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Systems Teaching

A Direction for Faculty Development and Curriculum Revitalization

A. Reza Hoshmand

Introduction

Agriculture, like most professional fields taught in higher education, is faced with problems of compartmentalization and over-specialization (Ellerbrock, 1987). Graduates of colleges of agriculture have been found to lack problem solving skills and conceptual as well as communication abilities required in the work setting (Merritt, 1984; Wilson, 1986). Concerns about the inability of our education system to meet the challenges of an increasingly complex, inter-dependent world have led to a call for revisions in curriculum and teaching practices (Boyer, 1987). The fact that the curriculum in most colleges of agriculture have not had major revisions over the past 25 years (Sledge, 1987) makes the need for revitalization especially pressing.

One potential answer to these stated needs is to bring about more integrative, cross-disciplinary teaching and curriculum design, using a systems framework. This framework and its introduction through faculty development workshops are described here with suggestions based on some evaluation data and observations from the experience of attempting to involve faculty in curriculum revitalization.

The Systems Model of Teaching

The systems model of teaching and curriculum design which offers an alternative to reductionistic approaches may be traced to several roots, including the pragmatic philosophy of John Dewey (1929, 1932) who emphasized learning to learn in practice; the field theory of Kurt Lewin (1951) which considers all factors of change in the total environment; and general systems theory from which holistic concepts were derived (Bertalanffy, 1950, 1968). Whereas reductionism seeks to explain phenomena at a simplified level of linear relationship between factors studied in isolation from their context, the systems conception of casuality is based on the totality of all factors in interaction in a given context.

Moreover, systems thinking, which has become more prevalent in the last twenty years in many fields, has only been recently applied to education. Conventional teaching has tended to be reductionistic, partly due to the historical influence of behaviorism on theories of teaching and learning (Paris, Olsen, & Stevenson, 1983), and partly due to the dominant model of professional knowledge which follows dualistic patterns of specialization by underlying disciplines (Schon, 1985). Reductionism is also reflected in the conception of agricultural problems and their solutions, as found in much of the theoretical content of existing curriculum. This combination of factors may have contributed to the deficiencies noted earlier. For example, a reductionist approach to the problem of food production would be to increase output with modern technology and inputs such as fertilizers, high-yield seeds, and chemical control of pests. The isolated effects of each input often constitute the focus of learning by the student of agriculture. It does not prepare the student to deal with the combined impact of technology and modern inputs on the total ecological environment of a developing area.

As an alternative, the systems model offers a multi-cause conception of problems that places

Hoshmand is associate dean and professor of Agricultural Business Management, College of Agriculture, California State Polytechnic University, Pomona, California 81768.

agricultural systems in the total ecological context (Bayliss-Smith, 1982; Jeffers, 1978; Lawrence, Stinner & Hause, 1984). In the example above, the appropriateness of a given input is evaluated by its potential interaction with factors in the physical, social, and cultural environment. Students have to obtain knowledge from multiple disciplines as well as to develop broad cultural and international understanding for the types of problems which challenge the food and fiber sector (Rosenblum, 1983). From a teaching standpoint, not only must the curriculum content reflect the systems view, but the teaching methodologies as well. A problem solving, process oriented, and learning by practice orientation is involved (Bawden, Macadam, Packham & Valentine, 1986). Students learn from case studies in which systems analysis is used. Some examples of systems applications are given in Checkland (1981) and Wilson (1984).

Journals which carry articles on systems thinking and practice include *Agricultural Systems, Agroecosystems, Agriculture and the Environment, Agriculture and Human Values,* and the *American Journal of Alternative Agriculture.* The Food and Agricultural Systems Task Group of the U.S. Department of Agriculture has also published a manual, *Systems Approaches to Food and Agricultural Problems* (1986). This Task Group has made available training personnel and programs at various university sites, as part of the National Agriculture and Natural Resources Curriculum (NANRC) project which was launched in 1981. This project and the dissemination of training materials have continued, with increased interest in workshop participation. A number of international conferences on systems are additionally planned, under the sponsorship of the U.S. Agency for International Development.

