

# Program to Prepare Ph.D. Candidates For College Teaching Roles in Agriculture

Jack C. Everly

### Abstract

*For four years the University of Illinois College of Agriculture has offered a unique course for advanced degree candidates to acquire knowledge and skills in handling teaching assignments as part of their future careers. The what, why, and how description can serve as a useful model for other institutions exploring ways to encourage the successful development of teaching competence of advanced degree candidates.*

### Bringing Focus to the Problem

By the late 1960's the University of Illinois College of Agriculture was experiencing student unrest similar to that on other campuses across the nation. Part of the student activity centered on evaluation of instructors and attempts to improve the "poor" instruction students were receiving.<sup>1</sup> At the same time, leaders in higher education were calling for the adoption of a Doctors of Arts degree "to prepare graduate students for a lifetime of effective teaching at the college level."<sup>2,3,4</sup> Faculty and administration were becoming concerned and requested appropriate action.

With this background, in February, 1971, the UIUC College of Agriculture Educational Policy Committee received a "Proposal to Improve Quality of College Instruction in Agriculture." Referred to the committee for comments and study by the college executive committee, it focused in part on preparation of Ph.D. candidates for teaching roles.

### Preparation for Teacher Roles

The proposal outlined an interdepartmental course designed to help the Ph.D. candidate acquire competence in teaching without jeopardizing the college's emphasis on creative research or diminishing the department's or advisor's role. Its primary goal was "To teach in order to produce other teachers."

A 1963 Instructional Resources survey had indicated that relatively few of the UIUC agricultural college's faculty members had received any systematic gui-

dance in the acquisition of teaching skills. Virtually their only opportunity for learning something about teaching before the attainment of the Ph.D. was the teaching assistantship. But in an environment which prizes research, the teaching assistantship is viewed as a "slave labor" position which slows the acquisition of the coveted degree. Many candidates, dodging the TA position, attain a Ph.D. which permits them to obtain faculty appointments while minimizing or eliminating most of the preparation for carrying out one of the component functions of those appointments — teaching.

### The Present Situation

Many of tomorrow's college teachers of agriculture are in master's and doctoral programs today; the question was what to do about this fact. It is generally recognized that nearly all land-grant colleges of agriculture seek dual abilities when employing staff members. They seek persons who have ability to do creative research and to teach effectively. Ideally, this combination has much to recommend it in practice, but seldom has the excellent researcher been prepared adequately for teaching.

There are those who say, "show me a relationship between preparation for teaching and excellence in teaching." This "cause-effect" relationship is as difficult to prove as any other evaluation of teaching activity. To reject the adequate preparation of people for teaching would mean that we accept the assumption that good teachers are born. If one is fated by some happy combination of genes and environment to be a good teacher nothing will thwart him. If he lacks the innate talent to be a teacher, no instruction will make the slightest difference.

Some hold to this assumption, but it is difficult to believe that we whose business is education should put so little faith in the value of education as to suppose that a person cannot improve his ability to handle the complexities of teaching by more adequate preparation.

And Ph.D.'s do become teachers. According to a 1968<sup>7</sup> survey of the 1,843 people granted Ph.D.'s in biological sciences by 94 leading universities during the previous five-year period, more than two-thirds assumed the role of a college teacher and out of this number 73 percent taught a beginning undergraduate course. To prepare these graduates for such responsibility, 65 percent of the universities in the survey **provided no special training** for teaching assistants, and 79 percent of the universities **offered no special courses or seminars** in any aspect of college teaching.

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## Content or Teaching Skills

Thus most Ph.D. programs have helped prepare the graduate for content mastery but have done little to help him acquire the other characteristics a good teacher must have. These are: (1) the ability to organize a domain of knowledge, to design and plan a course, to establish instructional objectives; (2) to have effective presentation skills and to be an effective manager of the teaching-learning environment; (3) to be able personally to interact with students both inside and outside the classroom; (4) to have the unique ability to evaluate his own teaching effectiveness; and (5) to have that particular trait called professionalism.

