Interdisciplinary Teaching

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Abstract

Changes in higher education are placing greater demands on the traditional methods and structures used to provide educational experiences. The experiences with interdisciplinary teaching at Oklahoma State University demonstrates that interdisciplinary teaching provides a means of improving the quality of teaching programs and increases utilization of faculty time and expertise.

Background

There are two aspects of education that everyone can agree on: it is changing and the amount of scrutiny by administrators and the public is increasing. These external and internal pressures are forcing higher education institutions and faculty to re-examine methods, organization, and the traditional ways of operation. It is almost impossible to pick up a newspaper or magazine without seeing at least one article describing what is wrong with the current educational system and how it should be fixed. Even though most of these articles deal with K-12 public schools, higher education is not immune. Two areas of higher education that are currently receiving attention are the quality of teaching and teaching loads of faculty.

Need for Change

At institutions of higher education internal pressures such as declining budgets, declining student numbers and reductions in faculty have forced departments and colleges to evaluate traditional methods and structures. One question being raised is, "Can we continue to justify each department having its own facilities and experts when duplicate capabilities exist in other departments?"

Departments are facing the dilemma of justifying and maintaining tenured teaching faculty when the demand for their services is declining. This decline is due to changes in student demographics, administrative and curriculum decisions that have changed traditional patterns of student enrollment, and the elimination of courses and curricula.

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At least one curricula at Oklahoma State University has been in this situation. The solution has been to use departmental resources, and faculty time and capabilities to provide service courses for College of Agriculture students and interdisciplinary course for other departments and colleges. The purpose of this article will be to explore the concept of interdisciplinary teaching, and describe the process used to develop three interdisciplinary classes at Oklahoma State University.

Interdisciplinary teaching

What is interdisciplinary teaching? It has been a tradition in higher education for courses of one academic area to attract students from other academic areas and in some cases to have nondiscipline classes as a graduation requirement. Interdisciplinary teaching goes beyond this. In interdisciplinary teaching an instructor in one discipline designs a course for and teaches students from a different discipline.

Potential Pitfalls

For interdisciplinary teaching to be successful, the academic departments of both the instructor and the students must be able to set down at the negotiating table and determine the structure and content of the class. Topics discussed should include objectives, topics, required skills and activities, method of evaluation, level and method of instruction, scheduling and costs. Throughout this process many of the traditional, educational methods and structures must be re-evaluated.

The first of these traditions is the role of the instructor. Traditionally in institutions of higher education the instructor has had a wide latitude in selecting course content, determining the best method(s) of teaching, level of instruction and assigning grades. Before interdisciplinary teaching will be successful, the instructor must be willing to give up the traditional independence and be willing to change to an advisory role during the development of the class. In most situations the discipline supplying the students will want the right to final decisions on course development. To be successful in this environment, the instructor must be flexible and allow input from another entity to guide the decision making process. As an adviser the instructor can make recommenda-

tions, but the ultimate authority rests with the faculty and administration in the students' department.

The attitude of the host department is the second tradition that must be reevaluated. Successful interdisciplinary teaching depends on the host departments adoption of a subservient attitude. Experiences at Oklahoma State University have shown that when a department approaches interdisciplinary teaching by asking two questions, "What do you want?", and "How should we provide it?", a fruitful dialogue can begin and successful courses can be developed. In the traditional academic departments this is a difficult and, in many cases, an impossible posture to assume.

Another potential roadblock to the development of an interdisciplinary course is the attitude of the department and college administration. If an interdisciplinary class will involve students and faculty from different colleges, it is imperative that the administrators work with one another. The collaboration may be as simple as a memorandum of understanding between administrators supporting interdisciplinary teaching. However, in some cases it will be much more arduous because of the negotiations that will be required to determine who counts the student credit hours and who provides the funds for the course. Funding has a greater potential for being a road block if the class requires a transfer of funds from the students' college to the host college.

One factor that must not be overlooked in interdisciplinary teaching is instructor-student rapport. By definition interdisciplinary teaching describes a situation in which the instructor and students are in different disciplines and in many cases will have very little previous experiences with each other. For this situation to be successful, the instructor must understand that students from different disciplines may have different personality types and different preferred styles of learning. In addition, it is not safe to assume that the non-discipline students will have the same background and will be able to start a topic at the same level as the students within the instructor's discipline. The instructor will also be faced with establishing his/her credibility with students who are unfamiliar with his subject area and level of expertise. The basic principles of welding in agriculture may be identical to the basic principles of welding in an industrial plant, but industrial students may not be willing to learn welding from an agricultural welder until they are convinced that the welding principles are the same. The students' adviser(s) and instructors play a key role in helping establish the host instructor's credibility with the students. If the instructor fails to acquire an understanding of the students ability levels and preferred styles of learning, and fails to establish credibility with the students, the class will be destined to failure.

