From the Viewpoint of An University Educator

Education in Agriculture:

Accountability
Responsibility
Technology

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Current emphasis in education generally and in agricultural education in particular is on evaluation; and evaluation, it seems, combines key elements of accountability, responsibility and technology. Inevitably, evaluation leads us down the data trail. In our college we have moved toward a computerized management information system for instruction and related departmental research. Effort distribution forms are completed once annually for every individual on regular payroll. Changes are made during the year only when there is a significant change in effort. Instructional load forms reflecting hours, credits, and the like are completed once each year after the academic year is over. Also, departments code expenses throughout the year by function: teaching, research, extension, and administration.

These comprehensive figures allow us to produce cost information by departments and by levels of courses, e.g., lower division (freshmen, sophomore); upper division (junior, senior); and graduate courses. In developing the instructional budget, we use our Management Information System (MIS) as an aid to decisions on resource allocations — where both additions and subtractions must be made.

Advising Students

An important faculty responsibility in our instructional program is that of advising undergraduate as well as graduate students. Our data system tells us the number of undergraduate advisees for each full time equivalent (FTE) professor in a specific department and similarly the graduate student advisees per FTE. For example, if the chairperson from Agricultural Economics inquires, I'll let him know that each of his full time instructional professors is advising an average 29 undergraduates and guiding the study of 7 graduate students. Incidentally, the average for all professors in the school is 18 undergraduates and 6 graduate students.

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Our ability to muster these data serves an important role in reporting to university and State Education Department administrators, in responding in responsible fashion to trustees and legislators, and in guiding with equity the promotion and salary recognitions for our own faculty members. It is a simple truth that the view from the data trail is most impressive to administrators, trustees, and legislators; yet we must beware that the trail is not too narrow or deadended in arriving at the most effective learning environment.

Striving for the Right Mix

The tricks which must be mastered by the university educator — I would say the NACTA educator — should allow us to combine reasonable, responsible evaluation with instructional innovation. We must be able to mix instructional accountability with instructional flexibility and to blend new technology with ongoing programs.

This crucial idea was expressed recently by one of our undergraduates, Steven Albert, in a letter to our student newspaper the *Cornell Sun*. His comment was directed to budget management in a time of tightness: "But here is the key: education is not a business venture: universities are corporations only tangentially. What may be a bad economic investment might be a good academic investment. This is what budgetmakers must remember. And those affected by their actions — students, faculty, and the public — must make sure they do not forget."

Thus, as a university educator — as an agricultural educator — I have a responsibility and accountability not only to those who pay the bills but to the education profession itself.

In the fall of 1974, we established an ad hoc Committee on Scholarships in Teaching chaired by Dr. Joseph Novak, a specialist in science education. The charge to this committee of outstanding instructors was in three parts:

(1) to identify the most effective types of change in instruction that have occurred during the last decade;
(2) to identify the major innovations likely to have most acceptance or payoff during the next ten years; and
(3) to identify instructional priorities for Cornell's College of Agriculture and Life Sciences for the period under consideration.

We noted, too, that it would be helpful to suggest some tradeoffs. That is, what could be dropped or reduced in scope in order to allow added changes for instructional programs.

This committee has been most diligent in its work. Initial discussions "focused on the cyclic nature of many educational changes, the problems of financing new or modified instruction, and the difficulties associated with staff recruitment and rewards for excellence in teaching." The committee was instructed by Novak in the application of learning theory and on ways to apply new knowledge of the learning process to improve teaching-learning practices.

New Assumptions

One major outcome to date has been the preparation and submission to the National Science Foundation of a proposal titled "Program for Instructional Improvement in the College of Agriculture and Life Sciences." A guiding principle in this proposal is that excellence in research scholarship can no longer be equated with excellence in instruction. Novak states that "there has been significant progress in theory development relevant to teaching in the past decade. In the area of instruction, Bloom's concept of 'mastery learning' is now being widely adopted[1]." Bloom suggested that 90 percent or more of our students can achieve any reasonable set of learning objectives if students are guided carefully toward well specified learning objectives and allowed varying amounts of time to achieve these objectives. This view is consistent with Skinner's emphasis on "the value of 'positive reinforcement' after each step in a learning sequence, thus suggesting careful specification of each learning step so as to provide students with immediate reinforcement as they 'master' each segment of instruction[2]."

