Innovative Teaching

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Abstract

To meet the diverse needs of students enrolling in agricultural courses today, educators must redesign traditional courses. Introduction of innovative teaching techniques need not be costly, but it will require time and hard work.

Enrollment in college agriculture courses continues to rise in spite of predictions to the contrary. Enrollment of undergraduate students in 70 reporting institutions more than doubled in the period from 1963 to 1974, increasing from 35,000 to more than 80,000. By 1976 this total had risen to 98,000 (4, 6). Most students with non-farm backgrounds were uninterested in agricultural education or agricultural employment until recently. However, this is no longer true. Since the percent of Americans now living on farms is down to 4.2 percent (1), we can expect the majority of our students to have little previous contact with any phase of agriculture. None of ten students in agronomy placed in jobs by one advisor last summer had farm background. This included four students who scouted for insect populations in farmers' fields. In a recent plant propagation class of 40 students at the University of Georgia, only four had actually lived on a "commercial" farm. Few of our graduates will be able to find employment "in the country," and fewer still will be able to own even small farms. Some will be our next generation of college agricultural teachers — students with non-farm backgrounds will be taught by persons from urban areas. This fact emphasizes once again the importance of effective instruction now.

The responsibility agricultural faculty members face in working with this tremendous number of students is sobering even without the problem of non-agricultural background. Consider the total of tuition and tax dollars spent for a class to hear a one-hour college lecture. If tuition is a low $20 per credit hour, the cost per student per hour during a 10-week quarter is $2. If there are 50 students in class, tuition alone for 50 minutes actual class time is $100.

Most departments have had a relatively small increase in teaching staff (4), making one-to-one contact with students next to impossible, even though today's students indicate that this is still how the most effective learning takes place. If we could know them individually, many students with over-glamorous ideas of agriculture could be counseled to change direction. This, too, is an important faculty responsibility. Why should taxpayers subsidize students or students pay high tuition for education in a profession they will find neither financially nor psychologically rewarding? One graduate student in horticulture recently confessed that horticulture at the professional level was not at all what she had expected.

Teaching faculty also have a responsibility to industry. In the final analysis, our entire educational system, including research activity, depends on industry dollars for its very existence. Employers want people ready to assume responsibility. Ronald C. Smith, Ohio State University, has pointed out that one of the responsibilities of agricultural educators is to meet the needs of industry with our graduates. He says that too often students memorize words from a text or lecture and cannot apply the concepts farther than in answering test questions (9). Ugo P. Lea, Director of Agriculture at Modesto Junior College, expresses the same concern. "Too frequently our students know their subject but cannot relate it to the dynamic world around them. Too many of our students have found our (classroom) material unrelated and irrelevant to their (career) goals (7)." James Anderson, dean of the College of Agriculture and Natural Resources, Michigan State University, states that, "there is real challenge in the teaching program to acquaint students who aren't from agricultural backgrounds with agriculture and to give them credibility within the industry." (1)

The ultimate goal of education should be to prepare an individual to live successfully in his environment. Unfortunately, the college degree itself has too often become the goal, but even the holder of a Ph.D. must obtain a JOB. Are we creating a marketable product? If not, what is wrong? The traditional format of lecture-lab, sometimes almost unrelated, is no longer the whole story. Students complain that the information given in lecture and the techniques touched lightly in lab are not applicable to problems they face in non-academic surroundings. Many find they have not even learned how to prepare a resume or write a letter of application.

What Can We Do

What can we do with large numbers of students, small numbers of instructors, limited facilities, and lack of funds? Educators, like politicians, find it easy to define and set up committees to investigate problems but much harder to start doing something to solve problems. We must change our format if our students are to become contributors to society. Rather than consider only costly solutions, educators should attempt to redesign traditional courses, evaluating the approaches used and making needed changes. Unfortunately, innovative teaching techniques are found much more frequently in primary and secondary schools than in colleges and universities. It has been assumed that a person with good subject material background and an above average research record is the one most qualified to teach (5). Only recently has there been any indication that college faculty are responsible for effective classroom presentations as well as up-to-date information. It is true most instructors are now using audiovisual aids; it is equally true that only a few are using them innovatively. Innovation has become stereotyped when students know that after a brief

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sentence or two the guest lecturer (asked in for variety) will say, "If someone will please dim the lights, I'll get right into the slides." Slides are a very effective way of illustrating material to be presented but can easily become a crutch for an ill-prepared or inadequate speaker.