Faculty Development Approach

In order to provide faculty development in the systems approach to teaching, a major resource commitment may not be a necessary prerequisite. As an example, the College of Agriculture at California State Polytechnic University, Pomona, started with a small allocation of discretionary funds to send two faculty members to a training program offered by the Food and Agricultural Systems Task Group members, held at Colorado State University in 1986. This generated sufficient interest for a group of eight faculty to be funded at $3,500 to attend a regional workshop on systems. This investment proved to be so beneficial that a grant proposal was written by the present author to obtain additional funds in the amount of $17,000 for providing a series of 2-day workshops on campus. (These figures are given for reference by those interested in obtaining this type of faculty development.) Faculty who received previous training became facilitators: the multiplier effects of investment on faculty development were evident. Trainer costs and costs of training materials were covered by the grant. The workshops were open to faculty in the College of Agriculture as well as an invited number of faculty from other colleges on campus as well as two community colleges. This broader group was included in order to promote inter-disciplinary dialogue and to enhance the possibilities of multi-disciplinary collaboration in teaching.

The workshop format included presentations and group exercises, with learning mechanisms such as role-playing, case study, and brainstorming. Each of the workshops had 30 participants. About 90% were faculty from Agriculture, and the remainder from other disciplines on and off campus. The Agriculture faculty were from different departments. About 25% were repeat participants as the training in systems expertise requires more than a single exposure.

To give an idea of the types of faculty participation and responses to the systems training workshops, the data on one of the workshops will be presented. For this particular workshop, 20 hours of different sessions were given by three trainers and five facilitators who were faculty who had previously obtained similar training. Of the twenty faculty participants surveyed in the post-workshop evaluation, twelve had doctorates, four, master's degrees, and four, bachelor degrees and teaching credentials. They represented the disciplines of animal science, agricultural business management, ornamental horticulture, foods and nutrition and home economics, plants and soil sciences, plus natural resources. The courses they taught ranged from soil and water engineering to policy, marketing, and management.

All 20 respondents in this particular post-workshop evaluation reported finding it "useful" (50%) to "very useful" (50%). All indicated a willingness to recommend other colleagues for similar training. The features found to be most helpful were identified predominantly as interacting and networking with colleagues from other areas, and being able to discover and identify with their creative ideas and concerns about teaching and curriculum. Other benefits reported include exposure to the systems concept, the case study approach, and group exercises in working with the process of experiential learning. The participants were predominantly satisfied with the format and mechanisms used in the workshop.

When asked about how they may include systems ideas in their teaching, 5 respondents reported already using some systems applications in their current teaching, 7 planned to use the case study method in the future, 2 had specific plans of developing a new course and revising existing courses, and others indicated a willingness to think about possible applications.

In terms of whether they would be committed to supporting an overall emphasis on systems teaching in the College of Agriculture, a little over half of the group responded in the affirmative. The other responses indicated some hesitancy and concerns about the potentially negative implications of change.

The participants were also asked to make suggestions as to how to bring about the institutionalization of the systems teaching approach on campus, and how to interface with community colleges on system based programs. A clear message from the group was that support through release time and reduced teaching loads would be important incentives for faculty to apply the new ideas to curriculum and teaching revision. They also favored the involvement of community colleges for common interest.

Potential Benefits from Faculty Development

Besides the evaluation data, observations from the experience of trying to involve faculty in curriculum revitalization suggests additional benefits from the investment in the faculty development workshops. The college is able to begin to use the systems language in discussing curricular development for the future. As more faculty members become familiar with the systems approach, there is a greater sense of a shared framework and direction for curriculum revitalization. The fact that the systems model is more than an incremental approach to content changes in curriculum offers a qualitative and integrative alternative to existing rationales for curriculum development.

Some faculty members who have participated in the training workshop found that the systems orientation offers new teaching approaches and classroom experiences which interest them. They are thus more motivated to participate in planning for curricular change. When certain faculty members have undergone the training, they are viewed as resource persons by their peers. In some cases, these individuals may assume faculty leadership which is a crucial component in curricular change.

Discussion

A number of observations deserve further consideration. The favorable response to the faculty development workshop seems to suggest a sense of isolation and need for networking among faculty. This isolation would have continued under a compartmentalized system of program delivery. Hence, cross-disciplinary teaching and curriculum integration probably have positive effects on faculty morale and professional functioning as well.

In spite of the predominantly positive experience of the approach reported by the faculty participants sampled, there remained a hesitancy towards total commitment to a new philosophy of teaching. Part of the hesitancy may be due to awareness of a general resistance to change (Johnson & Brandenburg, 1987). The process of planned change would require much care and the necessary climate (Bennis, Benne, & Chin, 1985; Darrow & Henderson, 1987).

