

Strengths and Weaknesses of Land-Grant Two-Year Technical Agriculture Programs as Perceived by Program Directors

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Abstract

For this study, a census of Technical Agriculture Association (TAA) members was conducted to gather perceptions of six categories; 1) Problems, 2) Issues, 3) Strengths, 4) Weaknesses, 5) Faculty Concerns, and 6) Support, as they relate to two-year technical programs that specialize in agriculture. According to respondents, the greatest problems facing technical agriculture programs are that industry need for graduates continually exceeds the number of graduates and high school counselors do not view technical agriculture programs as valuable as B.S. programs. The greatest issue is with research and scholarly literature focused on technical agriculture programs. The greatest strength of technical agriculture programs is their association with a land-grant university. The greatest weakness is the fact that technical agriculture programs are viewed as second class programs at the land-grant institutions. Directors perceive that faculty are most concerned about students entering the program lacking basic mathematical skills. On the issue of support for technical agriculture programs, directors strongly agreed that industry has a great interest in hiring the technical graduate. Some resulting recommendations are to maintain and strengthen relationships with industry, develop proactive recruitment plans, and increase admission standards.

Introduction

Only half of students who attend a four-year institution or two-year transfer institution, meaning a college that offers freshman and sophomore level coursework with the intent that students transfer to a four-year university upon completion, actually graduate with a degree. Of those graduates, half will take a position for which they are over qualified (Gray

and Herr, 2006). These statistics speak for the need of two-year technical programs from both a workplace, and student standpoint. With a mere 10% of high school students completing college and obtaining a suitable job (Gray and Herr, 2006), there is plenty of room for technical programs to attract students. According to a report from the National Center for Education Statistics, during the period from 1990-2005 a higher percentage of post-secondary students were pursuing courses related to career fields over academic areas, but there were no measurable changes in overall student enrollment in occupational education during that time (Levesque et al., 2008).

According to the Bureau of Labor Statistics (2010), occupations in a category with some postsecondary education are expected to experience higher rates of growth than those in an on-the-job training category. Occupations in the associate degree category are projected to grow the fastest, at about 19%. In addition, occupations in the bachelor's degree category are expected to grow by about 17% (Bureau of Labor Statistics, 2010).

There are ten land-grant institutions that have two-year post-secondary educational programs as part of their academic offerings. Two year programs are often attractive to students who are interested in furthering their education and gaining workplace skills but are not interested in or academically prepared to earn a four-year bachelor's degree (Duncan, 2004). Career related courses in technical agriculture programs tend to utilize hands-on learning environments to enhance students' development of workplace skills (Virginia Polytechnic Institute and State University, 2009).

Many of the students that enter these programs can be classified as having concrete sequential and/or concrete random learning styles. Orr et al. (1999)

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found that the majority of postsecondary students in trade and industrial technical programs were concrete sequential or concrete random. Concrete sequential students relate best to the physical, hands-on world and think in ways that are methodical, ordered, and predictable while concrete random learners are intuitive and more easily transition from fact to theory (Gregorc, 1982). These findings are supported by Myers and Dyer (2006) who found that a very high percentage of the postsecondary students they studied were concrete sequential and concrete random. Myers and Dyer (2006) concluded that their findings supported the contention that individuals studying agriculture tend to exhibit ordered and problem specific learning styles. Hence, the hands-on learning environment offered at agriculture technical schools is an attractive option for students.

Not only is the learning environment a draw for students, but there is evidence that students benefit from a job market desiring employees with technical skills. As stated by Gray (2000), there was increased job demand in the United States for high skill areas and significant numbers of four-year college graduates being underemployed. The utility of two-year technical programs was ever increasing. The same holds true today according to Carolyn Curtis, Hudson Valley Community College's Vice President for Academic Affairs. "Two-year schools that are focusing on training students for well-paying jobs in technical fields and other high-demand areas are positioned well to help rebuild the economy" (Cooper, 2010).

As the need for these technical programs grows, it is important for Program Directors to be aware of issues and concerns not only of their own programs, but of technical agriculture programs nationwide. Many may argue that the land-grant system should not only train future scholars with bachelors, masters and/or doctoral degrees, but should provide technical curriculum to train an ever increasing work force to meet the needs of the 21st century.

Every land-grant institution was created with the "industrial class" in mind (Herren and Hillison, 1996). One of the purposes of the land-grant institution is to serve the people of the state by traditional or non-traditional methods. One method of meeting the needs of the state is the inclusion of two-year programs (Kantrovich, 2000). If the needs of the people are not being met, then the land-grant mission is not being fulfilled (Morrill Land-Grant Act, 1862; NASULGC, 1995).