We felt that the College of Agriculture was, for several reasons, in a unique position to help graduate students prepare to be college teachers of agriculture.

**First**, it has a responsibility for leadership and innovation to close the gap because of its predominance in the field. Any change would have an immediate impact on elevating teaching to its rightful place beside research in the priorities and missions of higher education in agriculture.

**Second**, it is in the selfish interest of the College of Agriculture to prepare good teachers, for the college is both the producer and the employer of its product. Inadequately prepared teachers appointed to prepare other college teachers of agriculture perpetuate the inadequacy.

**Third**, the College of Agriculture has a similar responsibility to prepare good teachers for staffing two-year and four-year colleges. There is presently no other place where this can be done on an organized basis. It is difficult to see how this responsibility can be shrugged off.

**Fourth**, most preparation of college teachers in agriculture is through the master's or doctoral programs. To the extent that preparation is less than adequate, the college fails its own graduate students.

**Fifth**, the Committee on Missions and Priorities for the College of Agriculture's Long-Range Planning Report<sup>6</sup> indicates that it is the responsibility of the various colleges in the University constantly to review and periodically to modernize all graduate curricula. The Long-Range Planning Report indicated ways that this task could be done on an interdepartmental program basis, and that kind of basis has been adopted.

## What About the College of Education?

Why shouldn't future college teachers in agriculture be the responsibility of the College of Education rather than the College of Agriculture? Proponents within the Commission of Undergraduate Education in Biological Sciences, who believe in preparing Ph.D.'s for teaching roles, emphasize the importance of keeping the program

within the subject matter colleges and faculties rather than colleges, schools, or departments of education<sup>7</sup>. Future college teachers, as most other students, are looking for relevance in their education. This relevance can be maintained if the program for preparation in teaching is in their subject matter department. A preparation program requiring interdepartmental resources and cooperation can logically be developed at the college level. Such relevance can be assured with an interdepartmental program within the college. In this particular case faculty members of the College of Education contributed to the critique of the course outline and supported the plan for such a course.

## Basic Assumptions

Analysis of the situation led to the following assumptions which formed a base for the program to prepare Ph.D. candidates for teaching roles in agriculture:

**1.** Patterns vary from department to department, but approximately 60 percent of the Ph.D. graduates from the College of Agriculture will have significant teaching responsibilities sometime during their lifetimes.

**2.** It is easier to improve competence in teaching prior to graduation than afterward. Experience indicates that staff members with full-time teaching and research loads have very little time or motivation for developing additional competence in teaching. After all, they have achieved the coveted Ph.D. which gives its holder the "license" to teach. With appropriate advising, the graduate student has the motivation and can effectively participate in a program designed to increase his competence in teaching. Considering all costs, the graduate program is the most efficient period in professional development to get this preparation.

**3.** Other institutions of higher education which employ our graduates as faculty members usually assign split responsibilities in research and teaching. It is traditional and natural to link research and teaching. The degree program that prepares the college researcher should also incorporate preparation for the teaching role. Therefore, the present latitude included in the Ph.D. program should be used for course work and training in teaching rather than a different degree designed for teaching such as a Doctor of Arts degree.

**4.** If one of the purposes of the Ph.D. program is to prepare graduates for teaching roles in agriculture, this can be accomplished within the present degree structure (for example, by substituting the preparation in teaching for the foreign language requirement.)

**5.** The preparation of Ph.D. candidates for teaching roles in agriculture can be useful even to gradu-

ates who decide to take positions in private industry, government service, or Cooperative Extension Service.

6. The program can be administered and conducted within the College of Agriculture as an interdepartmental effort rather than within the College of Education. The College of Agriculture has the talent and the resources to make the preparation effort highly relevant to the Ph.D. candidate enrolled in any of the subject matter departments.