Perhaps the enthusiasm and support for faculty development in this case was partly due to the fact that the individuals in both the dean and associate dean positions of the college had participated in a systems workshop initially and had personally experienced the benefits. It may be essential for administrators to be exposed to the approach such that there is administrative support for faculty development in this area. The administration needs to consider the long-term benefits of such investment, and to provide the necessary release time and appropriate incentives for faculty to make the extra effort or engage in the risk taking associated with trying to implement new ideas.

Conclusion

Overall, the potential gains from systems teaching as a direction for faculty development and curriculum revitalization seem great, relative to the human effort and monetary incentives it requires to bring it about. A small grant or a small allocation of funds can set in motion a rewarding process. Once the initial commitment is made, the benefits can multiply, as witnessed in this case. This is not to underemphasize the importance of a long-term systematic plan for supporting and eventually institutionalizing the necessary changes.

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AG HORIZONS

A Campus Visitation Program for Student Recruitment

Josef M. Broder, Jack E. Houston, and F.W. Williams

Introduction

In the face of declining enrollments, many departments and colleges of agriculture are becoming increasingly concerned about their recruitment programs. This concern is best illustrated by recent contributions to the *Journal* on the subject of student recruitment. Recruitment programs in poultry/animal science departments have been assessed by Pescatore and Harter-Dennis (1987) and Litzenberg (1987). Programs to inform and recruit high school students have been examined by Betts and Newcomb (1986) and Reneau and Kabat (1986). Issues and challenges in recruiting have been addressed by Hildreth (1986) and Coulter (1985). Specific recruitment strategies have been developed to include students (Haque, 1986) and marketing research techniques (Schuster and Costantino, 1986). Related studies have examined factors associated with enrollments (Slocombe, 1986) and factors considered by students in selecting a college or university (Riesenberg, 1987). In general, these papers offer some revealing insights into recruitment programs which were once taken for granted. These papers also indicate a critical need for additional systematic research on alternative recruitment strategies.

This paper was written in response to a need to examine alternative recruitment strategies. This paper assesses recent efforts by the University of Georgia's College of Agriculture to recruit students through an annual campus visitation program entitled AG HORIZONS: A Career Institute. More specifically, the objectives of this paper are to 1) describe the AG HORIZONS program at the University of Georgia, 2) evaluate its effectiveness as a recruitment technique, and 3) offer suggstions for adoption, implementation, and further evaluation.

Broder is professor and Houston assistant professor of Agricultural Economics while Williams is associate director of Resident Instruction, College of Agriculture, University of Georgia, Athens, GA 30602.

Ag Horizons

AG HORIZONS is an annual campus visitation program for high school students. Initiated in 1984, the program has brought selected high school students to the University of Georgia for a three-day visit of programs and facilities. The goals of the program are to recruit high school students of high academic quality and to provide a better understanding of and a greater appreciation for agriculture. The AG HORIZONS program was modeled after a similar program at other colleges and universities.

At its inception AG HORIZONS has been jointly sponsored by the Georgia Farm Bureau Federation and coordinated by the University of Georgia, College of Agriculture. In 1987, the Georgia Agricultural Alumni Association shared with Farm Bureau, financial support for the program. Participants in the program are solicited through county Farm Bureau offices, vocational agriculture teachers, county extension agents, and high school science teachers.

The College of Agriculture arranges the speakers, tours, and other on-campus activities for the three-day program. The program is developed jointly by the educational program specialist in the Director's Office and the College's Standing Committee on Recruitment. Faculty from various departments are invited to participate in the program. Undergraduate and graduate students serve as live-in counselors for the student participants. An outline for the 1987 AG HORIZONS program is shown in the appendix.

Student Characteristics

General characertistics of students attending AG HORIZONS for the years 1985-1987 are shown in Table 1. These data were obtained from a pre-conference questionnaire administered during registration. When all groups were considered, the average age of students was 16.5 years. Approximately 43 percent of the participants were female and 67 percent were from farm backgrounds. The percentage from farm backgrounds declined throughout the period, while the percentage from non-farm backgrounds increased. Approximately 45 percent were members of 4-H clubs, while 54 percent were members of the FFA. Nearly half