To fulfill this need, technical agriculture Program Directors met in 1994 and formed the Technical Agricultural Association (TAA). The TAA members have met annually to discuss items of mutual interest. The TAA members decided to conduct a study that would identify the TAA Program Directors' perceptions of the strengths and weaknesses of their respected programs. The following institutions have actively been involved in TAA

functions: Agriculture Institute – North Carolina State University, Agricultural Technical Institute – The Ohio State University, Agricultural Technology Program – Virginia Polytechnic Institute and State University, Farm and Industry Short Course – University of Wisconsin, Institute of Agricultural Technology – Michigan State University

Institute of Applied Agriculture – University of Maryland, Nebraska College of Technical Agriculture – University of Nebraska, Ratchliffe Hick School of Agriculture – University of Connecticut, Stockbridge School of Agriculture – University of Massachusetts, and Thompson School of Applied Science – University of New Hampshire

According to Bryson (1988), effective assessment should provide several benefits to an organization: "among the most important is that it produces information vital to the organization's survival and prosperity" (p. 120). Birnbaum (1988, p. 42) states "understanding the environment is critical, because organizations have vital continuing and mutual transactions with elements outside their boundaries." By better understanding the perceptions of Program Directors, steps can be taken to address the needs of technical agriculture programs and their stakeholders.

Purpose and Objectives

The purpose of this descriptive study was to determine the Program Directors' perceptions of technical agricultural programs at land grant institutions in terms of problems, issues, strengths, weaknesses, faculty concerns, and degree of support. The following objectives guided this study:

1. Describe the agriculture programs at the institutions involved;
2. Describe Program Directors' perceptions of problems facing technical agriculture programs;
3. Describe Program Directors' perceptions of issues facing technical agriculture programs;
4. Describe Program Directors' perceptions of strengths of technical agriculture programs;
5. Describe Program Directors' perceptions of weaknesses of technical agriculture programs;
6. Describe Program Directors' perceptions of concerns of faculty who teach technical agriculture courses; and
7. Describe Program Directors' perceptions of the degree of support given to technical agriculture programs.

Materials and Methods

This study is descriptive in nature. Data was gathered using an online questionnaire designed by administrators and faculty who direct programming and teach courses in a two-year associate degree program at a land-grant university. Questions were divided into six constructs; 1) problems, 2) issues, 3) strengths/advantages, 4) weaknesses/disadvantages,

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5) faculty concerns, and 6) program support. Participants were asked to indicate their level of agreement with statements using a Likert-type scale where 1=strongly agree to 5=strongly disagree. Respondents were also given the opportunity to select “not-applicable” for statements that did not apply to them. Demographic data was also collected. The population of this study was the membership of the Technical Agriculture Association (TAA) which consisted of the Program Directors from the aforementioned institutions. Eight of the 10 members completed the questionnaire for a response rate of 80%. Non-respondents were not contacted to determine if differences existed between respondents and non-respondents. Means and standard deviations were calculated in Excel to determine the ranking and significance of each statement.

Results and Discussion

Objective One: Describe the programs offered by the institutions represented in this study.

Both one and two year programs were offered by the institutions. The one year programs required an average of 30 semester hours to complete while the two year programs required 61.5 semester hours, on average. Internships were required by 75% of institutions and were awarded an average of four semester hours toward program completion. Respondents indicated that 86% of institutions offer classes that transfer to a B.S. degree program. At those institutions, 75% of credits earned were transferable credits. Of faculty employed in these programs, 60% were full time employees and the average salary for all employees was \$49,500.

Responses indicated that 38% of institutions employ tenure-track faculty. The average years of experience for faculty were 15 years.

Objective Two: Determine Program Director's perceptions of problems facing technical agriculture programs. Of the twenty problem statements

Table 1. Program Directors' Agreement Levels with Statements about Problems Facing Technical Agriculture Programs (N=8)