7. The courses for preparation in teaching should be listed along with other graduate instruction offered by the subject matter departments to avoid the stigma which is sometimes (rightly or wrongly) attached to certain education courses. Such classification would acknowledge that teaching and research are two aspects, in equally visible status, of the same academic profession.<sup>11</sup>

### Action Taken

The Educational Policy committee collected departmental reactions, comments from the College of Education, the Graduate College, and members of the faculty; and it then accepted the intent of the proposal, asking that it be implemented through a single course offered by Agricultural Communications, but crosslisted with all departments in the College of Agriculture.

The author was charged with development of the course, called Agr Comm 460, Teaching College-Level Agriculture. The college Courses and Curriculum Committee reviewed the outline and made suggestions. Final clearance came from the Graduate College in February, 1972, for a ½-unit credit course.

#### AGCOM 460 Teaching of College-Level Agriculture.

PREREQUISITE: MASTER'S STANDING.

½ UNIT.

00274 Lect-Disc	10-12	M	W13 Turner	Every
	4	Th	W13 Turner	

The first offering of the course was in the fall semester, 1972, and it has been taught each fall for the past four years with a total of 28 students enrolled.

At the beginning of the first class period, participants complete a two-page student assessment instrument which helps the instructor identify answers to the following:

1. Who are we?
2. Why are we here?
3. How much do we know about teaching?

After assessing the students' objectives and needs, the instructor designs each semester's instruction to accomplish the following general course objectives: to prepare students for the particular teaching roles fulfilled by college teachers of agriculture and to implement the student's own learning objectives regarding the acquisition of knowledge, attitudes, and skills helpful to the teaching of college-level agriculture.

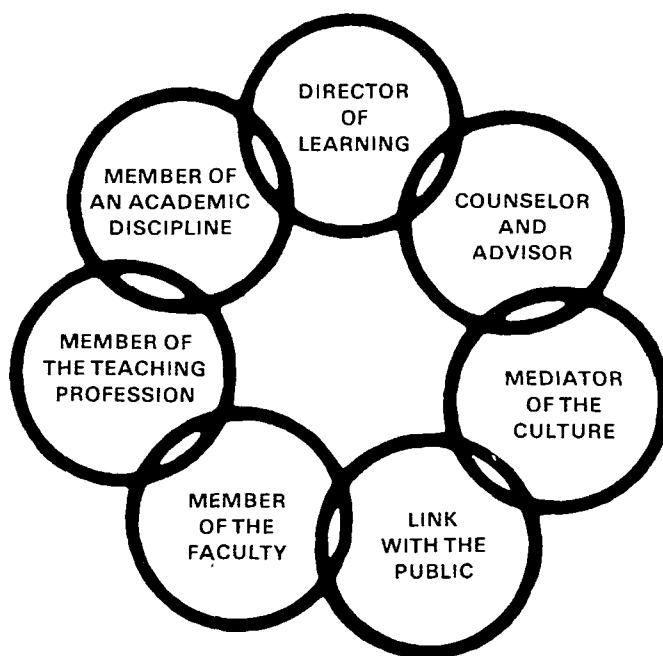


Figure 1 The Roles of the Teacher in College Level Agriculture

A wide variety of teaching patterns are used to implement the instructional strategies which lead to completion of the course requirements. Large group instruction is employed, usually when guest lecturers come to give special insight into college teaching; small group learning pattern is employed when groups are formed for student discussions and presentations of weekly syntheses of reading assignments; one-to-one teaching is used in oral testing of the student and for presentations on "How to Use Objectives."

Grades are contracted at the beginning of the semester with each student working against himself for fulfillment of his contract. The following course completion requirements indicate how this grading system works:

#### Course Completion Requirements

1. Successfully complete reference notebook on college-level teaching of the student's chosen subject matter area. This notebook, as a minimum, should contain the following:
  - a. Establish the framework for analysis of your teaching environment by carefully describing and analyzing:
    - (1) The institution and its teaching environment
    - (2) The prospective learners
    - (3) Society's expectation and need
    - (4) Subject matter as a source (identification of key concepts, etc.).
  - b. Describe a desirable curriculum leading to a two-year terminal or four-year B.S. degree.
  - c. Write a course description and outline that fits the above identified curriculum.