The OSU Situation

The authors' involvement in interdisciplinary courses at Oklahoma State University came about due to the elimination of the Mechanized Agriculture (MECAG) undergraduate degree program combined with declining numbers of students in the service courses offered for the College of Agriculture. At the same time changes in three other disciplines on campus left two curricula without a metals and welding lab, and one curricula without a surveying class. Over a period of three years, the Mechanized Agriculture curriculum has started supplying part of the laboratory periods for an Industrial Engineering class and a Manufacturing Technology class, and has developed a class that will be taught for the first time during the fall 1994 semester for the Landscape Architecture program. These classes represent two different methods of development. One we will label as an *informal process* and the other as a *formal process*.

Informal process

The Industrial Engineering and Manufacturing Technology classes are examples of three facets of interdisciplinary teaching. They are examples of teaching across college boundaries, of interdisciplinary team teaching, and of the informal processes that can be used to accomplish interdisciplinary course planning and development.

The primary need for these departments was an appropriately equipped laboratory and the instructors to teach the labs for the courses. The development of these labs started with a series of informal conversations between the professors of record for the courses and the MECAG professor. Informal conversations played a crucial role in the process. It was during this time that the faculty members determined their common ground and initiated a relationship. The needs of the students and the capabilities of the departments were reviewed. Scheduling alternatives were evaluated; a wide range of possible skills were discussed: a general philosophy of instruction was developed; the goals and attributes of the students were evaluated, the preferred method for student evaluation was selected and an estimate was developed for the costs of teaching the classes. Keeping this exploratory phase on a informal basis between faculty members expedited the process and did not require a firm commitment from either party.

After the professors involved reached an understanding, the ideas developed for the proposed labs were shared with the heads of both departments and the plans for the course were completed. During the initial years all of this was documented by nothing more than a gentlemen's agreement between the two professors. In 1994, it was determined that a gentlemen's handshake was insufficient and a more formal arrangement was required. In order to meet the demand of the administration, the instructors of record for the class submitted a written request for the MECAG curriculum to teach the labs. The host department submitted a budget to cover the costs of teaching the labs. This documentation was routed through the appropriate deans and department heads and received the blessings of the administration.

Formal process

The authors' second experience in interdisciplinary teaching was to develop a MECAG class for the Landscape Architecture program. Initially there were informal contacts be-

Table 1. Ratings of Landscape architects

Item	Topic	Mean	StD
1	Accuracy and Precision	3.62	0.65
22	Set-up, use and care of transits	3.43	0.88
2	Computing area from maps	3.37	0.90
24	Topographic surveys	3.33	0.85
21	Scales	3.29	0.91
25	Traverses	3.24	0.93
7	Note Keeping	3.24	1.02
11	Lay-out and measuring angles	3.20	0.99
12	Leveling rods	3.17	0.95
30	Differential leveling	3.15	1.03
29	Reading and interpreting landscape plans	3.10	1.07
3	Cuts and fills	3.10	0.96
17	Plotting contour lines	3.05	0.99
18	Plotting profiles	2.95	0.95
23	Stadia leveling	2.93	0.98
6	Errors and mistakes	2.90	1.10
10	Horizontal distances	2.90	0.98
8	Hand levels	2.86	0.99
16	Plotting by rectangular coordinates	2.83	1.02
13	Measurement of vertical angles	2.76	0.96
15	Plotting by distance and angles	2.73	0.96
28	ISO units	2.73	1.02
9	Horizontal angles	2.71	0.96
4	Electronic distance measuring	2.96	0.99
20	Reading verniers	2.61	0.96
14	Municipal and subdivision surveys	2.60	1.00
27	Units of measure	2.60	1.07
19	Profile leveling	2.54	0.94
26	United State Public land surveys	2.37	0.96
5	Electronic surveying	2.34	0.93

tween the two groups, as in the previous process, but the development of the course was more structured and formal.

In this case the process began between department heads. When the head of the Landscape Architecture department inquired about the possibility of the MECAG program teaching a class on surveying, he was informed that a written request to do so would be considered. A request was submitted, and it was determined that there were sufficient faculty time and departmental resources to develop and teach the course. The MECAG instructor and the Landscape Architect instructors were given permission to begin negotiations. During the initial discussions it became evident that the Landscape Architecture faculty did not feel comfortable making recommendations for course content. Although the MECAG program has and continues to teach land measurement and surveying for College of Agriculture students, the MECAG faculty had very limited experience with the needs of Landscape Architects. To solve this problem it was decided to follow the recommended practice of surveying the professionals within the discipline to determine their recommendations for course content.

