

how our relations with other nations directly and indirectly have a major impact on our own quality of life. Just as we have courses in art and music appreciation, why not courses in international development appreciation. I would display my prejudices and go even further to suggest a heavy emphasis on food and agriculture in such courses. After all, food is the most basic of human rights, and the failure to ensure that

right has led to the fall of governments and many of the wars throughout history. As educators, you have the possibility to ensure that successive generations of students understand international development issues and move into positions of leadership, prepared to promote national policies and programmes which will redound to the benefit of the United States and all of the world's nations. I wish you success.

Partners

The USDA and American Colleges of Agriculture In Setting Agricultural Education Trends In America

Alan Goecker

The May 12, 1982, issue of *The Chronicle of Higher Education* included a brief report of a New York student who recently conquered the popular video game, Pac-Man. Perhaps it is appropriate to share an edited summary of the article with you.

Eric G. Schwibs, a freshman at the State University of New York at Buffalo, is the self-declared king of Pac-Man. Schwibs put a quarter into the Pac-Man game at a Buffalo tavern at 9:45 on Saturday night and continued to play until 6 o'clock Sunday morning. By that time, Schwibs had accumulated a total score of 2,935,590, at which time Pac-Man suffered a nervous breakdown, filling half of its screen with electronic gibberish.

Following this encounter, Schwibs indicated that he was through with Pac-Man, stating that, "Once you beat the machine like that, there's nothing left." Oh, but there is something left: Ms. Pac-Man, a new video game which now has the attention of Schwibs. "Ms. Pac-Man is harder," he said. "The monsters move randomly."

As we attempt to address emerging agricultural education trends in America, perhaps we are in a Ms. Pac-Man environment with a number of randomly moving forces. Yet, it is my view that there are some rather clearly identified challenges and opportunities facing agricultural college teaching programs during the remainder of the 1980's.

Perhaps the paramount issue facing colleges of agriculture in the next 10 years is declining enrollment. Of course, this is an overriding concern of higher education in general and there are currently some rather significant struggles as various higher education institutions attempt to capture more than their traditional share of the decreasing new student pool.

Goecker is with the Science and Education Administration, USDA, and gave this paper before the annual NACTA Conference at Delaware Valley College, Doylestown, PA, June 15, 1982.

Between 1979 and 1992, the number of 18 year olds in the United States will drop from 4.3 million to 3.2 million, a 26 percent decline in the age group that comprises the bulk of entering college freshmen. Enrollments in colleges of agriculture and natural resources have declined by more than 8 percent during the past three years and several institutions are reporting sizeable anticipated reductions for the 1982 Fall term. After a decade of unprecedented high undergraduate enrollment in agriculture and natural resources, some may react with a sigh of relief and a suggestion that once again teaching quality rather than quantity might be emphasized. However, attracting high quality students is a continuing and, in my opinion, increasingly important challenge which must be addressed.

Human aptitudes required for the development of highly productive agricultural graduates are congruent to those utilized in engineering, business, biology, computer technology, and the health sciences. Agriculture employs and is dependent upon high technology. Agriculture, like the other major academic units, must aggressively compete for a dwindling supply of highly motivated and intelligent students to achieve future efficiencies to feed an expanding world population and enhance our nation's security.

Of particular concern is scientific preparation that current students are bringing to campus from the secondary schools. A 1980 study conducted by the National Center for Education Statistics¹ showed that 79 percent of the high school seniors had completed Algebra I, 56 percent took geometry, 49 percent completed Algebra II, 26 percent finished trigonometry and 8 percent completed a course in calculus. Only 54 percent of the nation's 21,000 high schools offer a course in trigonometry and fewer than one-third (31 percent) teach calculus.

Some 39 percent of the U.S. high school students are enrolled in an academic curriculum, 37 percent in

¹National Center for Education Statistics. *High School and Beyond: A National Longitudinal Study for the 1980's*. Washington, D.C.: National Center for Education Statistics, p. 5.

general programs, and 24 percent in vocational options. During the past decade, there has been a 4 percent enrollment decrease in academic programs with a corresponding increase in general curricula.

