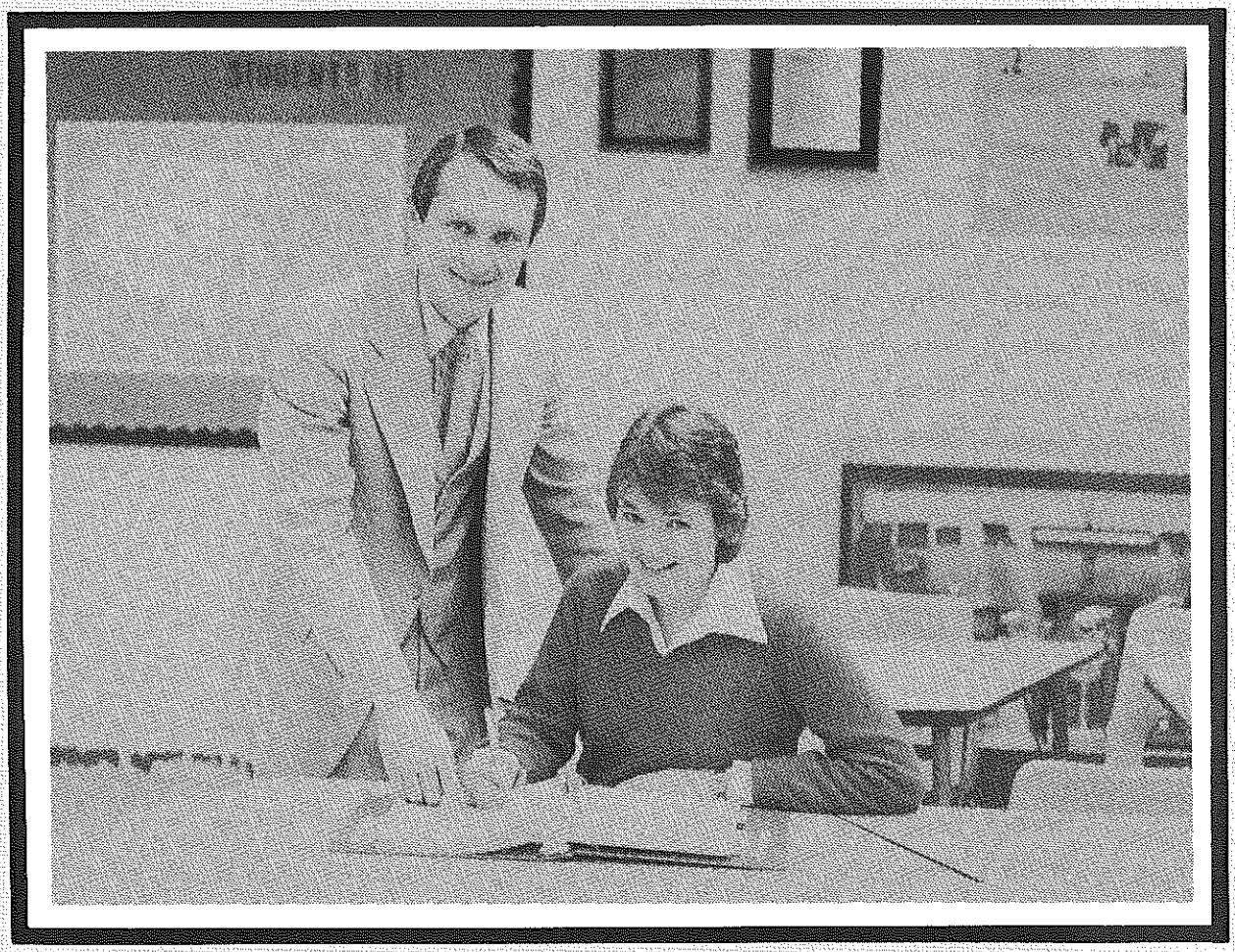
The
Agricultural Education
Magazine

March, 1989
Volume 61
Number 9



THEME: Coping with Competencies

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PUBLICATION INFORMATION

THE AGRICULTURAL EDUCATION MAGAZINE (ISSM 7324677) is the monthly professional journal of agricultural education. The journal is published by THE AGRICULTURAL EDUCATION MAGAZINE, INC., and is printed at M & D Printing Co., 616 Second Street, Henry, IL 61537.

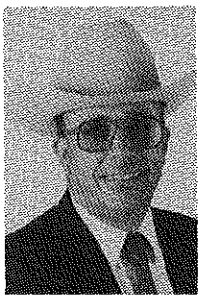
Second-class postage paid at Mechanicsville, VA 23111; additional entry at Henry, IL 61537.