The Oklahoma professional association of Landscape Architects and Planners supplied a list of members. The members were sent a survey instrument which asked them to rate the level of importance of a list of land measurement and surveying competencies on a four point Likert-type scale. The results of this survey have been included to illustrate the sometimes nebulous process of determining course content. Table 1 contains ranked mean scores for the 21 respondents to this survey.

A comparison of the survey results (Table 1) and the proposed syllabi (Table 2) shows several differences between the topics included in the syllabi and the importance given different topics. These differences resulted because the MECAG instructor and the landscape architecture faculty reviewed the survey data and compared it with the content of surveying textbooks, national trends, and the opinions of other teacher educators. The survey results were modified to include input from these other sources. In this instance the rankings of the professional landscape architects were used as a source of information, but not the determinate of course content. Table 2 is a list of the topics and the number of periods each topic will be taught in the proposed course.

Table 2. Syllabi Topics

Period	Topic
1	Introduction to plane surveying
2	Rounding, accuracy & precision, right angles
3	Field notes
4	Distance measuring
5	Distance measuring
6	Electronic Distance Measuring
7	Test #1
8	Review test
9	Leveling
10	Differential leveling
11	Differential leveling
12	Differential leveling
13	Profile leveling
14	Profile leveling
15	Profile leveling
16	Test #2
17	Review test
18	Angles
19	Angles
20	Errors and control of errors
21	Transits
22	Traverse
23	Topographic maps
24	Topographic principles
25	Contour lines
26	Test #3
27	Review test
28	Construction surveys
29	Construction surveys
30	Curves
31	Earth work
32	Test #4

Conclusions

Interdisciplinary teaching is an option that should not be overlooked as departments, colleges and universities go through the process of restructuring. It provides a means of crossing traditional boundaries to match up the expertise of faculty with the needs of students, enhancing the students' educational experience and improving the efficiency of the teaching program. The success of such an endeavor is dependent on the cooperation between and among faculty and ad-

ministrators in different departments and colleges. Our experience has shown the probability of success is improved and the process is expedited if the negotiations are conducted by the faculty—rather than administrators. Interdisciplinary teaching requires faculty and administrators to set aside traditional boundaries and structures and work together for the common good of students.

The two examples presented in this article show that one method of development will not fit all situations. Even though the processes used to develop a class will be different, and to a large extent dependent on the requirements of the department and college administrators, traditional course development models can be applied. The primary difference is in the number of individuals and the roles of the individuals involved in the process.

Future Directions: Action Plans for Vision 2000

An Open NACTA Planning Session for the Next Century

10–12 am • Sunday, June 18 • 301 Ag Administration Bldg. • Penn State University • University Park, PA

The following items may serve as discussion points. A multifaceted plan of action that might include the following will need to be aggressively pursued:

- Increase visibility for NACTA. its ideals , and objectives.
- Dramatically increase the use of NACTA displays, articles about NACTA award winners and programs in local media. Teaching Tips flyer and the NACTA Journal to build greater awareness of NACTA and its encouragement of the high quality teaching. Continue with and encourage expansion of the NACTA Teacher Award of Merit citations on local campuses.
- Give greater efforts to retain current members and resign former members.
- Information obtained by questionnaire from former members who chose not to will provide a knowledge base upon which organizational or service changes can be recommended.
- Personal contact with NACTA "drop outs" to encourage them to renew is encouraged.
- Encourage the development of additional NACTA affiliates (see below).
- Capitalize on the strengths of NACTA - NACTA Journal, awards program, conferences, etc.
- Try for additional media coverage; nationally, regionally, and locally as related to NACTA awards, conferences, and affiliate meetings.
- Develop a plan to capitalize on lower membership fees charged graduate students and emeritus members.
- Do we need some special publicity or brochure targeted to these groups?
- Publicize membership development incentives.
- Evaluate the "Two for one free membership" incentive. How well is it working? Could other approaches be more effective? Several professional organizations give first year members a 50 percent or 25 percent discount on that year's dues. Should that be considered for NACTA?
- Consider a membership development award or awards.
- Could we provide a NACTA shirt to each state coordinator and regional director whose area met or exceeded the 15 percent membership increase goal?
- Are there other ideas?
- Keep membership development on the "front burner."
- Planned mailings and telephone calls from vice president to regional directors.
- Propose a membership development round table for an idea sharing session at the NACTA Conference.
- Other suggestions?

2,000 by 2000 Membership Drive

2,000 by 2000 is both a most worthwhile and very ambitious goal. By attaining nearly a 15 percent growth in membership in each of the next five years, the goal can be achieved.

If the goal is to be met, it will require that the NACTA leadership team (officers, regional directors, and chairs) and state coordinators make a strong commitment to personally contact potential members face-to-face and by mail and telephone.

Become Part of the New Vigor and Rewards in Teaching!