- d. Take one week of the course and describe in detail the instructional strategy to accomplish specific objectives.
  - e. Fully describe the student evaluation procedures used for (d) above and briefly describe them for the entire course. Give examples of evaluation instruments.
  - f. Describe how you would evaluate the teaching in the above course and implement improvements for future classes.
2. Final Exam — Oral over the content of the student's notebook and the related content of the course.
  3. Complete the weekly syntheses on reading assignments and learning experiences in test construction.  
Achievement to this level = C
  4. Participate in two micro-teaching presentations of 10 to 15 minute duration for self-evaluation of teaching skill.  
Achievement to this level = B
  5. Select a counterpart from the professional teaching staff in your discipline and develop a complete learning experience in teaching. This can include the presentation of a lecture, organization of a discussion, development of teaching innovations, special projects, student evaluation, teacher evaluation, etc. Care should be taken that the project developed is limited enough to be completed during the present semester. Follow these steps:
    - a. Select the teacher you want to work with and seek his counsel.
    - b. Draft a proposal, one page or shorter, and get your counterpart's approval and my approval before proceeding.
    - c. Complete activity.
    - d. Get evaluation of the activity by your counterpart or appropriate peer group.
    - e. Submit evaluation with a summary report two class periods prior to the final exam and give an oral report during the class period prior to the final exam. This report should be limited to 15 minutes and one or two pages.

Achievement to this level = A

Note the requirements that are designed to increase the acquisition of classroom teaching skills by the student:

1. Construction of weekly tests on assigned textbook reading.
2. Two micro-teaching presentations (black and white video recording and playback of presentation) before peers who evaluate the instructional effort.
3. Direct work with a teacher (counterpart) in the student's own academic discipline with all activities carefully evaluated.

## Experiences Build Skills

These "real life" experiences, combined with assigned readings, tours of actual instructional systems in operation, and classroom discussion, have enabled students to achieve a great deal in a short 16-week semester in developing successful methods for teaching college-level agriculture.

Each week a reading list is developed by the instructor to meet the particular needs of the students enrolled that semester. From this list the student elects to synthesize one or more of the readings for the class and report on it the following week. Students duplicate enough copies of the synthesis for the entire class. The student's verbal report usually elicits several important comments or observations from class members and the instructor.

All students must read the assignment from the required text, **Teaching Tips**. The instructor never lectures on content from the text; however, a weekly quiz designed by a student which he gives to the rest of the class adequately covers the material and gives each student experience in test development and justification of items included in the test.

Texts and journals recommended for the course are:

### Required Book

**Teaching TIPS**, Sixth Edition, by Wilbert J. McKeachie, D. C. Heath & Co., 1969.

### Recommended Books

**In Touch with Students**, by John R. Campbell, Columbia Educational Affairs Publishers, 1972.

**Effective College Teaching**, William H. Morris, Editor, American Council of Education, Washington, D.C., 1970.

**Systematic Instruction**, James Popham and Eva I. Baker, Prentice-Hall, Inc., 1970.

**The Art of Teaching**, Gilbert Highet, Vintage Book V-1, 1950.

**Stating Behavioral Objectives for Classroom Instruction**, by Norman E. Gronlund, 6th printing, MacMillan Co., 1972.

**The Importance of Teaching: A Memorandum to the New College Teacher**, report of the Committee on Undergraduate Teaching, the Hazen Foundation, n.d.

### Recommended Journals

**NACTA Journal**, official journal of the National Association of Colleges and Teachers of Agriculture. Available in the Agriculture Library.

