the student interview of the cooperating rancher. The ranch plan is written in text form to encourage the use of writing skills. Writing should increase the learning efficiency while the plan serves to improve student literacy and competency in the language of the disciplines. The plan is written with the rancher as the intended audience.

Grading

Grading of the course involves examinations given during the field experience, grading of sections of the plan as they are completed, and an over-all grade assigned upon completion of the plan. Grading philosophy cannot follow traditional objective scales. It is not a reasonable expectation to expect "first-time" students to appreciate the complexities of management decisions and develop a perfect plan in all aspects. It is more important to acknowledge their effort in addressing difficult management decisions than it is to evaluate the absolute validity or practicality of their suggestions. Consequently, writing the plan is much closer to a learning tool than an evaluation tool. Grading is based more on the thoroughness of the attempt than accuracy of the content. Content errors are noted and suggestions made. This grading scheme encourages the student to be creative and innovative without the fear of grade impact. In support of this philosophy the student has the option to revise his plan based on instructor comments and resubmit. This process also serves to emphasize the developmental process of management plans.

Both instructors evaluate the ranch plan with attention given to spelling, grammar and clarity of writing. The best ranch plan(s) is (are) sent to the rancher at the end of the semester. Knowing that the rancher will read and possibly consider some of the student recommendations adds a sense of importance to plan preparation.

Grades are computerized with a print-out given to each student after each additional grade input. The print-out includes grades by assignment, average to date and rank in class. Part of the grading philosophy includes no grade for late papers. This has been adopted to impress upon students the value of responsibility to meet deadlines. It fulfills part of the "real world" training that many students overlook. The demands of the course and the deadline policy force the student to prioritize activities and become proficient in time management both of which are both characteristics of successful ranchers.

Summary

Livestock Management on Range and Pasture is a team-taught, synthesis course involving both field and classroom work. Expertise is provided by individuals from subject matter areas related to holistic management of cattle on range and pasture. Instructors continually emphasize the interrelationships of the various fields of study and disciplines involved. The management plan developed by each student requires integration of information and synthesis of a workable plan for livestock and range management on a Nebraska Sandhills ranch. The format of this course has been used as a model for course development or revision at other universities.

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Computer-Assisted Plant Identification Tests

F.A. Pokorny

Knowledge of plants and how they are propagated is one of the objectives of a course in plant propagation. To meet this objective, students in my plant propagation course are required to identify a group of 115 plants including annuals, perennials, shrubs, vines, and trees. Potted specimens are maintained in the greenhouse and accurately labeled for genus, species, variety or cultivar, and family. Each week students are provided with a study list containing the genus, species, family name and the commercial method of propagation for each of 15 plants. Students have access to the greenhouse for plant study and must learn to identify assigned plants and their commercial method of propagation. Correct spelling of scientific and family names is also required.

1985 Plant Test Procedure

Beginning the third week of class a weekly plant quiz was scheduled. Ten numbered plants, from previously assigned lists, were placed in the laboratory and a student could take the plant quiz on a designated day at a time of his or her convenience. The quiz consisted of writing the correct scientific name, family name, and commercial method of propagation for each test plant. Upon completion, the student's test paper was manually graded and assigned a preliminary performance score. All quizzes were retained, checked for errors, assigned a final grade, and returned the following Monday. This testing procedure was time consuming, labor intensive, and cumbersome.

1986-1987 Test Procedure

During 1985, a computer program written in GW-Basic was developed to assist in the testing procedure (2). It was introduced to the class in 1986 during the first laboratory period. About an hour and a half of instruction was devoted to computer operation and use

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of the computer-test program. In addition, nine copies of a practice test were made available for computer practice. These diskettes could be acquired from the Horticulture Office along with a key to the computer room. Students, thus, had an opportunity to familiarize themselves with the operation of the test program prior to initiation of formal testing.

During the third week of class, testing was begun with numbered plants on display in the computer room. A student would write the scientific and family name for each plant prior to inputting this information into the computer. A correction mode allowed for necessary changes; upon completion of all entries, the student obtained a computer printout. The printout consisted of the student's name and test score in duplicate, student's input, and correct test answers (Fig. 1). A tear sheet containing the student's name and test score (top of computer printout) was retained as a record of performance; the student retained the test input along with correct answers. Nine computers were available for class use; thus, up to 12 students could be accommodated simultaneously, each at a different stage in the testing process.