Statement	M	SD
Demand for graduates exceeds graduation numbers	1.38	0.52
High school counselors do not view the technical agricultural program as valuable as the BS program	1.38	0.52
Federal funds not earmarked for research on technical agricultural programs	1.50	0.93
Emphasis placed on the four-year program at the expense to the technical agricultural program	2.25	1.16
Level of state financial support provided for the program	2.29	0.95
Level of university financial support provided for the program	2.50	1.07
Image of the technical agricultural programs on campus less than positive	2.63	1.30
Distribution of college resources favors the four-year program	2.63	1.30
Faculty members not rewarded financially at an appropriate level	2.63	1.19
Graduation rate of students	2.63	1.51
College faculty assigned to other departments who teach in the technical agricultural programs question the value of this level of education	2.67	1.63
Inadequate number of students enrolling in the program	2.75	1.28
Securing qualified full-time faculty to teach courses	2.88	1.13
Inadequate infrastructure to support an effective program	2.88	1.13
Administrators of technical agricultural programs not included in some college administrative meetings/functions	3.00	1.20
Funding provided by the state not earmarked for the program	3.00	1.58
High school agricultural teachers do not view the technical agricultural program as valuable as the BS program	3.25	1.28
Securing qualified part-time faculty to teach courses	3.50	1.20
Course content taught too theoretical	4.00	1.41
Students lack opportunity in the curriculum to apply what is learned	4.13	1.13

Note. Scale: 1= strongly agree, 2= agree, 3= neutral, 4=disagree, 5= strongly disagree.

Table 2. Directors' Agreement Levels with Statements about Issues Facing Technical Agriculture Programs (N=8)

Statements	M	SD
Research and scholarly literature focused on technical agricultural programs	2.00	1.00
Majors or options offered in technical agricultural programs being on the cutting edge of technology	2.13	0.64
Communication between technical agricultural programs at land-grant institutions	2.13	0.99
Curricular focus of technical agricultural programs emphasizing multi-regional employment needs	2.13	0.64
The Technical Agricultural Association (TAA) reaching out to other technical agricultural programs at land-grant institutions that are not associated with TAA	2.25	0.71
Department heads in the college support the technical agricultural program as an important academic offering of the college	2.25	1.04
Teaching methods used in technical agricultural courses	2.25	0.71
Students diversity in technical agricultural programs	2.38	0.92
Transfer of credits into four-year bachelor degree programs	2.38	1.51
Curricular focus of technical agricultural programs emphasizing state employment needs	2.38	0.92
Level of course content taught to the students enrolled in the technical agricultural program	2.50	1.07
Accreditation for technical agricultural programs	2.50	0.93
Curricular focus of technical agricultural programs emphasizing international employment needs	2.50	0.93
Faculty in technical agricultural programs having tenure and rank	2.57	1.51
Faculty diversity in technical agricultural programs	2.63	1.19
TAA reaching out to other educational institutions offering technical agricultural programs	2.63	0.92
Technical agricultural programs being located at land-grant institutions and not at community colleges	2.88	1.36
Appropriateness of specific course content taught for mid-management/technician level jobs in the industry	2.88	1.13
Admission standards for technical agricultural programs	2.88	1.13
Technical agricultural program faculty involvement in college governance organizations/committees	2.88	1.13
Rigidity in course requirements for completion of the program	3.00	1.20
Department heads in the college encourage their faculty to teach courses in the technical agricultural program	3.14	1.21

Note. Scale: 1= strongly agree, 2= agree, 3= neutral, 4=disagree, 5= strongly disagree.

included in the questionnaire, respondents agreed that six were current problems facing programs (Table 1). The demand for graduates exceeds graduation numbers and guidance counselors do not view the technical program as valuable as the BS program were statements directors strongly agreed with (M=1.38). Other statements agreed upon as problems included: federal funds not earmarked for research in technical agriculture programs (M=1.50); emphasis placed on the four-year program at the expense to the technical agriculture program (M=2.25); and level of state financial support provided for the program (M=2.29).

Objective Three: Describe Program Director's perceptions of issues facing technical agriculture programs. Respondents indicated agreement with ten of the 22 statements (Table 2). The four issues directors agreed most strongly with were: research and scholarly literature focused on technical agriculture programs (M= 2.00); majors or options offered in technical agricultural programs being on the cutting edge of technology (M=2.13); Communication between technical agricultural programs at land-grant institutions (M=2.13); and Curricular focus of technical agricultural programs emphasizing multi-regional employment needs (M=2.13). The issue

which garnered the lowest level of agreement was: department heads in the college encourage their faculty to teach courses in the technical agricultural program (M=3.14).

Objective Four: Describe strengths of technical agriculture programs. The strengths portion of the questionnaire held 14 statements. Four statements earned mean responses of strongly agree. These were 1) association with the land grant university (M= 1.13), 2) laboratories that are part of the curriculum (M= 1.13), 3) students not admissible to the BS program can attend agricultural classes on the land-grant campus (M= 1.13), and 4) placement rates of program graduates (M= 1.38). Respondents agreed that all statements were strengths of technical agriculture programs (Table 3).