POSTMASTERS: Send Form 3579 to Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, Virginia 23111.

SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are $7 per year. Foreign subscriptions are $20 (U.S. Currency) per year for surface mail, and $40 (U.S. Currency) foreign airmail (except Canada). Student subscriptions in groups (one address) are $4 for eight issues. Single copies and back issues less than ten years old are available at $1 each ($2.00 for foreign mail). All back issues are available on microfilm from Xerox University Microfilms, 300 North Zeeb Road, Ann Arbor, MI 48106. In submitting subscriptions, designate new or renewal and address including ZIP code. Send all subscriptions and requests for hardcopy back issues to the Business Manager: Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, VA 23111. Publication No. 73246

Perceptions Are Reality!



By Phillip R. Zurbrick, Editor

(Dr. Zurbrick is Professor in the Department of Agricultural Education at The University of Arizona.)

The AVA, Agricultural Education Division keynote address presented by Bernard Staller at St. Louis in December was a real "barn burner!" That is to say, he really covered "fertile ground" and "hit the nail on the head." Yes, it was good!

I wish every agricultural educator in the entire country could have heard Bernie's address. His themes included: leadership, change and need for both in agricultural education. He did not pull any punches and I believe you would have had to be out of touch with reality if his comments did not stir you and put the mind in gear.

I don't intend to repeat Mr. Staller's address in total, but would like to share with you some of my thoughts as he delivered it and those that occurred to me after reading the manuscript.

Perceptions

The statement that perceptions are reality seems to be a truism. It does not matter what the truth is, only how it is perceived. We in agricultural education have a lot of perceptions to deal with, many that are at best half truths and many others that are the product or our long history and no longer even half truths.

Perhaps one of our biggest perception problems in agricultural education is the word "agriculture." Try as we have for the past thirty plus years, the term "agriculture" is still perceived by most people outside of the industry as production — cows and plows. Why does this narrow perception of agriculture continue? Perhaps the answer is associated with our history and traditions. Colleges of agriculture were established more than 100 years ago when the vast majority of people working in agriculture were, in fact, working on farms and ranches. We still have governmental agencies that annually publish employment projections who out of tradition use the term "agriculture" synonymously with "agricultural production." The nightly television news for the past several years has been showing and telling us about the serious economic plight of "agriculture" in the midwest.

The public relation experts would suggest that we have an image problem. The quick fix is to change the name from agriculture to a new term that does not have such a narrow image. I would like to point out that over the years terms like agribusiness, urban agriculture, agriscience, and off-farm agriculture are among many terms that have been used in largely an unsuccessful effort to expand the image.

Mr. Staller pointed out in his address that people tend to hold the following perceptions:

perception — agriculture is farming
perception — farming is a dying industry
perception — agricultural education is teaching about farming
perception — agricultural education does not teach the basics

The truth of these perceptions is unimportant because **perceptions are reality.** Furthermore, it is almost impossible to change people's perceptions.

Leadership

Another truism gleaned from the keynote address was the statement, "Leadership is critical to the survival of agricultural education." Similar statements are forever being verbalized by someone who is unhappy with the present situation. But, the impact of the presentation hinges on the appropriateness and perceived accuracy of the address; in this case, the evidence seems overwhelming on both counts. Agricultural education like any institution must assure its future by periodically renewing itself. Such a renewal is difficult and often calls for sacrifices. Changes must be made. The challenge is to make the appropriate changes. The resulting educational programs in agriculture must be perceived as appropriate and desirable by those who are our customers — students, parents, and educational decision makers.

The kind of leaders needed in this situation are those with vision. People who not only have vision, but who are not afraid to share that vision with others. Bernie points out that **leaders do the right thing** and **managers do things right.** I fear we have a lot of managers in the agricultural education profession, some of whom perceive themselves as leaders. Changing names for the sake of change is doing things right, not doing the right thing!

Agricultural Education — A Vision

The agricultural education profession is in a critical period of revolutionary change; change that will occur either because of us or in spite of us. Far better that the profession has some say in the nature of the change than to sit on our "collective hands" and let others dictate the nature of our program. We must not let the managers do things right by making superficial, inconsequential changes that are perceived as nothing more than the "same old thing in a new package." We risk becoming a "laughing stock" as was done with the headline, "F.F.A. Changes Name to FFA." Fortunately, the FFA has a positive image as reported by Miller (1988) and is held in high regard among the groups it serves.