Teacher's Perspective

Initially, the introduction of computer-assisted plant testing was viewed with considerable caution. All types of computer related problems were envisioned which actually did not materialize. Only in several instances were student responses not recoverable necessitating re-entry of information. Error trapping routines were added to the program to eliminate problems (1, 2).

With the exception of four or five students, most had no previous computer experience and many had no typing skills. Without exception, all seemed to adapt readily, though perhaps with initial reluctance, to using

Figure 1. Computer-generated Test Sheet with Student's Name, Test Score, Student's Answers and Correct Answers.

DOE JOHN

TEST SCORE ••••••••••••••••••••••••< 32/33 >••••••••••••••••••••••••••••

STUDENT'S ANSWERS

GENUS	SPECIES	VARIETY OR CULTIVAR		FAMILY NAME
1. ZEBRINA	PENDULA			COMMELINACEAE
2. SCHLUMBERGERA	BRIDGESII			CACTACEAE
3. SANSEVERIA	TRIFASCIATA			AGAVACEAE
4. CODIAEUM	VARIEGATUM	VAR.	PICTUM	EUPHORBIACEAE
5. JUNIPERUS	CONFERTA			PINACEAE
6. COLEUS	BLUMEI			LAMIACEAE
7. PEPEROMIA	SANDERSII			PIPERACEAE
8. HIBISCUS	ROSA-SINENSIS			MALVACEAE
9. IMPATIENS	SULTANII			BALSAMINACEAE
10. DRACAENA	DEREMENSIS	WARNECKII		AGAVACEAE

TEST 1 ANSWERS

GENUS	SPECIES	VARIETY OR CULTIVAR		FAMILY NAME
1. ZEBRINA	PENDULA			COMMELINACEAE
2. SCHLUMBERGERA	BRIDGESII			CACTACEAE
3. SANSEVIERIA	TRIFASCIATA			AGAVACEAE
4. CODIAEUM	VARIEGATUM	VAR.	PICTUM	EUPHORBIACEAE
5. JUNIPERUS	CONFERTA			PINACEAE
6. COLEUS	BLUMEI			LAMIACEAE
7. PEPEROMIA	SANDERSII			PIPERACEAE
8. HIBISCUS	ROSA-SINENSIS			MALVACEAE
9. IMPATIENS	SULTANII			BALSAMINACEAE
10. DRACAENA	DEREMENSIS	WARNECKII		AGAVACEAE

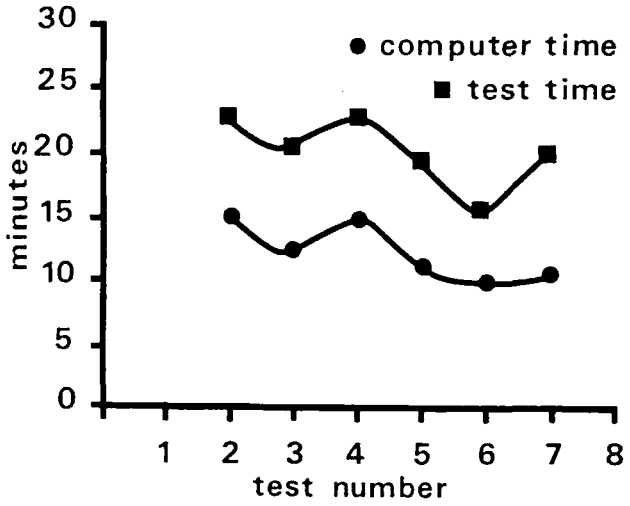

Figure 2. Mean Total Test Time and Computer Time Spent by Students on Plant Tests.

the computer. Without students' knowledge, total time spent on the plant test (identification time plus computer time) and time spent entering responses in the computer were recorded. Mean data for tests 2 through 7 are shown in Figure 2. Total time spent on a test declined 11.5% from test 2 through test 7. Average computer time spent by the student entering or correcting information declined about 65% from test 2 through test 7 indicating increased computer proficiency with the passage of time.

Test score data for plant tests 1, 4 and 7 for the plant propagation classes of 1985, 1986 and 1987 were transformed by arc sine and statistically analyzed (t-Test) (3). Scores of the 1985 class did not significantly differ from those of the 1986 or 1987 classes using the computer (Table 1).

Table 1. Mean Test Scores for Initial, Mid and Final Plant Tests During 1985, 1986 and 1987.

