

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 segment 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

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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

Table 1. Academic Majors of Graduates of Tennessee Technological University School of Agriculture by Year of Graduation

Majors	Year of Graduation						Total	
	84-85	81-82	79-80	74-75	69-70	64-65	Number	Percent
Agricultural Science	8	7	2	7	7	9	40	25.6
Animal Science	5	8	3	8	7	5	36	23.1
Plant and Soil Science	3	7	6	2	7	3	28	17.9
Agribusiness	8	1	-	0	1	1	18	11.5
Agricultural Natural Resource Management	0	1	-	4	1	0	11	7.1
Others	0	1	0	0	14	8	23	14.7
Total	24	25	23	21	37	26	156	100.0

Table 2. Sex of Graduates of Tennessee Technological University School of Agriculture by Year of Graduation

Sex	Year of Graduation						Total	
	84-85	81-82	79-80	74-75	69-70	64-65	Number	Percent
Male	20	17	17	19	36	24	133	85.3
Female	4	8	6	2	1	2	23	14.7
Total	24	25	23	21	37	26	156	100.0

majored in Agricultural Science, 23 percent in Animal Science, 17.9 percent in Plant and Soil Science, 11.5 percent in Agribusiness Economics, 7.1 percent in Agricultural Natural Resource Management, and 14.7 percent in other areas of study (Table 1).

As revealed in Table 2, eighty-five percent of the graduates were males, and 15 percent were females. The largest number of females (8) graduated in 1981-82 and the smallest number (1) in 1969-70.

One hundred thirty-five of the graduates, or 86.5 percent, were native Tennesseans. Two graduates were from South Carolina, two from New York, and two from Texas (Table 3).

Table 3. Home States of Graduates of Tennessee Technological University School of Agriculture

Home States	Number	Percent
Tennessee	135	86.5
South Carolina	2	1.3
New York	2	1.3
Texas	2	1.3
Connecticut	1	0.6
Delaware	1	0.6
Alabama	1	0.6
Indiana	1	0.6
New Jersey	1	0.6
Georgia	1	0.6
Ohio	1	0.6
Illinois	1	0.6
Virginia	1	0.6
No Response	6	3.8
Total	156	100.0

Table 4. Size of Hometown or Community of Graduates of Tennessee Technological University School of Agriculture by Year of Graduation

Size of Town or Community	Year of Graduation						Total	
	84-85	81-82	79-80	74-75	69-70	64-65	Number	Percent
A large metropolitan city (over 500,000 in population)	4	1	2	1	2	0	10	6.4
A medium-sized city (50,000-500,000 in population)	4	3	7	1	0	3	18	11.5
A smaller city (10,000-50,000 in population)	4	6	3	6	8	6	33	21.2
A town or village (under 10,000 in population)	1	3	1	4	5	4	18	11.5
In the country, outside a city or town	2	3	3	3	9	3	23	14.7
In the country and on a farm or ranch, outside a city or village	10	9	7	6	13	5	54	34.6
Total	25	25	23	21	37	25	156	100.0

Table 5. Graduates of Tennessee Technological University School of Agriculture by Number of Agriculture Courses Completed in High School and by Year of Graduation

Number of Courses in High School	Year of Graduation						Total	
	84-85	81-82	79-80	74-75	69-70	64-65	Number	Percent
One course	2	2	1	0	3	1	9	11.1
Two courses	1	1	1	2	5	0	10	12.3
Three courses	1	1	1	2	6	1	12	14.8
Four courses	7	3	4	6	12	18	50	61.7
Total	11	7	7	10	16	20	81	100.0

The graduates had spent most of their lives in towns and communities of various sizes (Table 4). The largest number, 54 graduates, or 34.6 percent, lived in the country and on a farm or ranch, outside a city or village. The lowest number, 10 graduates, or 6.4 percent, lived in a metropolitan city with a population of more than 500,000 people. Approximately one-fifth of the graduates lived in a small city with a population between 10,000 and 50,000 people. In 1964-65, only three graduates were from cities of 50,000 or more in population. By 1984-85, this number had increased to eight.

The graduates were asked if they studied agriculture in high school. Eighty-one graduates, or 51.9 percent, completed agriculture courses (Table 5). However, the number who studied vocational agriculture decreased from 20 in 1964-65 to 11 in 1984-85. Of this number, fifty graduates, or 61.7 percent, completed four courses in agriculture. Only seven of the 1984-85 graduates completed four courses compared to 18 graduates in 1964-65.

