

educators are interested in the future success of our graduates and the well being of American Agriculture and our society in the 21st century, then we must be open to innovative ideas and programs which are designed to prepare the best possible graduate for the next century.

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Revitalizing Agricultural Curricula

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Follow-up studies of former students are an effective method to assess performance and progress of students in their chosen careers. Such studies are designed to evaluate the product of career programs — the **graduate**. The primary goal of such education, the preparation of individuals for employment, can best be assessed by examining the placement records of graduates. In addition, very important information regarding the strengths and weaknesses of a college degree program may be gathered from former students, as they are in the best position to judge such characteristics (Wentling, 1980).

Projections have been made that United States (U.S.) agricultural output must increase 60 percent by the year 2030. Rapid increases in the sophistication of technology will be necessary in order to achieve this projected increase in agricultural production. Now more than ever, it is imperative that college degree programs remain relevant to the needs of employers. Follow-up studies of graduates provide data which can be used to help improve the on-the-job effectiveness of future graduates. Many researchers have advocated that such studies be conducted on a routine basis with a frequency of at least every five years.

Objectives

The purpose of this article is to present an effective approach for conducting follow-up studies of a

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university degree program and incorporating the results into the curriculum revitalization process. The specific objectives are to:

1. Describe the process used to conduct a follow-up study of the Agricultural Mechanization curriculum at Kansas State University (KSU) using graduates from 1976-1985.
2. Describe the process used to revitalize the Agricultural Mechanization curriculum at KSU based on the data received from graduates.

Process Used for Follow-Up Study

A 32-item survey instrument representing the general and technical education requirements of the Agricultural Mechanization curriculum at KSU was developed by the authors. The instrument employed an 11-point Likert scale to ascertain graduates' perceptions of the agricultural mechanization curriculum. A rating of 11 indicated a course should be added to the subject matter area, a rating of 6 indicated the current number of credit hours in the area should be maintained, and a rating of 1 indicated a course should be dropped from the area. To validate the instrument, it was field tested with six randomly selected agricultural mechanization graduates from other institutions. Refinement was made to the instrument upon completion of the field test. The instrument was further validated by a panel of experts consisting of eight faculty, one administrator, one undergraduate student, and one graduate student in the Department of Agricultural Engineering at KSU. The 32-item in-

strument yielded a reliability coefficient (Cronbach's alpha) of .874. The authors concluded the instrument was valid and reliable for the intended use of this study.

The study sample consisted of all agricultural mechanization graduates at KSU from May 1976 to May 1985 who were employed in the U.S. The entire sample of 156 graduates was used in the study. Data were collected from 110 graduates representing 70.5% of the sample. Three weeks following the initial mailing of the instrument, a follow-up letter was mailed to nonrespondents. Five weeks following the initial mailing, follow-up telephone conversations were conducted by the researchers. Data collection was declared complete seven weeks after the initial mailing of the instrument.

Results of Follow-Up Study

One item of particular interest to the authors was the applicability of the education received by graduates from the Agricultural Mechanization curriculum to their present position. Table 1 shows that over 87 percent of the graduates indicated their education was above average in applicability to their present position. Of equal interest, over 57 percent of the graduates reported their present position was very motivating, important and challenging (Baugher et al., 1986). This type of information is very useful in recruiting future students into a curriculum.

Table 1. Applicability of education received at KSU to Present Position.

Rating	Number	Percent
Very Applicable	16	14.50
Applicable	52	47.30
Somewhat Applicable	28	25.50
Slightly Applicable	9	8.20
Not Applicable	5	4.50
TOTAL	110	100.00

Table 2 shows the graduates perceptions of general education subject matter required in the Agricultural Mechanization curriculum. Graduates indicated a need to increase the credit hour requirements in computer applications, mathematics,

Table 2. Graduates' Perceptions of General Education Subject Matter in the Agricultural Mechanization Curriculum.

Subject Matter	Mean	S.D.
Computer Operation and Programming	8.76	1.80
Financial Management	8.75	1.62
Accounting	7.94	1.84
Marketing	7.94	1.84
Mathematics	7.58	1.52
Administration	7.41	1.71
Written Communications	7.08	1.99
Interpreting Statistics	6.89	1.74
Oral Communications	6.86	1.87
Physics	6.65	1.78
Chemistry	6.57	1.56

a: N = 109

Table 3. Graduates' Perceptions of Technical Subject Matter in the Agricultural Mechanization Curriculum.