Test year	No. students	Grading method	Test Number 1	4	7
			Mean score (%)		
1985	26	manual	81.4%	84.2[1]	83.1*
1986	18	computer	84.6	89.4	85.7
1987	20	computer	81.2	79.3	80.2

[1]Means within column not significantly different at 5% level (t-Test).

Since tests were computer graded, the instructor's time was utilized monitoring and working with students who may have encountered problems or had questions concerning computer operation. Introduction of computers into the plant testing routine diminished time spent by the instructor proctoring and grading quizzes from 6 to 7 hours to approximately 3 to 3½ hours.

Student's Perspective

What did students think of the computer-assisted plant tests? The following comments are taken from anonymous written evaluations concerning the testing procedure: 1) "...feel it is more stimulating than hand

written tests."; 2) "...an inward force that makes you want to do well."; 3) "...looked at it as a challenging game."; 4) "...accurate grading and fast."; 5) "...fun to use the computer, fast."; 6) "...helps students learn to spell names correctly."; 7) "In some ways it made me slow down and notice spelling errors, etc."; 8) "...made me more aware of what I was writing. I found myself constantly checking and double checking my answers..."; 9) "...instant feedback."

What were the negative criticisms regarding computer-assisted plant tests? Student replies were: 1) "None"; 2) "...correction segement of the computer program could be improved since it was a source for error."; 3) "...too long to take the plant tests."

Conclusions

The introduction of computers to students enrolled in my plant propagation course during 1986 and 1987 was, in my opinion, a positive educational experience. Rather than feeling intimidated, students perceived computers as a motivating force and a challenge.

Since student's test scores were neither positively nor negatively influenced by computer-assisted grading, the major benefit was rapid feedback of test performance to the student. Instructor's time was also efficiently used by reviewing test performance with the student and suggesting ways that future performance could be improved.

While potted, intact plants served as test specimens, detached stems or quality color photographs might be equally useful. The use of detached plant parts or photographs might allow test responses to be directly entered into the computer, thus eliminating the need for handwritten copy.

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Using Alumni Follow-up Studies For Program and Curricular Improvements

Ben L. Byler and Edwin E. Lamberth

Introduction

In this era of rapid scientific and technological developments in agriculture, it is imperative that universities continually assess programs and curricula to assure that students are provided an academic program of the highest quality. Determining how well a program has prepared its graduates for the high technology professions, and their satisfaction with that preparation is an effective way of evaluating the merit of an educational program and obtaining suggestions for program improvement (Johnson and Wittmer, 1984).

The School of Agriculture at Tennessee Technological University has conducted five follow-up surveys between the academic years 1979-80 to 1983-84, obtaining valuable data from 1,362 graduates (Lamberth and Griffin, 1985; Lamberth and Griffin, 1984; Lamberth and Griffin, 1983; Lamberth and Griffin, 1982; and Lamberth and Griffin, 1981).

This is a report of the 1986-87 follow-up survey conducted by the Tennessee Tech University School of Agriculture. (Byler and Lamberth, 1987)

Purpose

The survey was a means of involving former students in an evaluation of the undergraduate curriculum; identifying the nature of employment for which students are prepared; and determining their views on how successful the School of Agriculture has been in preparing them for entry and advancement in their professions. Data were collected on the graduates': 1) personal background, 2) educational status, 3) occupational status, 4) satisfaction with their agricultural training, 5) type of employment selected, 6) type of work performed, and 7) salaries received.

Procedure

A follow-up study was made of graduates one, three, five, ten, fifteen and twenty years after graduation. The questionnaire used in collecting data was developed by the authors, with suggestions made by the faculty of the School of Agriculture.

For the years selected, there were 245 graduates of the School of Agriculture. The questionnaire, a letter of instruction, and a self-addressed stamped envelope were mailed to each graduate. Approximately three weeks and six weeks after mailing the questionnaires, follow-up letters were sent to each graduate who did not return the questionnaire. Responses of the graduates were analyzed using descriptive statistics and frequency distributions.

Results and Discussion

Graduates from the following six academic years were surveyed: 1984-85, 1981-82, 1979-80, 1974-75, 1969-70, and 1964-65. Two hundred forty-five graduates were surveyed and 156, or 63.7 percent, returned usable questionnaires.

An analysis of the academic majors of the graduates revealed that approximately 26 percent

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