

Future Curriculum Needs and Graduate Attributes Of Agricultural Associate Degree Programs

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Abstract

This paper presents results of a survey of the agricultural community in the state of Ohio to assess future curriculum needs in the associate of applied science degree programs at The Ohio State University/Agricultural Technical Institute (OSU/ATI). Agricultural leaders in the state of Ohio and OSU/ATI advisory committee members were surveyed to determine important changes occurring in the field of agriculture which will necessitate changes in the degree programs. In addition, questions regarding the development of a core curriculum for all graduates were included. With regard to topics which will become more important in the future, survey results indicated strong emphasis should be placed on computer skills, business management techniques, ecology and communication ability. The most frequent responses to the question regarding changes which will occur in the future included increased reliance on computers, farm consolidation, the need for greater specialization in a particular field, environmental issues and public relations skills. Results of the survey led to the development of a description of an OSU/ATI graduate.

Introduction

The agricultural community is changing rapidly and institutions which serve this segment of industry must also change to accommodate new and different demands. In general, agricultural businesses are becoming fewer in number, larger and more specialized with less family ownership. These changes have been in motion for several years and were largely stimulated by economic factors. If educational institutions are to prepare individuals who are ready to enter the agricultural work force, the educational system must continually modify curricula to meet current and future demands.

Methods

The Ohio State University/Agricultural Technical Institute (OSU/ATI) is currently undergoing curriculum review of academic programs. As a part of the curriculum review process, a survey instrument was developed to assess changes that are occurring in agriculture which will influence curriculum needs in the future. This survey instrument was sent to advisory committee (AC) members of all academic programs at OSU/ATI (n=314) and agricultural lead-

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ers (AL) in the state of Ohio (n=169). Advisory committees generally are composed of a mixture of industry individuals from production, agribusiness and commodity groups as well as related educational representatives. The agricultural leader group included commodity group representatives, farm organization leaders, livestock association personnel, agribusiness leaders, state agricultural officials, and agricultural education representatives. Individuals were asked to respond to specific questions relating to topics that will become more important in the future and specific attributes needed in a associate degree program graduate.

Results

A portion of the survey results are presented in the following frequency tables. There was 26% response rate to the survey which consisted of 94 advisory committee members and 31 agricultural leaders. A partial explanation for the response rate was that a portion of the individuals included in the advisory committee group were also included in the industry leader listing. Individuals were instructed not to respond to more than one survey instrument. Combined results are presented in the following tables by survey question. The tables contain the five most frequent responses to particular questions and percentages beside responses indicate their frequency of occurrence.

In terms of future needs of graduates and anticipated changes in agriculture (tables 1 and 2), survey respondents indicated clearly that computer literacy and increased reliance on computers would be of major importance. Additionally, important topics for students in an associate degree program in agriculture will be business management, communication skills (oral and written), people management and leadership abilities and the ability to respond to change and seek out new and updated information.

Other changes that are anticipated and will affect the curriculum needs of students in agricultural technical programs are increased trends in consolidation of both production units and agribusinesses which will in turn heighten the need for greater specialization in a particular area. Since consolidation and expansion will in turn increase invest-

Table 1. Survey Question 1

What topics will become more important in the future as we educate students?

Frequency	Response - 21 AL and 89 AC
31%	Computers
25%	Business management
16%	Communications/public speaking
13%	Personnel management/Leadership
11%	Technology updates/ability to respond and modify

Table 2. Survey Question 2

What changes do you anticipate in your area of agriculture in the next ten years that will influence the training needed by a two-year technical graduate?	
Frequency	Response - 23 AL and 79 AC
17%	Reliance on computers
15%	Consolidation of production units/agri-businesses
11%	Increased need for specialization
11%	Environmental issues/food safety
7%	Public relations

ment in facilities and equipment, employers will demand employees who are technically competent. Greater emphasis will be placed on an individual's ability to learn and adapt to new technology and equipment.

Agriculture is also facing a situation of greater accountability for conserving the environment and preserving the safety of the food supply, therefore students must be educated about environmental issues and consumer perceptions. Also, graduates will tend to be more exposed to conservation and activist groups and must be prepared to deal with the general public. This is even more important as the number of people involved in production agriculture declines and the public awareness of agricultural practices continues to diminish.

Individuals were also requested to respond to a question regarding the content of the core curriculum of all programs at OSU/ATI. Table 3 presents the five most frequent responses to the question about content of an Institute wide core curriculum. Respondents were in favor of including the *basic subjects* of communications, mathematics and basic sciences in the core curriculum. Survey results also indicated a need for all programs to include a computer literacy course and some emphasis on business management.

Responses to the question requesting proposed attributes of a graduate of OSU/ATI are listed in table 4. Generally, the responses followed those of previous questions, however the response stressing the need for good work ethics and habits was added.

As a result of the survey information and other fact finding efforts, a description of an OSU/ATI graduate was developed for the purpose of modeling the curriculum of the institute to meet the objectives implied by the description.

Attributes of a Graduate

A graduate of The Ohio State University Agricultural Technical Institute should be a contributing member of society and a productive member of his/her industry. In order to be successful in both of these avenues of life, a graduate should be well versed in general/basic skills (communications, mathematics, science, social skills and business skills) and be proficient in his/her chosen technical field of study.

Regarding general/basic skills, each graduate should be able to comprehend, write and speak with clarity and read and think critically. Each graduate needs to be able to successfully conduct a search of the literature.

