STRATEGIES FOR ENGAGING ENGINEERING FACULTY IN CONTINUING EDUCATION

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Engaging engineering faculty at a large research university in continuing education is a challenge because faculty choose to invest their time and talents in other activities which are perceived to have higher benefits. This paper describes strategies that can be employed to increase the benefits of continuing education activities to make them more attractive. These strategies include reducing the faculty time requirements and increasing the rewards. The paper illustrates how these strategies have been applied to the activities necessary for the design, production and delivery a graduate-level credit course taught to distant students.

Introduction

This paper explores the issue of faculty engagement from the perspective of the Engineering Outreach Office of a large, land-grant, research university. Land-grant universities in the United States date from the 1860's when they were established to teach agriculture, the mechanical arts, and home economics to the working class. In the late 1800s, their mission was expanded to include agricultural research and the dissemination of research results. Today's land-grant universities teach a broad range of subjects beyond agriculture, provide access to higher education for the general population, and have outstanding research capabilities. Still, the fundamental concept of service to society remains firmly rooted in their mission statements which include three elements: teaching, research, and service. Continuing education is a part of the service element. Recent studies have encouraged the land-grant colleges and universities to renew and expand engagement with external communities [1].

The Engineering Outreach Office at Penn State encourages and facilitates continuing education activities which include short courses, conferences, and distance education. All require the involvement of faculty subject matter experts in their design, production and delivery. For the purpose of this paper, we will focus on graduate-level credit courses delivered to distant students, because those are among the most difficult continuing education programs to design, implement, and deliver[2]. Also, the subject matter experts for graduate-level courses are senior faculty. Engaging those faculty in continuing education is challenging because there are many competing demands on their time and intellectual resources – foremost among them research and the direction of graduate students. Being rational human beings, the faculty decide where to invest their time, based on the perceived benefit for the investment made. Looking at this as a simple formula,

Benefit = f (Reward / Resources invested)

Faculty perceive that the greatest benefits come from research and related scholarly activities because these enhance one's reputation among one's peers and are given high consideration in the promotion and tenure process. Continuing education, on the other hand, is viewed by faculty as generating low benefits for the resources invested, making it difficult to engage faculty in continuing education [3]. That creates a problem for the Outreach Office. The Office's mission is to facilitate continuing education, but the faculty subject matter experts, a critical element of the process, are reluctant to participate because of the lower perceived benefit to them from these activities. In an attempt to mitigate this problem, we have developed

strategies to make continuing education more competitive with other activities by increasing its benefit. This is accomplished by both reducing the resources faculty must invest and increasing the rewards.

Strategy 1: Reduce Faculty Time Requirement

Aside from intellectual content, time is the primary resource that faculty invest in continuing education. If the time investment can be reduced, the benefit can be increased. Thus, the first strategy: reduce the amount of faculty time required for a continuing education project.

To determine where time is spent, let's look at the activities involved in the development and delivery of a course, using the value chain concept [4]. A value chain shows the value-added activities involved in designing, producing, delivering, and supporting a product. Value chains are often applied to business processes, but a value chain can also be constructed for an academic process – in this case the development, production, and delivery of a continuing education course, Figure 1.

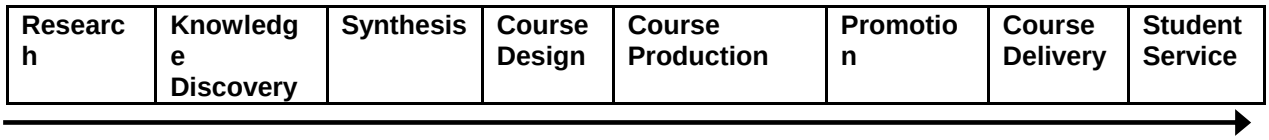

Figure 1. A value chain showing the activities in the design, production, and delivery of a continuing education course.