Table 6. Graduates of Tennessee Technological University School of Agriculture by Year of Graduation Who Completed FFA or 4-H Activities

Completed FFA or 4-H Activities	Year of Graduation						Total	
	84-85	81-82	79-80	74-75	69-70	64-65	Number	Percent
Yes	14	8	7	10	28	22	89	57.1
No	10	15	16	11	11	4	67	42.9
Total	24	23	23	21	39	26	156	100.0

Eighty-nine graduates, or 57.1 percent, participated in FFA or 4-H activities (Table 6). Of this number, 58 graduates, or 65.2 percent, participated for four years in FFA or 4-H activities. The number of graduates who participated in FFA and 4-H activities decreased from a high of 27 in 1969-70 to a low of eight in 1981-82 and 1979-80. Only five graduates completed just one year of FFA or 4-H activities.

The graduates were asked to indicate their highest academic degree earned. Thirty-five graduates, or 22.4 percent, had earned one or more advanced degrees since leaving Tennessee Tech. Of this number, nine graduates had earned the doctorate. One hundred and twenty-one graduates, or 77.6 percent, held the B.S. degree.

Forty-six current job titles were reported by the graduates. Several graduates held prominent leadership positions in agriculture. Eleven percent of the respondents were in managerial positions, eight percent were administrative or executive officers, five percent were teachers of vocational agriculture, and five percent were business owners or partners.

The graduates were asked to indicate the location of their present employment. The graduates were employed in 18 states and the District of Columbia. Approximately 77 percent were employed in the southern states, with the largest number, 68 percent, in Tennessee. Between one and six graduates were employed in each of the other 17 states and the District of Columbia.

Respondents had worked for an average of 7.1 years for their present employer. One-third of the graduates had worked more than nine years for their

present employers, and 17 percent had worked more than 15 years.

The graduates were asked the question, "Is your present job related to your major at Tech?" Ninety-five graduates, or 61 percent, stated that their present jobs and agricultural majors were related, while 60 graduates, or 39 percent, stated that they were not related.

The respondents were requested to analyze the nature of their work by checking the type of tasks performed. Management and education were the most common tasks performed, respectively by 37 and 26 percent of the graduates. Sales were performed by 22 percent. Between 8 and 14 percent of the graduates were engaged in the tasks of farming, production, marketing, finance, research, and development.

The graduates were requested to indicate their current annual salaries or income ranges. Eighteen percent of the graduates reported salaries ranging from \$15,000 to \$20,000. Approximately 14 percent of the graduates were earning salaries of less than \$15,000; 14 percent between \$20,000 and \$25,000; 13 percent between \$25,000 and \$30,000; 15 percent between \$30,000 and \$35,000; approximately 10 percent were earning more than \$50,000.

The graduates were asked to rate the benefits of their academic education at Tennessee Tech in pursuing their current professional endeavors. Sixteen aspects of the graduates' academic education were rated.

Table 7 reveals that highest mean ratings were received for communication skills, leadership training, academic advisement, special problems and independent study courses, and participation in agricultural clubs and organizations.

The graduates were also asked to list the strengths and the improvements needed in the program of agriculture at Tennessee Tech. The strengths are summarized in Table 8 and the improvements needed are summarized in Table 9. Sixteen strengths were listed, but only the following three were listed by more than 10 percent of the graduates: "Faculty showed personal interest in students," "Agricultural curriculum was well-rounded," and "Instructors were of good quality." The graduates identified 33 improvements needed in the agricultural program. However, only one was listed by more than 10 percent of the respondents. It was, "More emphasis on career guidance and placement."

Conclusions

The following conclusions are based on the preceding data of this study:

1. Most of the graduates (86 percent) of the School of Agriculture were native Tennesseans.
2. A majority of the graduates have spent most of their lives living in the country and in towns of less than 10,000 population.

However, the number of graduates from cities of 50,000 or more people increased from 1964-65 to 1984-85.

3. A majority of the graduates studied vocational agriculture in high school. Fifty-two percent completed one or more vocational agriculture courses. The number of graduates who studied vocational agriculture decreased from 1964-65 to 1984-85.
4. Most graduates participated in high school FFA and 4-H activities. Fifty-seven percent were active in these two organizations. However, the trend is toward a decreasing number of graduates with FFA and 4-H experience.
5. Many of the graduates had continued their education. Twenty-two percent had earned one or more advanced degrees. Six percent had earned a doctorate.
6. The graduates were employed in a variety of agricultural occupations and several held prominent leadership positions in agriculture. They held 46 different job titles.
7. A majority of the graduates were employed in agricultural occupations related to their majors at Tennessee Tech. Sixty-one percent were employed in related occupations.
8. Most of the graduates stayed in Tennessee to work. Approximately 68 percent were employed in Tennessee.
9. Management, education, and sales were the most common job tasks performed by the graduates.