**Journal of Higher Education**

**Junior College Journal**

**Improving College and University Teaching**

**Journal of Educational Research**

**Research in Education** (issued monthly by Educational Resources Information Center; contains a review of current literature)

**Journal of Agronomic Education**, a yearly publication of the American Society of Agronomy.

## How Has It Worked?

Evaluation of the program has come from students, faculty involved as counterparts for the students, and alumni of the course who are teaching in the "real world." Each of the four years, the course and instructor have been evaluated by the students using the Illinois Course Evaluation Questionnaire.<sup>8,9</sup> Results are indicated below:

Table 1. AGCOM 460 Evaluation Summary by Course Evaluation Questionnaire.

Year	1972		1973		1974		1975		4-year Average
Number of students	6		6		9		7		
	Mean <sup>1</sup>	Rank <sup>2</sup>	Mean <sup>1</sup>	Rank <sup>2</sup>	Mean <sup>1</sup>	Rank <sup>2</sup>	Mean <sup>1</sup>	Rank <sup>2</sup>	
General Attitude	3.33	7	3.79	9	3.14	4	3.71	9	3.50
Method	3.08	7	3.38	8	2.47	1	3.50	9	3.10
Content	3.33	9	3.46	9	2.86	3	3.36	8	3.25
Interest	3.17	8	3.33	8	2.39	1	3.32	8	3.05
Instructor, general	3.08		3.00	3	2.67	1	3.50	7	3.06
Instructor, specific	3.53	8	3.53	8	3.36	5	3.63	8	3.51
Total	3.28	8	3.46	9	2.85	2	3.51	8	3.27
	Mean <sup>3</sup>		Mean <sup>3</sup>		Mean <sup>3</sup>		Mean <sup>3</sup>		4-year Average
Content rating	5.33		5.40		4.85		5.29		5.21
Instructor rating	5.33		4.40		4.57		5.57		4.96
Course rating	5.16		5.20		4.71		5.29		5.09
Total	5.27		5.00		4.71		5.38		5.08

<sup>1</sup> Determined by a 4-point scale, with 4 as best.

<sup>2</sup> Overall rank computed from 1 to 9, with 9 as best. Compares course with 10,616 University of Illinois courses and 3,728 outside courses.

<sup>3</sup> Determined by a scale from 1 to 6, with 6 as best.

A sample of the student evaluative comments on the CEQ follows:

This course taught me not only what it means to be a teacher, but also what it means to be a learner. . . very good that students have an active role in the course. . . course needed for several years. . . made me realize "more" to teaching than classroom instruction. . . textbook well written, assignments in text followed class assignments closely. . . outside reading assignments all applicable. . . much knowledge gained from working on course notebook. . . micro-teaching experiences very helpful. . . quizzes made by students themselves gave valuable experience in preparing and grading exams. . . I particularly liked the grading system in which the student could select his own level of mastery of content to match his course objectives and particular needs. . . I could not have received the exposure to so much on teaching in any other way. . . advise that you require all teaching assistants in the college to take the course."<sup>1</sup>

More than 15 faculty members have served as professional teaching counterparts for the students. They must approve and evaluate the student's project. Only in one case has such a project not been completed satisfactorily. The faculty have been enthusiastic. A typical statement closing a student's project appears below:

Mr. S organized and acted as lead instructor for a nutritional physiology laboratory for Dairy Science 100. This is a 3-hour laboratory conducted on a Saturday morning each fall at the Dairy Science Nutrition Field Lab.

S prepared the laboratory worksheet, organized the order of presentations, and helped get other qualified personnel to work with the various parts of the lab. S also led the discussion and demonstration in the section of the lab on the rumen microbes.

After completion of the laboratory, S graded the lab reports and discussed them with the students at a later class period.

The laboratory went smoothly with several good comments concerning its value from the students involved. Thus, indicating to me a successful job of organization by S.

In his own presentation S seemed at ease and covered the material well. For a first time teaching experience he did an outstanding job.