Three units of high school science is a preferred entry characteristic of students enrolling in colleges of agriculture and natural resources, but only 41 percent of graduates from high school academic curricula complete at least three years of science. Some 13 percent of general program graduates and 9 percent of vocational program graduates complete three or more units of science. Few individuals doubt that we will continue to encounter an increasingly complex and scientific agriculture. At the same time, there is very substantial empirical evidence that scientific literacy of entering college students is waning.

The Changing Mix

Another continuing challenge facing instructional programs in colleges of agriculture is the changing mix of students. During the past decade most agricultural colleges attracted a significantly greater proportion of female students and individuals from urban and suburban backgrounds.

Proportionally, women enrollment in agricultural programs of study has nearly doubled in the past decade. In 1972, 19 percent of the agricultural college students were women, compared to slightly more than 36 percent this past year. Some 35 percent of the agriculture students in 1972 came from non-farm backgrounds compared to more than 65 percent today. Although the increased proportion of women in agriculture has generally not had major impact on instructional methodology, the same cannot be said regarding the shift from a predominantly farm to a non-farm student population. As you certainly realize, these changes have significantly affected teaching activities, requiring more emphases on basic agricultural nomenclature and experiential instructional activities.

Current ratios of women and non-farm students enrolled in agricultural and natural resources programs are expected to stabilize and remain relatively constant throughout the 1980's. Perhaps the most significant student characteristic which will impact agricultural teaching programs during the remainder of the 1980's is rapidly increasing student involvement in computers. One's effectiveness in using the computer as an integral part of the instructional process is and will likely continue to be a very significant determinant of teaching success.

When discussing challenges facing college agricultural teaching programs, one cannot ignore the relative financial resource base which underwrites instructional activities. Currently, best available estimates suggest per student real dollar support for agricultural college teaching programs has declined some 15-20 percent during the past five years. As one

might expect, individual institutions have fared somewhat better or poorer than the 15-20 percent reduction. However, there is substantial empirical evidence that instructional quality has eroded as a result of reduced laboratory experiences, oversized classes, elimination of specialized courses, and other economy measures. There is little doubt that maintaining an adequate financial resource base for high quality agricultural instructional programs will be a continuing and growing challenge.

Agriculture and natural resources faculties have constantly faced the challenge of providing a well-balanced curricula to prepare students for entry level positions and productive careers. In periods of sizeable resource reductions, curricular challenges are greatly magnified. Curricula are increasingly evaluated relative to inherent economic characteristics, and comparatively less emphasis is given to the optimum blend of courses needed to prepare graduates for future professional roles.

Will the curriculum generate more teaching credit hours and more resources for the department? Will the course be required or a prerequisite for a required course in the curriculum? Should courses be limited to student majors in lieu of service courses? Should all students in the college or university be required to take the course? Should the number of laboratory courses in the curriculum be reduced? These are serious questions of curricular economics being asked with increasing frequency.

Agriculture and natural resources college teaching programs face difficult challenges during the remainder of the 1980's. However, each challenge provides stimuli for responsible actions by agricultural educators and opportunities to creatively address the issues.

American agriculture did not achieve its current state of efficiency without dealing with tough issues. Even though 6 percent fewer acres were utilized in 1980 compared to 1930, total farm output increased by more than 2½ times during these past 50 years. Economically, the United States food and fiber system accounted for some 532 billion dollars in 1981 or more than 20 percent of the nation's gross national product.

In the world agricultural economy, the United States contributes some 40 percent of the global wheat exports, more than 60 percent of the feed grains and over half of the soybeans and soybean meal. In 1981, the agricultural sector contributed a net trade balance of \$26.6 billion, significantly offsetting a non-agricultural U.S. trade deficit of more than \$60 billion. Each dollar returned to the farm sector is more than doubled in the U.S. economy. Increasingly, agriculture is a key element of U.S. foreign policy initiatives with other nations and a basic cornerstone of national defense.

