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Utilizing Industry's Support For Two-Year Program In Agricultural Machinery

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This article discusses the joint role of education and the farm machinery industry in providing teaching excellence. Recent trends involving the farm machinery industry and expanding technology, which increase the complexity of the educational process, are addressed. Finally, an educational strategy that has proven successful in forming an educational partnership with industry is offered.

Over recent years increasing numbers of farm machinery industries have filed for bankruptcy or have been drastically restructured to prevent bankruptcy. Many other agricultural industries have or are presently relocating factories outside the U.S., moving their factories from one state to another, or are closing their factories. The recessed farm economy, labor costs, availability and increasing costs of raw materials, tax inconsistencies from state to state, and certain governmental policies have forced these changes. Presently, the farm machinery industry is faced with severe competition, as each company strives for its market share.

In addition, farmers and educators have and will continue to be faced with industry's advancements in technology. The present state of "technology overload" and accompanying new terminology add to the confusion. One important example involves the nationwide change in tillage practices, in which the shift from conventional tillage to some type of conservation tillage has been gradual, yet almost imperative. This change has been met with confusion not only to farmers and educators, but also to the farm machinery industry. Farmers and educators may be noted for blaming the machinery industry for the slow transition to reduced tillage. Whether a just criticism or not, economic self-interest is mentioned with industry's broader line of tillage equipment. All three groups have had to deal with the new terminologies that have accompanied this national tillage trend. In the text **Fundamentals of Machine Operation (FMO) Tillage** (1976), several relatively new terms are identified. Till-plant, zero-till, mulch tillage, conservation tillage, economy seedbed, reduced tillage, optimum tillage, minimum tillage, and conventional tillage are explained. Other titles for reduced tillage practices, such as profit till and econo till, add to the growing list of labels.

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Similarly, a somewhat slow response has been noted from certain chemical and seed companies. Only recently have crops such as soybeans and corn been visually advertised in a field covered with residue. Previously, advertisements displayed the weed-free crop growing in a fertile black soil without any evidence of surface residue. Confusion is evident.

Apparently many farmers have or are realizing the need to change to some form of reduced tillage to conserve soil, but now are confronted with a set of new and complicated decisions. Not only may the farmer be contemplating the sale of certain conventional tillage and planting equipment, but he is also looking to industrial, educational and research institutions for answers concerning repurchase. The use or frequency of use of the moldboard plow continues to be debated. Further, the chisel plow is slowly declining in use and economic value as use of a more popular one-pass disk-chisel increases. Yet Herman Warsaw (1984) attributed deep fall tillage with the chisel plow to his world-record corn crop. The 338 bushel corn yield on nonirrigated land is astonishing. Is the chisel plow or any one tillage tool the answer? Confusing, isn't it? Still further, there are experts who recommend an annual rotation not only of crops but also of tillage operations.

Still, numerous other questions confronting the change to reduced or conservation tillage remain unanswered. In **Conservation Farming** (1980), such topics as water management, energy conservation, soil conservation, and fertilizer and pesticide management are discussed. Yield and varietal selection, soil compaction, and other concerns continue to be researched.

Recently, a clearinghouse for information was established with the assistance of both private industry and public agencies. The Conservation Tillage Information Center (CTIC) located in Washington, D.C., is an example of industry's involvement in educating the public. This agency gathers and disseminates information on various topics related to conservation tillage.

A third national trend confronting the farmer, educator, and the machinery industry is the rapid and ever-expanding technology associated with modern agricultural equipment. The need to update faculty with inservice training is apparent. Dr. Thomas A. Hoerner (1982), professor of agricultural engineering at Iowa State University, noted the need for such training. In his speech at John Deere's Industry and Education Conference, Dr. Hoerner and others noted the importance of inservice education for postsecondary teachers throughout industry.

The expanding uses of computers and software also confront and confuse those who are not computer-literate. Programs are available to assist with all types of economic analyses, and the use of microprocessors to monitor engine operation, planting and chemical application, harvest losses, and numerous other operations is commonplace.

In recognition of these national trends in the agricultural machinery industry, educators responsible for course work in farm machinery and equipment must take a critical look at their curriculums. Without a doubt, certain strategies for curriculum and instruction must be revised. The trends that have previously been noted make the educators' task formidable. Are there rational and workable solutions to that task? Let's take a closer look.

