CASE STUDY

Earlier Degree Completion Shown When Beginning Graduate Students Start with Research Methods Course

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Abstract

The transition from undergraduate to graduate programs within and among Colleges and Universities frequently creates problems in student adjustment to a new environment and different sets of objectives.

A study of Agronomy students from the University of Georgia receiving the Master of Science degree between June 1972 and June 1983 was conducted to evaluate the influence of a course entitled Agronomic Research Methods. The course was designed to aquaint students with the importance of and methods of planning, conducting, and publishing thesis research. Data from the 89 full time students graduating during the study period show that students who included the course in their program of study completed degree requirements an average of four quarters earlier than students who did not enroll in the course. Sex and nationality were not related to time required for meeting degree requirements.

Introduction

Numerous factors affect student performance in a course of study. Graduate students specializing in any given field of science frequently have diverse undergraduate backgrounds. This is especially true in the Applied Sciences. Studies have shown that personal attributes, high school and undergraduate experiences, and environmental conditions helped determine the performance of undergraduate and graduate students (2, 3, 8).

In recent years, the background of Agronomy graduate students has markedly changed due to the enrollment of females (2, 3, 7), students from urban settings (1, 4, 5), international students (7) and students with undergraduate training from different colleges and universities. In view of these differences, the student frequently undergoes a period of confusion and limited productivity in making the transition from undergraduate to graduate studies.

A course entitled **Agronomic Research Methods** was organized by the author in cooperation with Departmental faculty to assist the student in reducing the length of the transition period. Faculty input consisted of suggestions to enhance the student's thesis research efficiency from initial planning to publication. The course was designed for incoming graduate students who were beginning their research programs. It is not a required course, however. The course consists of three one-hour lecture-discussion and two two-hour laboratory work sessions per week per 10 week quarter.

Course Outline

An outline and sample class assignments are as follows:

A. Qualities of a good research scientist.
B. Choosing the area of research. The student, in cooperation with his or her major professor decides the student's research topic which is used, where feasible, as a basis for all class assignments.
C. The library as a research tool.
   1. The Science Library. Laboratories are conducted by the library staff to acquaint the student with relevant aspects of the library.
   2. Sources of material. **Assignment:** Use the research topic chosen and review and abstract two journal articles each week. A given journal may be used only once, therefore 20 different journals will be involved.
   3. Use of computer in library research. **Assignment:** Use research topic to develop an acceptable program for computer search of literature. Initiate search.
D. Project outline
   1. Purpose.
   2. Format. **Assignment:** Prepare a project outline using an acceptable format on a subject about which you wish to prepare a research manuscript (usually related to topic of thesis research).
E. Kinds of projects and sources of financial support.
F. Scientific research.
   1. Science and common sense
   2. Applied vs basic research
   3. Levels of research
   4. Methods of research
   5. Professional courtesy
G. History of the development of agricultural research with emphasis on crops and soils.
   1. Early contributions by scientists and their impact on the development of agricultural science.
   2. Organization of U.S.D.A., state and related research organizations.
H. Preparation of manuscript for technical journal (including thesis).
   1. Purpose of publication
   2. Promptness in publishing
   3. Determining the type of publication and selecting the journal.
   4. Rules for preparing an acceptable manuscript.
   5. Selecting the style or format.
   6. Use of figures and tables. **Assignment:** From data provided, write a technical article using the American Society of Agronomy standards as a guide.
I. Preparation of manuscript for non-technical publication. **Assignment:** From data used in preparing the technical article,

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Table 1. Time interval between date of enrollment and thesis approval of Master of Science Agronomy graduates at the University of Georgia. 1972-1983.

Enrolled in Research Methods	Time in Qtrs. between enrollment and thesis approval: Students (No.)	Mean (No.)	S.D. (No.)	Extremes (No.)
Yes	53	7.70	±2.76	5 - 24
No	36	11.86	±5.26	6 - 32

prepare a manuscript in non-technical style using appropriate illustrations, etc.

J. Sources of equipment and supplies. **Assignment:** Using the project outline as a source, prepare a list of equipment and supplies necessary to conduct the investigation. List each item and show costs as determined from recent scientific catalogues.

K. Field and greenhouse investigations
   1. Types
   2. Plot and pot sizes for various crop plants grown for different purposes.
   3. Methods of labeling and record keeping.
   4. Common field lot and greenhouse statistical designs. **Assignment:** Prepare simple field plot layout including randomization for four common field plot designs using differential treatments provided by the instructor. Calculate quantities of differential treatments for each plot. Give advantages and disadvantages of each design.

L. Computers as an aid in research. **Assignment:** From data provided run regression analysis, correlation coefficients, ANOVA, and Duncan's Multiple Range Test using a remote terminal and microcomputer.

M. Methods of sampling soil and plant tissue for analysis.

N. Methods of recording data and taking notes.

O. Acceptable and unacceptable units of weights and measures and calculations for laboratory, greenhouse, and field investigations.

P. Preparation of abstract for publication. **Assignment:** From data used in technical manuscript prepare an abstract appropriate for publication in **Agronomy Abstracts.**

Q. Preparation of visual aids. **Assignment:** From data used in technical manuscript, prepare 2x2 slides acceptable for presenting a paper at a professional meeting. Photograph, develop, and mount slides using at least four of the procedures outlined by instructor.

R. Oral presentation. **Assignment:** Select appropriate 2x2 slides from those prepared from technical manuscript and give a 12 minute presentation to the class.

Evaluation

During the period between June 1972 and June 1983, 89 full time students graduated in Agronomy with the Master of Science Degree. A total of 53 students chose Agronomic Research Methods in their program of study whereas 36 elected other courses. Effectiveness of the course was determined by the length of time required from the academic quarter entered to the quarter of thesis approval.

Data in Table 1 show that students who elected to take Agronomic Research Methods averaged 7.70 quarters in completing the thesis requirements whereas those who did not take the course required an average of 11.86 quarters. The difference in time is highly significant (PR-T at 0.0001). It is apparent that data from extremes indicate that all students were not continuously enrolled. Some students delayed initiating their research until course requirements were met; whereas others left the University and completed the research and thesis later.

Most students who enroll in Agronomic Research Methods surveyed the literature and developed thesis research outlines and many initiated research programs by the end of the first quarter in residence. Many students use the course to gain a challenge to complete the degree requirements in the shortest possible time. The success of the course is evident by the fact those who enrolled in the course completed degree requirements in approximately four quarters less time than those who chose other options (Table 1).

Sex and nationality did not influence time required to complete degree requirements (Table 2). Females constituted 15% and 9% of those who did and did not enroll in Agronomic Research Methods, respectively. Values for non-American vs American Nationals were 28% and 31% respectively.

Table 2. Classification of Master of Science Agronomy graduates at the University of Georgia by sex and nationality, 1972-1983.

Classification	Agronomy Research Methods: Enrolled (No.)	Enrolled (%)	Not Enrolled (No.)	Not Enrolled (%)
Male	45	85	33	91
Female	8	15	3	9
American	38	72	25	69
Non-American	15	28	11	31

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