Our nation's agricultural efficiency is dependent upon many factors including a sizeable land base suitable for crop production, a favorable climate, and

an economic structure which provides strong incentives to producers and others who are a part of the food production and delivery system. Also, there is ample evidence that advances in agricultural production and marketing efficiencies are critically dependent upon education, research, and human expertise which directs and operates the system.

While we have discussed some challenges facing agricultural college teaching programs, let's now direct attention to major opportunities before us. Perhaps the following are the most significant.

Emphasize Success of Graduates

Agricultural graduates fare well in the employment market. The most frequent question asked by new students and their parents may be stated quite simply — Are there employment opportunities for graduates? Data collected by land-grant colleges of agriculture during 1978-81 showed that more than 90 percent of the graduates were employed within three months after graduation. Perhaps it will be difficult to equal this employment level in 1982, but there is substantial evidence that agricultural graduates fare very well when compared to peers in most other disciplines. Agricultural colleges must utilize the opportunity increasingly to emphasize the relative employability of their graduates.

USDA's Office of Higher Education is currently developing a Food and Agricultural Education Information System which, when completed, will provide more definitive graduate employment data for all agricultural colleges. Such data should enhance state, regional, and national initiatives which emphasize comparative employment advantages of agricultural graduates.

Adjust Programs to Changing Needs

Agricultural college teaching programs that do not currently include significant components which address computer applications in agriculture are probably 5-10 years out of date. A 1981 survey indicated that fewer than one-third of agriculture and natural resources college study programs required any computer science or computer technology courses in the curriculum.

In many cases, the university financial resource base is a major impediment in expanding computing facilities, but I believe that business and industry cooperators are interested in helping colleges develop instructional programs emphasizing computer applications. Perhaps we are sending the wrong signal to potential agriculture and natural resources students in the 1980's when we indicate that more than two-thirds of our current programs do not require students to develop computer skills as a part of their professional preparation.

Clearly, there are opportunities before us to integrate electronic technologies into all programs of

study. It is an issue that cannot afford additional dialogue without further deterioration of program quality. It may be an unpopular suggestion, but from a relative perspective, apprehension among faculty to develop computer skills and utilize them in courses may be a greater inhibiting factor than a paucity of financial resources to support such activities.

Adopting electronic technology as an integral component of agricultural curricula is not the sole adjustment deserving special attention. With strong pressures to incorporate more science, more communications, more technical courses, and more experiential activities into the curriculum, we must aggressively seek possible efficiencies in structuring curricula and packaging college courses. For example, are three-semester-credit and four-quarter-credit course packages critical to academic operations?

The National Higher Education Committee of the Joint Council on Food and Agricultural Sciences has identified a national agricultural and natural resources curriculum study as its top priority. To the fullest extent possible, the Office of Higher Education will encourage and support this assessment.

Increase Cooperator Participation

Agricultural business and industry cooperators have been key supporters of college teaching programs in the food and agricultural sciences. In recent years, agricultural businesses have strongly encouraged and underwritten a major expansion of student intern and cooperative education programs. Also, agricultural business and industry representatives have been utilized extensively to bring a "real world" perspective to classrooms and lecture halls.

It is my view that there are significant opportunities to further enhance the symbiotic relationship between agricultural college teaching programs and industry cooperators. Certainly, industrial representatives have contributed and will continue to provide important views and resources as colleges adjust curricula and program emphases. There is strong evidence that business cooperators will increasingly assist agriculture and natural resources colleges as they compete with other disciplines for high quality new students. As the primary employer of graduates, agricultural business representatives are quite interested in the quality and quantity of students enrolling in college programs.