Unnecessary course requirements can make innovation difficult. If there is no longer a reason for its existence, a course should be eliminated entirely. Flexibility in curriculum requirements is essential to meet the varied needs of today's students. Flexibility can also help avoid irrelevant laboratory exercises. There is no reason why every student should be doing the same thing. Probably no two of them will be employed in identical positions following graduation. Students with strong backgrounds can be given an opportunity to design their own laboratory activity, and all students can be given a chance to design at least one lab to investigate a question of interest to them. A self-designed lab should, of course, follow several more structured sessions designed specifically to help students see variables that could affect results. Good students often begin to find other factors, even in the first sessions, that they would like to investigate. Although, as expected, a few people will do the minimum, most will do good work. For example, in one class a student was interested in how the depth of sticking a sansevieria leaf section cutting would affect the expression of polarity. Could a cutting be placed deep enough in a well-drained medium that even though rooting was at the top, a new plantlet would form?

Traditional labs can be more flexible - some students gain confidence by working together; others are "loners." Let them decide this for themselves. It is important for students to observe and interpret results, whether good or bad, which is often difficult if growing plant material is involved. The first half of a course might be spent almost entirely in the laboratory, the last half in class interpreting results and aquiring concepts. The MFW lecture TTh lab routine has somehow become sanctified, even though it may not be the best for the purpose of observing growth for 10 weeks.

Take-home laboratory exercises can help relieve space problems. It is not unusual for students in indoor plant science classes to report that plants at home are outperforming those in the growth carts at school. It is easier for students to care for plants at home and to make frequent accurate observations and record data. Evaluation may seem to be a problem, but sketches, pictures, and actual specimens can support written information.

Writing Skill Essential

Written laboratory observations are important to help students organize and sift information. Employers frequently criticize the inability of college graduates to express themselves coherently on paper. All college educators are concerned about this wide-spread deficiency in a basic skill and are well aware that students are having trouble. What can be done? Innovation in this case may be a return to older teaching techniques. Five years ago a high school upperclassman was expected to be able to write a well-constructed report in any class, not just in English. Today many college students have trouble doing so. Written assignments are a thing of the past in many classes since grading them is time consuming and difficult to complete promptly with overcrowded classes. Two suggestions may help: 1. Emphasize the importance of condensing information. The best writers use just enough words to convey their meaning clearly. Laboratory write-ups, for example, should be based on a great deal of background reading, but the information should be condensed for the report into a properly referenced page for each activity. 2. Make outside reading assignments. Both writing ability and subject knowledge will improve. Summaries of articles of their choice from appropriate periodicals are not difficult to read — and can be informative! They can be graded for choice of material as well as comprehension, effective presentation, and proper referencing. It is much more meaningful for a student to learn English composition in writing about a subject of interest to him than to learn it in writing about an assigned subject.

Outside Help

R. L. Luckhardt, Supervisor of Ag. Technical Service, Collier Carbon & Chemical Corporation, Los Angeles, California, speaking to the 1975 NACTA convention, described another innovative teaching approach. Industry representatives were working with school officials to put together a curriculum on soils and fertilizers for a high school vo-ag class (8). Industry people could be very helpful in designing a basic college course to give students a broader exposure to all phases of agriculture. Field trips could be an important part of the course. Actual observation of research and technology at work could help acquaint students with agriculture.

Most instructors will tentatively agree with these comments. Why, then, does nothing change? In the first place it is difficult to define innovative teaching. One instructor may use an old technique in an innovative manner; but another, attempting to do the same, will fail completely. Once repeated, a fresh presentation is no longer really fresh. Innovative teaching takes time and work. Old lecture notes kept conveniently available from year to year will not do. If we are to respond to the needs of students in each class, we cannot expect the same material to be usable each time.

