention are course and faculty evaluations, software and hardware requirements, cost of outside courses versus on-campus courses, administrative involvement, and quality assurance.

C. Course Catalog

Choice of courses to offer and cross list is an important concern effected by the specialization of the faculty at various departments, their commitment to remote instruction, their loading level

and the number of faculty at various departments. Choice of a particular offering institution when there are multiple faculty offering the same course is a delicate situation which may effect this process. In addition, choices between different modes of delivery such as live versus video tapes, Internet offering versus microwave link, etc. also need to be made in the face of larger picture issues like state wide standards and national trends.

VII. Conclusion

Based on the experience from the initial experiment on course sharing, the authors are convinced that it offers tremendous potential to be exploited by universities for the benefit of students, faculty and the administration alike.

In order to ensure that such alliances meet their full potential, long term planning across campuses is essential to complement each other in instructional interests of faculty. Coordination of courses, catalog listings etc. are easier to maintain at the level of areas of specialization - such as power, control, computer architecture, etc., rather than at a departmental or college level, where it becomes an overwhelming task. Informal gatherings of faculty at professional conferences are apt venues for planning such ventures.

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