The first three activities in the value chain, research, knowledge discovery, and synthesis are research-related activities. These are activities that engineering faculty typically enjoy, and for which they are rewarded. Faculty are less enthusiastic about the course design, construction, and delivery tasks, which lie outside their realm of expertise and, therefore, take an inordinate amount of time to accomplish. If a faculty member is expected to do all of the activities on this value chain it is doubtful that they will choose to do so because the amount of time invested is high and, therefore, the benefit is low.

To counter this situation, we developed the strategy of reducing the amount of time engineering faculty must invest by having the Outreach staff perform many tasks related to the production and delivery activities. To accomplish this, we created an infrastructure composed of human, physical, and intellectual resources. Those resources include: an instructional designer, a technical typist, a course management administrator, a multi-media specialist, hardware and software for course production and delivery, and facilities and hardware to capture and distribute course content. While this sounds cumbersome and expensive, it isn't because people cover multiple jobs and costs are spread across multiple projects. Let's look at how the system works for activities on the value chain beyond synthesis, using the example of a graduate-level, distance education course.

Course design is centered on course content, which must be defined by faculty who have the expertise to put the course into the academic context and define the concepts that must be taught. The Outreach Office contributes to the design activity by having an instructional designer and course administrator collaborate with the faculty member on learning objectives, student engagement strategies, assessment, and other elements of the design. The final design emerges from this collaboration.

Once the design has been finalized, the course must be produced in a manner suitable for the mode by which it will be delivered – in this example, via technology to distant students. The production activity requires considerable effort and is performed by the Outreach staff, in consultation with the instructor. If necessary, the design can be modified during production.

As part of a faculty-friendly approach, we have developed a model for distance courses

that has the flexibility to accommodate a variety of teaching styles and course materials. Engineering distance education courses are produced using the ANGEL® course management system adopted and supported by Penn State. Each course has its own ANGEL® web site which can be accessed by registered students, the instructor, and the staff. Each site provides a rich communication and learning environment for students and useful features for instructors. A course site may contain, but is not limited to: a syllabus, a study guide and course information; reading assignments; case study lab activities; sample exams; a threaded discussion forum; forms and checklists; special software, design tools, and videos; a link to the instructor's web site; and a matrix, Figure 2, with class-by-class links to on-demand streaming videos, notes and presentation slides.

Class Number	Topic	Readings	Class Notes	Class Notes (EDITED)	Streaming Video	Homework	Case Studies/Labs
Class #5 1/30/08	Manual Work, Low back	Ch. 4 (153-166)	Back	Back(ed)	On-Demand Video	HW #1 Due	CS/Lab #2 Assigned
Class #6 2/4/08	NIOSH lifting eq, Example	Ch. 4 (166-175)	NIOSH	NIOSH (ed)	On-Demand Video UofM 3DModel	HW #2 Assigned	
Class #7 2/6/08	CDT Risk, Tools	Ch. 5 (206-226)	CTD Tool	CTD Tool (ed)	On-Demand Video Crimper Demo Cut & Tack		CS/Lab #3 Assigned

Figure 2. The matrix within the course web site. Blue text indicates a hyperlink.

The matrix is a useful resource for students because it presents, in one place, the information relevant to each class – the topic, notes, a streaming video of the lecture, and assignments. The Outreach staff creates the matrix skeleton at the beginning of the course and populates it with materials as they become available. If a course is being taught in parallel to a resident section, the instructor's notes and lectures (as view-on-demand videos) are inserted into the matrix at the time the class is taught. Thus, course production and delivery become concurrent activities. Let's look at how the notes and the videos are produced.

Instructor notes vary considerably – some have PowerPoint slides while others have hand-written notes or viewgraphs. Since materials have to be delivered to distant students via the web, it is important that they are clear, understandable and in a format suitable for posting to a web site. If an instructor's materials do not meet these criteria, a technical typist types the text into an electronic document and produces and inserts the equations and illustrations. Given the nature of engineering materials, the equations and figures can take considerable time and effort to produce, but the finished product is worth the effort – see Rewards below.