One teacher refers to this as the "hang loose" approach. The idea does not imply a lack of overall purpose, but the specific day on which a particular topic is discussed is no longer important. Emphasis in the teacher's mind is on the large concept in contrast to the detail. Adoption of this philosophy increases the teacher's responsibility. He must be alert in order to seize upon the moment and keep alive the excitement of learning. During the past intensely cold winter, any of our classes could — and should — have spent time discussing the ef-

fect of temperature on the specific phase of agriculture being studied, as well as the effect on the overall industry.

There is a second reason for resistance to change. Instructors who have received adequate student evaluations by using a set format are reluctant to chance lower ratings. These people should read the excellent review of measurements given by Burger and Seif in the September, 1975, issue of **NACTA Journal** (3). Students have become trained to expect a lecture — note taking routine with three or four major tests, and they feel insecure when they are not given a detailed course syllabus. However, a rigid format may allow no time for the pure enjoyment of learning, which comes primarily through development of the ability to observe and interpret the constantly changing world around us. Students who learn to depend on a complete course outline have a tendency to consider **any** change as an indication of disorganization on the part of the instructor.

Two other obstacles to change exist due to the overall philosophy of college and university teaching. Provision is rarely made in the greenhouse or other laboratory facilities for independent student work below the graduate level. Students are expected to attend regularly scheduled laboratory sessions and may be restricted at other times. Often they need to make daily, or sometimes hourly, observations of changes taking place. A possible solution is shifting work areas so that there are zones restricted for greenhouse and research activities, thus enabling students to have access to areas where their own work is in progress.

Finally, there is the problem of evaluation. Giving the usual written test to be graded with an answer key will not serve the purpose. Again, there are students who feel insecure. They want a hard mid-term exam to cram for and forget. A teacher is vulnerable; there have been instances of suits brought against teachers by students who felt they had been graded unfairly. This is a real and increasing problem. Although most educators agree that motivation by threat is undesirable, our philosophy of teaching is sometimes based on just this concept. If our innovations are designed to allow individualized effort, it is essential that we make clear that the motivation will not come from the formalized test. It is equally important that students be given certain guidelines and that frequent well-organized progress reports are required. If a student is helped to set his own goals, working to achieve them becomes much easier. Too frequently goals are set for him that may be neither suitable nor attainable.

Innovative teaching is difficult to define; it is work to design; it takes time to prepare, present, and evaluate. Innovation is imperative if we are to keep abreast of the rapid changes occuring in the society of which our graduates will be a part. This is the only way we can cope with a large and changing student population and also fulfill our responsibilities to students, industry, taxpayers, and ourselves!

Above all we need to avoid the straight-jacket of formality and seriousness that personifies many college curricula. Learning is work, as is innovative teaching. But if we are willing to do the work, innovative techniques can make both learning and teaching spontaneous, personal, and enjoyable.

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Student Performance Factors In An Introductory Course For Animal Science

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Abstract

The effects of several student characteristics on their performance in an introductory course in animal science were studied. The subject matter of the course was oriented heavily toward the biological sciences. As a group, sophomore, junior, and senior students scored significantly higher than freshmen students. ($P < .005$). Some of the data studied indicated animal science majors scored significantly higher than students with other majors. No differences were observed between male and female students nor between students with less than three years of farm background and those with more than five. The number of women in the course and the number of students without farm backgrounds have both increased rapidly during the last five years.

Introduction

For a number of years, students in Principles of Animal Science at Southwest Missouri State University have been asked to fill out a questionaire relating to their background and experiences. This helps the instructor become better acquainted with the students and also provides a reference if additional information is needed about one of the students. The questionaires have also provided information for answering a number of questions about how the various backgrounds, interests, and other factors might affect a student's performance in class.

The objectives of this study were to answer these questions: 1) Do students reared on a farm perform bet-

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