Graduates should have an overall understanding of mathematics and science as it relates to modern society and

Table 3. Survey Question 3

If OSU/ATI were to develop a basic core curriculum for students in all majors, what courses would you suggest be included?	
Frequency	Response - 23 AL and 89 AC
67%	Communications
62%	Mathematics
49%	Sciences
18%	Computer literacy
10%	Business management

technology. Since mathematics is a basic building block of an educated person, each graduate should be able to solve mathematical problems appropriate to his/her field of study. A fundamental working knowledge of the biological, chemical and physical processes related to the student's specialty area is needed by each graduate. These principles are critical in applying current and future technology and anticipating the potential environmental consequences of technological advances.

Certain social skills need to be present in each OSU/ATI graduate. Management of people is a very important attribute of a productive supervisory employee. Graduates should be able to interact with people effectively, as well as motivate, lead and direct their fellow employees. Ethics in the global business community are very important in the proper functioning of society. Therefore, OSU/ATI graduates should develop personal and professional values and integrity to allow them to function effectively in society. Graduates should also have knowledge of, and an appreciation for cultural differences.

Business management skills necessary for OSU/ATI graduates should include the ability to effectively manage, analyze, summarize and apply business data. Graduates must have the ability to prepare progress and evaluation reports that are crucial to the successful operation of a business. Each graduate should be able to successfully and accurately plan, coordinate and execute projects and work activities.

Computers have wide spread use in business today. Each OSU/ATI graduate should be computer literate and be able to adapt to a wide range of business and technological software. Another very important business skill that is necessary for success in today's market place is a thorough understanding and appreciation of the functioning of world markets and their effect on local business.

Technical competence in a graduate's chosen field of study is vital. OSU/ATI graduates should be proficient in technical practices, procedures, processes and skills important in their chosen profession. Graduates should have a

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Table 4. Survey Question 4

What specific attributes should a graduate of a two-year technical program possess?	
Frequency	Response - 25 AL and 89 AC
43%	General knowledge in their field
20%	Communication skills (oral and written)
18%	Good Work ethics/habits
15%	Ability to learn/knowledge of information sources
12%	People management skills

Perceptions of Agriculture College Faculty Regarding Integration of Higher Level Thinking Skills in the Curriculum

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Most people will agree that graduating college students who are capable of critical thinking and problem solving is an important objective of the educational system. According to Ruggiero (1988), teaching students to think requires more than the mere possession of knowledge. He indicated that instruction at the university level should apply knowledge to problem situations within the academic discipline.

Statements are often made that students need to understand a certain amount of factual material before they can begin to consider the formulation of models or theories in their subject field. Therefore, the promotion of higher levels of thinking is often thought to be more appropriate in graduate or upper level undergraduate classes, thus allowing freshman and sophomore classes to focus on the accumulation and comprehension of basic facts and concepts.

If students in Colleges of Agriculture are to graduate and be competitive in a world in which technology is changing more and more rapidly, agricultural faculty members need to be able to provide their students the analytical skills that will enable them to solve problems, make decisions, and integrate new technology outside of the classroom.

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thorough working knowledge of specialty equipment found in their career profession. The OSU/ATI graduate should have a comprehensive understanding of their specialty area and industry and continue life-long learning and adapting into the future.

Summary

The survey of Ohio agricultural business and industry leaders and Institute advisory committee members provided direct input into the Institute's curriculum review process. Faculty awareness of the changing needs of industry was heightened. Specific business and industry priorities were made known to faculty which has been a catalyst for change. Survey results provided support for both course revision and new course development.

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One of these analytical skills is that of critical thinking. To be able to evaluate and compare new technologies and developments in terms of the usefulness of their application to differing circumstances should be a mandated criteria that is included in every course taught in today's institutions of higher education. Colleges of Agriculture should not lag behind in promoting higher level thinking skills among their students. If students are expected to think at higher levels during their freshman and sophomore years in college, they will more easily synthesize and evaluate new material as well as be able to integrate thinking skills into other courses they take (Ruggiero, 1988).

The term "higher levels of thinking" as used in this article, is defined by Bloom (1956), as those higher mental processes involving application, analysis, synthesis, and evaluation of material. Knowledge and comprehension of information require no special cognitive contribution by the person engaged in the mental process, while higher levels of thinking require a much greater contribution (Rath, Wassermann, Jonas and Rothstein; 1986). Lower level thinking processes rely on memorizing declarative knowledge, while higher levels of thinking demand that information in long term memory be manipulated in some manner so as to change the form of the material to fit a stated criteria or a new problem situation.

The promotion of higher levels of thinking has been a focus in many universities across the country. The success of curriculum restructuring efforts to promote thinking skills among agricultural colleges is a subject that has not received enough attention. The quest to integrate higher levels of thinking in all colleges and universities should be the goal of every major institution.

Purpose of the Study

The primary purpose of this study was to determine the perception of agricultural college faculty in a large mid-western university about the importance of including higher level thinking skills in the course work provided to college students. College of Agricultural Science and Natural Resources (CASNR) faculty at the University of Nebraska-Lincoln were included because of the desire to obtain baseline information for use in developing an instructional improvement program in critical thinking.

Procedures

The following procedures were followed in conducting this study:

Participants: A random sample of 48 CASNR faculty at the University of Nebraska-Lincoln were included in the study. This represented 50 percent of all the faculty with at