(Continued on page 19)

THEME

Coping With Competencies

By Daniel W. Brown, Theme Editor
(Mr. Brown is a Professor and Coordinator, Farm Management, Ellsworth Community College.)

Being competent in life not only makes you employable but also keeps you employed. More importantly, you will find satisfaction in your work and live a more enjoyable life. The focus of educational programs in agriculture is for that goal. Competency based is part of our very foundation. It has an effect upon every part of the curriculum. Professor Clarence E. Bundy once stated that, "The result of Supervised Occupational Experience Programs was that students in the first place developed a lot of competencies. Some of the skills they learned were managerial and some were manipulative" (Rheault & Miller, 1983, p. 8).

In early 1980 the theme of this publication was "Basic Competency Programs." Today, we address "Coping with Competencies." Those of us in the profession have been addressing this topic throughout this decade and well before. Our commitment to deliver quality educational programs to able students providing technical knowledge and practical, workable experiences and job saleable skills is competency-based instruction at its finest. However, that does not address the issue of coping with competencies.

In the lead article written by Dr. Floyd G. McCormick, the stage is established for the remaining theme articles. Dr. McCormick was an author in the 1980 magazine. His conclusions demonstrate the positive results of being able to successfully cope with competencies. Mr. Duane Wahlstrom discusses the practical aspects of coping with competencies in using the computer as a teaching tool in this article entitled, "Record Keeping Competencies."

Coping with the changes in agriculture with technological advancement and developing fields which broaden our program offerings is also a challenge for the present day agricultural instructor. "Hydroponics - Spaceage Technology," written by Drs. Handwerker and Neufville, demonstrates how this may be accomplished in one area. Their article shows that we can learn a great deal from others in related areas of agriculture outside the vocational agricultural education profession.

In addition to utilizing outside resources from our advisory councils and committees, we can gain expertise in coping with competencies. Mr. Dennis Lettow, former vocational agriculture teacher and director of sales training for Ralston Purina, and current sales training manager for Pioneer Hi-Bred International Incorporated, explains how industry works to cope with competencies developed by the products or our educational programs and institutions. His contribution gives another perspective on competency development in agribusiness.

For those who were not in vocational education in agriculture in 1980, and as a review for those of us who were, it would be worth our time to read the theme articles from the April 1980 issue of *The Agricultural Education Magazine.* They provide a foundation for this series of theme articles.

The importance of competencies in education and of how to cope with competencies is a challenging and rewarding one for those who manage to successfully accomplish it. The National Council for Vocational and Technical Education in Agriculture (The Council), which serves a proactive role for the entire profession, formed a competency committee as one of its first working committees to critically examine competencies and how those in the profession were coping with them. Their work is ongoing as a national priority. The committee is addressing which competencies should be national in scope and which should pertain specifically to state or local educational agencies. They have the additional challenge of developing a template of procedure for updating competencies needed for all. With their leadership, we will all benefit in the future. Agricultural education will provide quality educational programs for agriculture in the public sector.

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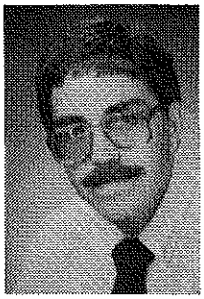
About The Cover

Students must develop ways to individually cope with competencies. Cindy Johnson (R) and her instructor, Dan Brown (L) review the market plan for her farming operation. (Photo courtesy of Ellsworth Community College.)

FEATURE COLUMN

Computer Technology Resources

Are There Bugs In Your Apple?



By Nat Jaeggli, Special Editor

(Mr. Jaeggli is Coordinator, California Ag. Ed. Computer Network, University of California-Davis.)

An evolution of computer equipment continues to take place. Often the changes are subtle and allow computer owners to follow an upgrade path that maintains the compatability with current standards. Apple IIe computers have had a number of changes over the past few years that if not upgraded, are now beginning to cause problems with advanced peripherals (1200 and 2400 baud modems for example) and newly released programs.

Versions of Apple IIe's built prior to March, 1985 contain an older chip set, which cause some of the characters in the left hand column of the display and printouts to be missing when used with a modem at greater than 300 baud. These chips can be replaced with an enhancement kit A2M2052 for about $70. The kit is available from local Apple dealers or Silicon Express (800) 999-6868. The enhancement kit will bring older Apple IIe computers up to current operating standards.

How can you tell if you have an older Apple IIe or whether the Apple you have has been enhanced or not? There are two ways; either by checking the opening display or by lifting the lid and looking inside.