Maintaining instructional quality during the remainder of the 1980's will increasingly depend upon the support by private sector contributors. Current trends suggest agricultural business and industrial representatives will exert expanded influence on public decision making which will impact agricultural research and education during the remainder of the decade. The bottom line is that agricultural colleges must capitalize on emerging opportunities to expand cooperator participation in instructional programs.

Maintain Strong Relations With Students

Agriculture and natural resources faculties have been perceived as being among the best on campuses in fostering strong and respected working relationships with students. It seems obvious that colleges of agriculture and natural resources must continue to capitalize on this positive perception and foster such relationships. Certainly, the favorable image of caring about students and graduates has been and must continually be earned. It is not an automatic response based upon history.

I believe that faculty must continue to be actively involved in helping students plan their education programs and career development strategies. In recent years, some colleges have transferred counseling responsibilities from faculty to career counseling centers. My observations suggest career counseling centers may have a comparative advantage in helping students deal with mechanical operations in the university bureaucracy, but are generally less able than faculty in helping most students effectively utilize available courses and curricula.

In summary, major challenges and opportunities facing colleges of agriculture and natural resources in 1982 generally are not new, unique, or profound. Education in the United States exceeds a 100 billion dollar business managed by nearly 20,000 boards of directors. Like Mr. Schwibs of Buffalo and other potential conquerors of Ms. Pack-Man, educators must occasionally deal with random monsters in the system. However, the educational issues are real, and they must be addressed by each of us if we are to produce the required human capital for a continued efficient and productive agriculture in the coming decades.

IDEA SHARING SESSION

NACTA Conference

An Interdisciplinary Taped Closed Circuit Television Course

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Abstract

The development of an interdisciplinary closed circuit television course is described. The medium has the disadvantages of rapid obsolescence of lectures, greater demands on instructor time, and lack of student-instructor contact. The interdisciplinary aspects increase problems of subject matter integration and instructor and department recognition. The advantages are greater ease of scheduling prominent instructors,

greater efficiency in integration of subject matter in a multi-disciplinary offering, and much greater flexibility in utilizing various teaching techniques, particularly in terms of bringing students to uniform, close-up views of lab and field examples.

Introduction

This article is prepared to fulfill part of the obligation to a grant provided by the Minnesota Higher Education Coordinating Commission to revise a closed circuit television course. This revision has come at a time when both closed circuit television courses and interdisciplinary courses are losing favor. This report will attempt to express the author's views and personal experience regarding a specific closed circuit television course. Because this paper deals with a specific course the reader should be aware that the experiences recorded here are not necessarily generally applicable.

Course Description

The experiences described deal with an interdisciplinary course originally developed in 1971 and entitled "Issues in the Environment." It was part of the Resources and Community Development Curriculum. A grant to revise the course was obtained in 1977 from the Minnesota Higher Education Coordinating Commission. The course originally contained five segments: land use and planning, water pollution, solid waste disposal, agricultural chemicals, and forest management and involved a team of nine instructors. The 3-credit (quarter basis), 10 week course had four taped lectures, one discussion period with an instructor from that segment, and a guest lecture with each of the five segments.

The video lectures were 45 minutes in length leaving five minutes for discussion after each tape. Subsequently, class periods were reduced to 45 minutes and revised tapes were scheduled to run 30 to 35 minutes, leaving 10 to 15 minutes for discussion after each tape.

To facilitate grading, objective examination questions with a key were prepared by the instructor of each segment. Quiz materials came directly out of the lecture. Students were permitted to review their exam paper after grading, but were not allowed to keep the exam. Students were warned early that clues to selecting the right answer were deliberately inserted into the exam so as to be misleading and could not be depended upon to lead to the correct answer. The exam was structured so as to achieve an average score of 75 percent. Examinations that deviated significantly were subsequently revised and the current exam scores adjusted to an average of 75. Scores on five examinations accounted for 70 percent of the grade and were weighted equally.

A term paper has been required of each student. The paper may be a case study of an environmental problem or a library study of a very specific topic. Prior approval of term paper topics has been required. The paper accounts for 30 percent of the grade.