Subject Matter	Mean	S.D.
Electronic Monitors and Controls	8.25	1.89
Hydraulics	7.80	1.76
Electric Motors and Controls	7.49	1.51
Electric Wiring	7.45	1.57
Managing Grains and Forages	7.32	1.55
Agricultural Machinery Management	7.24	1.80
Agricultural Machinery Repair	6.95	1.69
Soil and Water Conservation	6.86	1.66
Tillage and Planting Machinery	6.79	1.63
Planning and Managing Ag Buildings	6.77	1.28
Crop Harvesting Machinery	6.68	1.63
Managing Irrigation Systems	6.67	1.59
Engine Operation and Repair	6.63	2.09
Animal and Waste Management	6.26	1.47
Welding	6.26	1.62
Metal Construction	6.21	1.59
Wood Construction	5.73	1.62

a: N = 109

business administration courses (financial management, accounting, marketing, and administration), and written communications. Similarly, graduates perceived the current number of credit hours required in statistics, physics, chemistry, and oral communications to be adequate. These findings, even though discipline specific, are valuable inputs for university faculty to consider when evaluating curriculum relevancy. Typically such general education requirements provide the foundation for students to build upon as they complete technical education requirements in their chosen curriculum.

The graduates' perceptions of the adequacy of technical subject matter in the Agricultural Mechanization curriculum are presented in Table 3. They indicated an increased emphasis should be placed on electronic monitors and controls, hydraulics, electric motors and controls, electrical wiring, managing grains and forages, and agricultural machinery management. Several subject matter areas clustered around the mid-point of the scale which indicated the current level of emphasis being placed on these areas was adequate. However, the graduates did perceive that traditional construction oriented subject matter should be de-emphasized in the curriculum. Once again, this information was quite useful in the revitalization process of the Agricultural Mechanization curriculum at KSU. Similar formats could easily be developed and used to assess technical subject matter relevance in other agricultural disciplines.

Process Used to Revitalize Curriculum

The results obtained from the follow-up study were one of several inputs used to conduct a complete evaluation of the Agricultural Mechanization curriculum at KSU. Additional curriculum information

were obtained from similar research studies conducted at other universities offering a four-year degree program in Agricultural Mechanization (Bekkm, 1987; Gaultney, 1984). Much of the information obtained from these studies paralleled the findings of the study reported herein. Input from current and future employers of graduates was obtained through individual and group interviews. Employers emphasized the importance for future graduates to have above average skills in written and oral communications and management. Finally, input was obtained on an individual basis from peers at other state universities that offered a four-year degree program in Agricultural Mechanization. Some of the most valuable information obtained from these peers was contained in the curriculum guides for their respective curriculums.

After obtaining input about the curriculum, a departmental curriculum committee, consisting of faculty and students, synthesized the information collected. Based on the information, the committee developed a revised curriculum which incorporated many of the recommendations from the input sources. The revised curriculum underwent multiple revisions as it was being validated by faculty, students, and standards established by the American Society of Agricultural Engineers (ASAE) A-206 Committee — Agricultural Mechanization Curriculum Recognition Committee. The completed revised curriculum for Agricultural Mechanization at KSU became effective with the fall semester 1988.

Summary

The procedures reported herein were used effectively to obtain input about the Agricultural Mechanization curriculum at KSU from graduates, employers, peers at other state universities, previous research, and students. The information obtained was synthesized to comply with program standards established by the ASAE. The outcome of this process was a revised curriculum which incorporated the necessary ingredients to more closely align it with current agricultural and industrial technology.

While the information reported herein is discipline specific, the process is quite adaptable to other agricultural disciplines. The curriculum evaluation process should be conducted with methodical procedures which will yield reliable and consistent data. Research by Wentling (1980), Bekkm (1987), Gaultney et al. (1984), and Baugher et al. (1986) indicates these types of studies should be conducted every five years in order to maintain a curriculum which is relevant to the needs of graduates.

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New Approaches Degree Programs In Agriculture

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Several things impressed me during the Curriculum 2005 Conference in St. Louis last October. Two events in particular made strong impressions. The first of these was the response from those attending to the question, "Do you feel our curricula in the colleges of agriculture should be more general in scope?" About 95 percent of the hands went up affirming this versus the approximately 5% supporting the specific nature of our current curricula. This show of hands by the curriculum leaders present in St. Louis, was a shock to me as I had no idea they would agree so much on this one point. This reinforces the call made by some of the panel members who spoke to us yesterday, for us to be less "vocational" and more "general" in our curriculum development.

The second most impressive event to me was the report by the University of Guelph regarding their proposed curricula changes, including the combination of some of their majors and the renaming of most of their major offerings. Their proposals were sweeping and even included the renaming of their bachelor degrees to include a Bachelor of Science (Agriculture), Bachelor of Management Studies, Bachelor of Environmental Management, Bachelor of Food Science and a Bachelor of Rural Studies. I thought they were sweeping and innovative changes.

This last spring, I received Guelph's new brochure. Even though they did not complete all the changes, they made some definite progress. The following are the categories of their majors as listed in their brochure:

- Environmental Management
- Resource Use
- Animal Production Systems
- Plant Production Systems
- Food Product Development
- Business Management

According to the brochure, they have not renamed their majors but are grouping them under these

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