Objective Five: Describe perceptions of weaknesses of technical agriculture programs. This section of the questionnaire included eight statements (Table 4). Respondents strongly agreed with the following statements: technical agriculture programs viewed as second class programs at the land-grant institution (M= 1.38); technical agricultural students viewed as second class citizens at the land-grant institutions (M=1.50); and other faculty at the institution sees the technical program as less important than other academic programs in the college (M=1.88).

Objective Six: Describe perceptions of Program Directors of technical agriculture programs related to faculty concerns. The faculty concerns section of the questionnaire consisted of eighteen statements. Respondents were in agreement with five statements concerning faculty in technical agriculture programs: 1) students enter the program lacking basic math skills (M= 1.50); students enter the program lacking basic grammatical skills (M= 1.63); 3) student attendance in class (M= 2.25); sufficient operating dollars to teach lecture/laboratories (M= 2.25); and faculty dedicated to teach in the technical program are not compensated adequately, as compared to faculty who are assigned from other departments to teach specific courses (M= 2.25).

Table 3. Directors' Agreement Levels with Statements about Strengths of Technical Agriculture Programs (N=8)

Statements	M	SD
Association with the land-grant university	1.13	0.35
Laboratories that are a part of the curriculum	1.13	0.35
Students not admissible in the BS program can attend agricultural classes on the land-grant campus	1.13	0.35
Placement rates of program graduates	1.38	0.52
Agricultural industry support of the program	1.50	0.53
Technical agricultural program's ability to provide industry with trained personnel in a relatively short period of time	1.50	1.07
Student's ability to obtain a degree or education in a relatively short period of time as compared to a four-year commitment	1.50	0.76
Internships that are required in technical agricultural programs	1.50	1.07
Students in technical programs can receive more applicable skills than students in BS degree programs	1.50	1.07
Provides students with the opportunity to attend further education	1.63	1.06
Technical agricultural program's ability to adjust the curriculum quickly to changing needs and new technologies	1.75	1.16
Technical agricultural programs ideal for individuals who want to work in mid-management or technical fields	1.75	0.89
Technical agricultural graduates remain in their home state after graduation to a greater degree than the four-year graduates	2.00	1.20
Starting salaries of program graduates comparable to BS graduates	2.13	0.64

Note. Scale: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree.

Table 4. Directors' Agreement Levels with Statements about Weaknesses of Technical Agriculture Programs (N=8)

Statements	M	SD
Technical agricultural programs viewed as second class programs at the land-grant institutions	1.38	0.74
Technical agricultural students viewed as second class citizens at the land-grant institutions	1.50	0.76
Other faculty at the institution sees the technical program as less important than other academic programs in the college	1.88	1.25
The brevity of the program lacks the time to develop the "whole" student	3.13	0.83
Curricular aspects of the program lack liberal arts courses	3.13	0.99
Curricular aspects of the program lack communication courses	3.43	1.13
The agricultural industry views the technical program as a source of cheap labor	4.13	0.83
The agricultural industry fails to see the quality of the technical agricultural program	4.25	0.71

Note. Scale: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree.

Strengths and Weaknesses

Respondents disagreed that students leave the program with too little skill preparation ($M=4.00$) and programs should require more courses/credits for completion ($M=4.00$). All 18 statements, means, and standard deviations are listed in Table 5.

However, it is evident that graduates are in high demand and the job market would support expansion of technical agriculture programs.

Industry benefits from a highly qualified workforce in part due to the high value placed on

laboratory-based instruction throughout the curriculum which provides students with skills valuable for job placement. However, problems were identified with newly admitted students lack of academic skills; most notably in mathematics and grammar. In order to address these concerns and expand recruitment efforts to grow programs, the directors agreed that more financial support should be provided for the programs from both state and university funds. The directors also agreed that the lack of research and scholarly literature focused on technical agricultural programs is an issue that needs attention.