As assumed, not all of the alumni of this course have teaching roles when they graduate. However, one with an outstanding potential for teaching went into research and claims he uses the course content in continuing education activities with peers and farm groups and that he would still take the course if he were selecting courses today. One alumnus was quite critical of the course because he was employed in a research position with no chance to use the content of it in his job. However, two years later he is back at the University of Illinois teaching three courses and has sent three Ph.D. candidates to the course because it is a "must"! Two out of three foreign students who have taken the course were trained under the British system of higher education. They rated the course as the best one in their course of study at the university because it helped them to understand their own system and how changes could be made for needed improvements. Both are presently successful teachers in their homelands.

## Conclusions

The impact of the program on 28 students and their departments (seven) during the past four years may not be large compared with enrollment in other graduate courses; however, the quality of the results has been beyond expectations. It has proved that the program is on target and can be expected to grow as it fulfills the need of graduate students for preparation to teach college-level agriculture.

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# A Computerized Futures Market Simulation System

Steven C. Griffin and Paul D. Hummer

## Abstract

*Classroom gaming can be used to reinforce theoretical and analytical concepts and provide experience in performing managerial functions. A computerized futures market game was developed to provide increased capacity and capability for executing sophisticated trading plans. A marketplace simulation model is used to provide market uncertainties and reduce data requirements.*

## Introduction

The development and use of computerized classroom games in resident undergraduate and adult extension instruction has become increasingly popular among educational institutions. The Agricultural Economics Department of Oklahoma State University, for one, currently employs five computerized simulation games in its teaching and extension programs.<sup>1 2 3 4 5</sup>

In controlled experiments, Curtis<sup>6</sup> found that business games can be an effective teaching toll for management education. Classroom gaming can reinforce theoretical and analytical functions. This article discusses the structure and successful classroom use of a unique futures market game.

The dramatic price fluctuations of the current and recent past market in agricultural commodities has caused increased interest among students in the workings of the futures markets. Whether an individual will manage a firm seeking to escape the risks of changing prices, or whether he is speculating, hoping to take advantage of those price fluctuations, a study of the role and characteristics of the futures market is important.

Simulated futures trading has long been a part of futures market classwork. Computerized programs relieving the student and teaching staff of some burdensome clerical accounting involved in futures market transactions have been developed for several years.<sup>7 8</sup> A flexible system incorporating the relevant realities of futures trading (i.e., execution uncertainty and price uncertainty) and a variety of market-order types to involve the student in sophisticated trading plans, however, has

not been available. The data input, number of market observations required, and high computer operational expenses as the exercise continues make the use of many futures market games cumbersome.

The OSU Computerized Futures Market Simulation System (CFMSS) is a Fortran IV-based computer software package designed as a classroom game and learning tool for teaching and understanding of the operations, functions, and characteristics of commodity futures trading. The computerized system acts as a brokerage house by maintaining customer transaction and financial records, and by submitting user-supplied contract orders into a pseudo-real world marketplace.

CFMSS stresses (1) the capacity for trading numerous commodity groups and contract-months, (2) the capability for handling sophisticated limit and spread orders, (3) the inclusion of a pseudo-real world marketplace for the continuous execution of market orders, and (4) the minimization of game administration time and the amount of card input required.

The primary objective of any computerized commodity trading game is not to make the participants expert commodity traders, but rather to provide a stimulus to encourage the observation of market workings and the digestion of facts and principles which influence the markets and their price levels. (The fulfillment of the primary objective is a step toward gaining expertise in commodity trading.) The OSU system is therefore designed to simulate actual speculator trading of commodity futures contracts on the organized exchanges of the world. The system departs from complete reality somewhat in the simulation of the actual filling of market orders. However, CFMSS uses actual market opening, high, low, and closing prices; and by simulating a continuum of intraday prices, the system provides for realistic "fill" price uncertainty with relative execution certainty, or "fill" price certainty with order execution uncertainty in the use of the various types of market orders. The procedure for simulating "fill" prices which is not present in other futures market games known to the authors is discussed below.

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<sup>1</sup> This article is taken from a more detailed explanation of the futures market simulator given in (3).