The Educational Dilemma

By no means have all of the issues been noted and discussed. Certain national trends affecting the farmer and the agricultural machinery industry have been identified. However, when discussed from the educators' viewpoint, still other concerns surface.

While quite concerned with the issues already noted, educational institutions face other constraints. Two of the most common are that, first, students enrolled in agricultural machinery courses possess a wide variety of backgrounds. By no means are all of these students majoring in mechanized agriculture. Students enrolled in these courses include both farm and nonfarm students, students with differing career goals, and students with diverse abilities and experience with agricultural machinery. Second, educators face time and economic constraints that continue to challenge their ability to keep technically current.

Strategies for Curriculum Change

Even though the educational challenges appear formidable, certain alternatives merit consideration. At the University of Minnesota Technical College, Waseca, an implemented strategy aided in solving the complexity of this task. An up-to-date list of machinery companies was developed. Soon afterward, a letter was mailed to each of these companies requesting the following information:

1. The name, address, and phone number of a nearby industry representative
2. A list of up-to-date audio-visual material available at cost and also on a free loan basis to educational institutions
3. Copies of their most recent product information.

A "selected sample" was chosen from the total machinery industry respondents. This group included those industries with equipment types paralleling those taught in the agricultural machinery course. Over a short period of time, several industry representatives stopped by and offered their support. Presently industry representatives are utilized in several of the laboratory sessions of the machinery course. Representatives from Massey Ferguson, Gleaner-Allis Chalmers, John Deere, International Harvester, Hiniker, Owatonna Manufacturing Company, Gandy,

Fox Brady, Gehl, Lindsay Brothers, and Vermeer have brought in their respective equipment for presentations. These representatives discuss equipment, economic trends in the farm machinery industry, and career opportunities, and provide excellent answers to students' questions. Further, the industry representatives present up-to-date audio-visual material and distribute product literature. Education, and not sales, is the primary goal of this strategy. By noting this concern with all representatives, industry educates students as well as staff on up-to-date technology and recent design changes. Further, staff are informed and encouraged to attend service schools. Similarly, certain representatives are serving as advisory committee members.

The Challenge Ahead

By no means has the complexity of the problem been explained or solved, but a great stride has been made to overcome part of the dilemma. Still other strategies must be sought to provide the optimum educational offering in farm machinery and equipment classes. The challenge to revise courses to keep them technically current must be continued. Undoubtedly, minicourses must be considered to meet the needs of faculty and practicing farmers, among others. Further, library resources must be closely evaluated and updated. Finally, faculty must be allowed to have release time to keep current with the ever-changing technology. The machinery industry has and is providing the necessary educational support needed for a quality program at the University of Minnesota Technical College at Waseca.

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The Effect of Teaching Method or Student Characteristics On Achievement or Attitudes in an Ag Computer Course

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Abstract

A pretest-postest experimental/control group design was used to test for significant differences in student achievement or attitude in a microcomputer programning course in agricultural engineering at Iowa State University. During two successive semesters, 103 students were enrolled in classes that were randomly assigned to either an experimental or control group. The analysis of covariance revealed significant differences in student achievement when students were grouped by subject in which the students made their highest and lowest grade in high school, average secondary and postsecondary mathematics grade, student classification, student major, video game experience, occupational plans, pretest attitude score, and the person most influencing them to take the course. There was also a significant difference in attitude scores when the students were grouped by typing ability or computer experience.

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Introduction

The computer is a relative newcomer as an educational aid in the agricultural classroom. Until recently, it has been used in classrooms and laboratories, to process large quantities of data. Now many agricultural disciplines are using the microcomputer for other instructional purposes. At the same time, there is a need to train students, educators, and adults already involved in agriculture and agribusiness on microcomputer usage.

> "Just as the producer who knows the principles of tractor operations is in a better position to make tractor-related decisions, so is the computer-literate agriculturalist better able to use the microcomputer. The implication is that as the use of computers on farms and ranches increases, students in Colleges of Agriculture will need to understand how computers can be used in Agriculture." (Legacy et al., 1984, p. 254).

Current research concerning the computer as an agricultural education tool is very limited. If educators are to use the computer effectively and efficiently, this body of knowledge must expand and grow. As noted by Borg and Gall (1983), "The major reason for educational research is to develop new knowledge