Table 5. Directors' Agreement Levels with Statements about Concerns of Faculty Teaching Technical Agriculture Courses (N=8)

Statements	M	SD
Students enter the program lacking basic mathematical skills	1.50	0.53
Students enter the program lacking basic grammatical skills	1.63	0.52
Student attendance in class	2.25	1.04
Sufficient operating dollars to teach lecture/laboratories	2.25	1.04
Faculty is expected to engage in some type of scholarly work	2.50	1.20
Quality of laboratories/facilities in which courses are taught	2.50	0.76
Students behavior in class	2.88	0.99
Faculty finds it difficult to develop new educational technology skills	3.00	1.31
Faculty dedicated to teach in the technical program are not compensated adequately, as compared to faculty who are assigned from other departments to teach specific course(s)	3.00	1.26
Faculty finding the appropriate text resources for courses taught at the technical level	3.13	1.64
Resources are diverted to other programs in the college from the technical programs	3.13	1.36
Faculty is expected to engage in some type of research	3.25	1.39
Technical agricultural programs are expected to become involved in distance education	3.38	0.92
Students enter the program lacking the basic computer skills	3.38	1.19
Faculty finds it difficult to stay current in their specialty areas	3.75	1.04
Faculty who teach in the program have a less than a positive attitude about the program	3.88	0.83
Students leave the program with too little skill preparation	4.00	1.07
Programs should require more courses/credits for completion	4.00	1.07

Note. Scale: 1= strongly agree, 2= agree, 3= neutral, 4=disagree, 5= strongly disagree.

Objective Seven: Describe perceptions of directors of technical agriculture programs relating to support given technical agriculture programs. The support section of the questionnaire included five statements (Table 6). Respondents indicated strong agreement with the following statement: industry has a great interest in hiring the technical graduate ($M= 1.25$). Respondents did not agree that industry support for the program is not as strong as it has been in the past ($M= 3.63$).

From these findings, several recommendations have been developed for action by directors of technical agriculture programs and for further research. It is recommended that directors of technical agriculture programs continue to maintain and strengthen relationships with agricultural industry leaders. The findings of this study suggest that industry is a major supporter of these technical programs, depend on them as a source of skilled employees. The fact that there are continually more jobs than graduates hints at a need for further partnership to make sure students are learning the best technical skills for the available jobs and also to reinforce recruiting efforts to attract students into technical programs and industry positions.

Table 6. Directors' Agreement Levels with Statements about the Degree of Support for Technical Agriculture Programs (N=8)

Statements	M	SD
Industry has a great interest in hiring the technical graduate	1.25	0.46
Industry provides scholarships to the students	1.50	0.76
College provides scholarships to the students	1.75	0.71
Industry willing to lease/loan/donate equipment or other in-kind support (seeds, plants, etc.)	2.13	0.99
Industry support for the program is not as strong as it has been in the past	3.63	0.74

Note. Scale: 1= strongly agree, 2= agree, 3= neutral, 4=disagree, 5= strongly disagree.

Summary

The findings of this study support the idea that technical agricultural programs are producing a qualified workforce that is strongly supported by the agricultural industry through scholarship programs and hiring practices. While the programs have a favorable image with industry, directors expressed concern with the image of their programs on the land-grant campus in comparison with bachelor degree programs. There is a perception that the students and programs are not held in as high esteem by other faculty in the college as the four-year programs.

Technical agriculture programs should not only develop more proactive and positive recruitment plans, but should also establish higher standards for incoming students to address the concerns about new students' skills in math and grammar. With the demand for technical program graduates, it is not desirable to change admission standards in a way that will significantly diminish acceptance rates. However, to address concerns about poor academic performance, tutoring, mentoring, and on campus study aid resources should be well advertised. Also, if

admission standards are increased, the change should be well advertised at the high school level to encourage potential students to develop those academic skills prior to graduating high school and applying for admission into a technical agriculture program. In addition, alternative remediation programs or online tutorials should be investigated as to their effectiveness in improving skills of students with regard to math and grammar prior to or upon admission into technical agriculture programs. Addressing this issue will not only result in better prepared students but will also reduce class time spent going over these fundamentals so more time can be spent on skills content.

In addition to student issues, concerns about research should also be addressed. Faculty in technical agriculture programs should consider not only collaborative research with other technical agriculture faculty, but also with other departments in the college that have common interests and concerns. In addition, research is needed to determine why perceptions exist that the technical agriculture program is less valuable than a four year program. A third avenue of research should involve follow-up studies with technical agriculture program graduates and industry personnel to assess their perceptions of the value of technical agriculture programs and provide input on curriculum upgrades that would serve needs of industry.

A final recommendation for action by directors of technical agriculture programs is the identification of outside funding sources to support research and program operations. Changes in admissions standards, recruitment strategies, and research expectations of faculty will require additional funding to be implemented successfully. Directors should advertise past successes and the industry needs that are met through technical agriculture programs to secure investment from outside sources in addition to state and university funds. Continued investment will allow technical agriculture programs to further develop and thrive and continue to supply a well-qualified work force for agriculture industry.

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