Novak relates these ideas about teaching to the learning theory of David Ausubel which stresses the importance of so-called "meaningful learning" wherein new information is acquired through interaction with existing concepts in cognitive structure[3]. "During the course of meaningful learning, the learner's concepts differentiate further; form new associations with other related concepts; and gradually result in a hierarchically organized conceptual framework that enormously facilitates new relevant learning and also augments complex problem solving."

My reason for sharing this detail is not to indicate any personal expertise in learning theory but rather to indicate that a university educator is accountable to his or her faculty and students in identifying the state of the art (accountability, responsibility, and technology) in instruction. My Blue Ribbon Committee tells me that "we now have the necessary philosophical and theoretical basis to commence an organized program of instructional improvement that can be guided by scholarly inputs similar to those that have guided research in sciences."

Finding a Starting Point

My obligation for accountability includes doing all in my power to support such a program. I would hope to have a training phase for staff in one or two areas. A likely starting point is with a new course in animal and plant heredity. The instructors have participated in Novak's seminar on college teaching. They are ready to organize their course in such a way as to emphasize how concepts have been devised or modified by geneticists, the relationships between concepts, and the way in which conceptual frameworks can be used to solve new problems in genetics, including specific problems in plant and animal breeding. The course is now offered in the traditional lecture-laboratory-discussion format but differs from most traditional courses in the explicit manner students are guided to learn and use basic genetic concepts. It is likely that future development in this course will lead to a modular program with expanded alternatives to allow students to study illustrative materials closely related to their fields of interest, but conveying the same basic framework of genetics concepts. Some audio-tutorial and/or computer assisted instruction will likely accompany a change to a more individualized program.

Another course which may serve as a candidate for modification is in introductory economics. The next expectation is that all interested faculty and graduate students will be accommodated in a semester-long seminar on college teaching or in a short, intensive five-week training course covering a substantial portion of the theory and practice needed to initiate significant instructional improvement efforts. The courses in plant and animal heredity and introductory economics will serve as models in this expanded program. A further objective is to exchange course syllabi, video tapes, and other materials with faculty at other institutions who may have similar interests.

Beyond the instructional area, agricultural educators have a responsibility to their students and career interests. We must help to identify and foster career objectives. One new addition to our multiphase career development program is called the student-alumni contact program. Participating alumni and friends of the college sponsor students for one week periods during the winter break, spring recess, or summer. Students observe and assist the alumnus or alumna on the job for that week. The primary objective of the "contact" experience is to provide students with opportunities to have a glimpse at the day-to-day work done by those employed in their field. Insights gained from these contacts will help students to plan academic programs more knowledgeably and to take advantage of other opportunities for field experiences as their goals become more clearly defined.

In summary, it is seen that dimensions of accountability, responsibility, and technology for an educator must encompass comprehensive reporting to individuals, groups, and agencies responsible for establishing institutional policies and budgets.

But the educator has other dimensions of responsibility, too. There must be recognition of faculty and student needs. Imaginative approaches, the ability to think around corners, will spell success for our educational endeavors for agriculture in the future. The national and international need is too imperative to allow us anything less.

References

1. Bloom, B.S. "Learning for Mastery." *UCLA Evaluation Comment*. 1968, 1 (2), 1.
2. Skinner, B. F. *The Technology of Teaching*. New York: Appleton-Century-Crofts, 1968.
3. Ausubel, D. P. *Educational Psychology: A Cognitive View*. New York: Holt, Rinehart, and Winston, Inc., 1968.