Look At The Opening Display

Start up your computer and look at the top of the first display. If it looks like this, you have an enhanced IIe.

Apple //e

If it looks like this, your IIe has not been enhanced.

Apple] [

Lift The Lid

Pull on the back edge of the IIe's cover and lift it off. If the part numbers associated with the microprocessor (a large chip just south of slot #3) are 6502 370-6502, then your computer has not been enhanced. If the part number associated with the microprocessor are 65C02 338-6503 then you either have an enhanced IIe or a newer model.

The loss of characters in the left hand column is caused by the way the interrupts are handled. By installing the enhancement kit (the new microprocessor and three other ROM chips), this problem should be corrected. Once installed, reconfigure the communication software so that it is able to run at 1200 or 2400 baud depending on the available modem. Also corrected with this enhancement is the way older IIe's handle "Mouse Text" characters that are incorporated into many of the newer software programs written for the Apple II family.

You may also wish to upgrade the memory capabilities with one of the many RAM cards that are available on the market today. Although this upgrade is not associated with the interrupts problem, it will improve performance of most of your software programs. Applied Engineering has a number of cards, like an extended 80 column card which will expand your RAM to 128K, or a RAM works card which can be expanded to 3 meg. Contact them for their latest catalog (214) 241-6060.

As the evolution of personal computer technology continues, and our current computer begins to reach retirement age (5 years or 10,000 hours) the struggle between purchasing "the new" or maintaining "the old" becomes more of an issue for each of us.

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AppleLink Service Bulletin "Apple IIe Enhancement Kit: Technical Benefits" October 1987.

NOTICE

If you have a question on Computer Technology that you would like discussed in the Feature Column on Computer Technology Resources, send them to:

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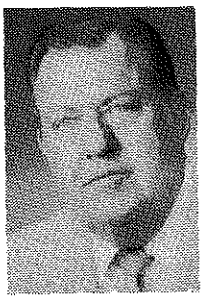
Whether Competency-Based Instruction



By Floyd G. McCormick

(Dr. McCormick is Professor and Head, Department of Agricultural Education, The University of Arizona.)

Competency-based instruction (CBI) has been with the agricultural education profession for several years. As a result, "CBI" has been and is stressed by agricultural educators in various degrees and in various locations. But what has really been done to make "CBI" a functional component of the instructional delivery system in vocational and technical education in agriculture? Is "CBI" like so many other educational concepts — professed to be useful and valuable to help fulfill the mission of the profession, but in reality, only talked about with little or no effort to actually use competency-based instruction at the grassroots level?

Why Competency-Based Instruction?

It has been said, "Good education teaches for the future;" thus good vocational education should also teach for the students' occupational future. Vocational education should prepare people (youth and adults) to be able to function in the future with competencies required for future occupational endeavors. Competency-based instruction, I believe, should promote the development of knowledges, skills and attitudes (competencies) associated with occupations. In the case of vocational education in agriculture, these competencies should be associated with agricultural occupations. Furthermore, the competencies need to be carried to the application level so students "can do" following instruction and supervised occupational experience. If properly perceived and designed, "CBI" can be futuristic in both content and delivery.

From an educational point of view, competency-based instruction offers several values to the agricultural education profession assuming that the competencies taught are those required in the occupation(s) for which students are being prepared. "CBI" can become a vehicle:

- to determine the "must know" content to be taught and learned.
- to minimize the teaching of "nice to know" content.
- to make SOE program activities relevant and germane to the occupational area(s) for which students are being prepared.
- to provide an accountability system whereby what is professed to be delivered is actually delivered.
- to provide individual instruction to meet students' occupational needs.
- to help plan relevant FFA activities germane to the preparation program.
- to contribute to the three domains of learning — cognitive psychomotor, affective (Bloom, 1956).

In essence, an effective, balanced educational program should provide for the satisfaction of the students' developmental, occupational and social needs. To this end, students must master the basic competencies in both written and oral communications and computation, along with those competencies which will help them to secure, hold, be productive and advance in a career. This instruction must also embrace the cognitive (knowledge), psychomotor (skill) and affective (attitude) domains of learning if students are to be able to think, to reason and to make decisions.

Content and Delivery

It should be obvious CBI is valuable in determining content for a vocational education program. But is it effective as a delivery system? Recently, in rebuttal to statements I had written relative to competency-based instruction in vocational agriculture, a colleague wrote, "I reject the competency-based model as too narrow. The competency model has utility in determining content, but very limited ability in delivery . . . By itself, competency-based education is insufficient, and in reality is seldom practiced." Are these opinions correct?