Program and Curricular Improvements

During the past few years, several changes have been made in the curricula offered by the School of Agriculture at Tennessee Technological University. The results of the follow-up studies provided support for these program and curricular revisions.

The number of majors and options was reduced from 13 to 6. The revised curricula require more science, mathematics, and computer science skills. Computers were introduced as an integral part of the instructional program. A two-year core of courses was developed to include both general education and agriculture. A new course on communications and public relations in agriculture was developed and included in the core requirements. Internship and work experience programs were implemented to provide additional opportunities for students to make practical application of knowledge and skills gained through college course work in his/her major field of study.

The School of Agriculture will implement additional changes to enhance the academic program and improve student retention. More emphasis will be placed on career guidance and placement by faculty advisors and by the Office of the Director. Curricula and courses will include more laboratory activities

through greater utilization of the University farms, greenhouses, and on-campus laboratories. All seniors in agriculture will be required to enroll in a capstone course utilizing the systems concept.

Agriculture programs in higher education assume a tremendous responsibility in the development of human expertise (Coulter, et al.). Periodic assessment of the agriculture curriculum is essential to assure that students are provided high quality academic programs. Alumni play a vital role in the revitalization of the agriculture curriculum in higher education.

Table 7. Mean Ratings of Academic Education by Graduates of Tennessee Technological University School of Agriculture

Aspects of Academic Education	Number	Mean Rating ¹
Communication Skills	139	3.43
Leadership Training	133	3.33
Academic Advisement	140	3.29
Special Problems and Independent Study Courses	127	3.24
Participation in Agricultural Clubs and Organizations	135	3.10
General Agricultural Coursework	135	2.89
Soils Coursework	130	2.88
Agricultural Engineering Coursework	129	2.85
Agribusiness Economics Coursework	135	2.81
Laboratory Experience at Tech Farms	123	2.81
Agronomy Coursework	131	2.73
Animal Science Coursework	132	2.72
Laboratory Experiences on Campus	137	2.68
Animal Science Coursework - Dairy	121	2.52
Horticulture Coursework	130	2.45
Agricultural Education Coursework	88	2.35

¹Ratings: 1 = Little or no benefit
 2 = Some benefit
 3 = Average benefit
 4 = Much benefit
 5 = Great benefit
 N/A = Not applicable

Table 8. Strengths of the Agricultural Program Listed by Graduates of Tennessee Technological University School of Agriculture¹

Strengths	Number	Percent
Faculty showed personal interest in students	54	34.6
Agricultural curriculum was well-rounded	43	27.6
Instructors were of good quality	31	19.9
Good basic practical agricultural program was provided	14	9.0
Low instructor-pupil ratio stimulated learning	14	9.0
Good reputation of university	4	2.7
Good extracurricular activities and clubs	3	1.9
Supportive town and community	3	1.9
Small campus	2	1.3
Others	7	4.5

¹Each graduate could list most than one strong point.

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Table 9. Improvements Needed in the Agricultural Program Listed by Graduates of Tennessee Technological University School of Agriculture¹

Improvements Needed	Number	Percent
More emphasis on career guidance and placement	20	12.8
Include more laboratory activities	15	9.6
Include more practical agricultural experience	13	8.3
Better unity among faculty members	7	4.5
Construct a building for School of Agriculture	6	3.8
Improve farm facilities	6	3.8
More computerized instruction needed	6	3.8
Increase courses in agribusiness management	6	3.8
Increase independent study courses	6	3.8
Revisions in plant and soil science program	6	3.8
A broader agricultural program	5	3.2
Improve advisement of students	4	2.6
Require more English, Speech, and communication courses	4	2.6
Improve all areas of the agricultural program	4	2.6
Involvement in extracurricular activities	3	1.9
Better teacher-student relationships	3	1.9
Improve equipment and facilities	3	1.9
Increase courses in animal science	3	1.9
Require more math and science courses	3	1.9
Better promotion of the School of Agriculture	2	1.3
Agricultural program should be updated	2	1.3
Revisions in agribusiness economics program	2	1.3
Others	11	7.1

¹Each graduate could list more than one improvement.

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