View-on-demand videos are a critical element of the course materials for the distant students. The videos are primarily class lectures, but they can also include laboratory demonstrations, tutorials, and other relevant visual material. To capture video lectures, we have designed and equipped several dedicated technology classrooms which are conveniently located in the Engineering area of campus. Each classroom is equipped with a variety of instructional and communication technologies, including: interactive video conferencing equipment, a streaming encoder to capture video, video recording equipment, a tablet computer, video projectors, and a SMART interactive white board. A member of the staff supports each capture session by insuring that the equipment is operating properly, switching

the feed between the instructor and the presentation materials, and transferring the video files to the streaming server.

During course delivery a member of the Outreach staff serves as the point of contact with students for logistics questions; homework submittal; distribution and collection of examinations; proctor coordination; and distribution of general student announcements. Thus, faculty are relieved of these potentially time consuming activities.

For a distance course to be viable it must attract an audience; therefore, time and effort has to be devoted to promoting the course to potential students. To assist with this, the Outreach Office maintains a web site with information about available distance courses and general information for potential students. We also handle inquiries and assist potential students in engaging with the university. Questions of an academic nature are, of course, referred to the faculty or department.

These are some of the ways we reduce the faculty time requirements. Now, let's look at a second strategy.

Strategy 2: Enhance Faculty Rewards

Benefit is a function of two elements – rewards and resources invested. So far, we have focused on increasing the benefit by reducing the denominator, resources invested. Another way to increase the benefit is to increase the rewards. This requires identifying the rewards from continuing education and communicating them to faculty. Rewards that we have identified, based on faculty input, are: improved quality of instruction and materials; enhanced resident instruction; the ability to reuse materials; the ability to shift time commitments; and increased engagement with external communities. Let's look at a few of these in detail.

Because students are being taught at a distance, all elements of the course must be clear and well communicated. This often necessitates improvements in materials and teaching techniques. The use of these improved materials and techniques is not limited to distance education. Because instructional materials exist and are archived in an electronic format, they can be accessed and used wholly or in part for resident instruction. This improves resident instruction by giving resident students access to the rich and improved materials developed for continuing education.

Another faculty reward for participation in continuing distance education is the ability to shift time commitments. Since distance education allows for asynchronous instruction and learning, faculty have scheduling flexibility to accommodate travel or other commitments. For example, lectures can be captured in advance; then, posted while the instructor is traveling.

Finally, there is the reward of closer engagement with external communities. This is a reciprocal process wherein faculty increase their visibility and interactions with external organizations and working professionals in those organizations have access to advanced education. By incorporating information about the latest research in courses, faculty can disseminate the results more quickly and receive valuable feedback to inform future research.

Faculty can reap many rewards from participation in continuing education activities. They need to be aware of those rewards when making the decision about becoming engaged.

Strategy 3: Treat Faculty as Valued Customers

A final strategy for engaging faculty is to treat them as valued customers. This requires accommodating their needs and suggestions, working with them in a true partnership, and helping them look good. Doing so creates good will and a sense of partnership that results in repeat projects and a positive reputation for continuing education among the faculty.

Summary

Faculty at a large research university have many demands on their time, and they choose to invest that time in activities they believe will provide the greatest benefit. It is possible to enhance the benefit from continuing education and make it more attractive to faculty through several strategies – reducing the amount of faculty time required, identifying and publicizing the potential rewards, and treating faculty as valued customers. We have applied these strategies to continuing education credit courses taught to students at a distance and found that faculty are more willing to be engaged initially and to continue their engagement. This is desirable and beneficial because when faculty become engaged in the service mission of the university, the model for the three elements of the land-grant mission are no longer separate and distinct activities but are integrated and synergistic as illustrated in Figure 3.

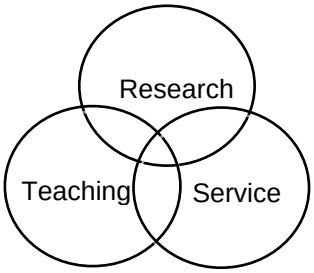

Figure 3. Integration of the three missions.

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Curriculum Vitae

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