We can basically agree that "CBI" is valuable in determining content assuming the competencies identified are valid for the occupations for which students are being prepared. But what about delivery? How is and can "CBI" be used to affect desired behavioral modification? It is my opinion that "CBI" does not affect delivery! Delivery is not stifled by competency-based instruction. In actuality, "CBI" has no influence upon the delivery system. Delivery is determined by the innovativeness and competence of the teacher.

What "CBI" Is Not?

When speaking of "CBI," it should be pointed out that reference is **not** being made to **Minimum Competency Testing** (Perkins, 1984). However, as a profession, vocational education should work toward the goal that any student who completes a vocational education program should be able to demonstrate or show evidence of minimum competence in some occupational area.

Likewise, "CBI" is **not** to be confused with performance-based instruction designed as "learning activity packages" (LAPS). Probably the best known materials of this nature have been developed by the National Center for Vocational Education (1975). These performance-based teacher education (PBTE) materials are designed for individualized learning and concentrate upon **one** specific competency. It should be noted that if an individual perceives "CBI" to be

synonymous with performance-based instruction, it is quite possible to view "CBI" as too narrow. Individualized learning materials which place major emphasis upon "skill development" with minimum emphasis placed upon the other domains of learning provide an ineffective delivery system. If an individual perceives "CBI" as the process of merely checking off skills as they are mastered with little or no attention paid to other competencies essential to perform a total operation, then the statement that "CBI" is too narrow is correct.

Does CBI Work?

I am employed in a state in which state legislators, key educational policymakers and state leadership in vocational and technical education believe vocational education at the secondary school level and technical education at the postsecondary (community college) level should be designed and delivered to prepare people for the world of work, including entrepreneurship and/or further education, and they believe that this education should be competency-based!

To this end, through a series of state legislative statutes, state policymakers have created an environment whereby "preparation-type" vocational education can be delivered and funded at the local level. In my state, it is a state law that "instruction in **all** vocational education programs offered by local public schools, including community colleges, must be **"competency-based"** if the local educational agency (LEA) desires to receive state and federal vocational educational funds to help pay for the "added costs" of offering vocational and technical programs. Of more consequence, the instructional program delivered must address those competencies listed on the "State Validated Competency Lists" for each specialized curriculum in each vocational education program area.

State Validated Competencies

Once state legislation was passed to make all vocational education competency-based, the State Superintendent of Public Instruction assembled "actual workers" who were employed in the occupational area for which competencies were being identified to verify whether or not the competencies listed for the occupation(s) were actually used by the workers. Those competencies which received a "pre-set" value relative to use on the job were identified as "State Validated Competencies for the Occupational Area."

These state validated competencies are then used by the local teacher to identify those competencies which should be included and then design the curriculum and accompanying activities for the specialized vocational education program(s) to be offered. Once the curriculum has been legitimized with the local advisory committee consisting of individuals associated with the actual occupation(s) the curriculum is designed to address, the teacher develops Occupational Readiness Records (ORR). These are a list of those competencies identified/included on the program curriculum which are to be taught students enrolled. The Occupational Readiness Record contains a rating scale for each competency for the teacher to indicate his/her assessment of the student's ability to perform the competency. The rating scale is designed as follows:

4 — Competent, needs no supervision.
3 — Moderate competence, needs minimal supervision.
2 — Limited competence, regular supervision.
1 — Not competent, needs constant supervision.

It is critical that proper procedures be utilized to record and verify those competencies attained by the individual student. The following minimal procedure is used by vocational agriculture teachers to verify the level of competence for each competency:

1. Using the "Occupational Readiness Record", students rate themselves as to their level of competence at least twice per semester and preferably after each unit of instruction.

2. When students have mastered the competency, they must justify (verify) their level of competence by citing specific activities in which they participated to verify competence, such as FFA contests, units of instruction from class work, laboratory activities, improvement projects completed, supplementary agricultural practices completed, records kept, etc.

3. Following student's self evaluation, the student develops a list of competencies which "need improvement." From this list, the student uses this information to plan additional meaningful occupational experiences designed to strengthen the student's level of competence.

4. Upon completion of the program, the teacher conducts an interview with each program completer. At this time, the teacher makes a final assessment of the student's level of competence for each competency and records same on the back of the "Certificate of Competency." It should be noted that vocational agriculture teachers have adopted computer software programs to provide for the use of their computers to record (and update) those competencies mastered by each students in each class. In some instances, students are responsible, under the supervision of the teacher, for recording competencies attained.

At the completion of the vocational education program, a "Certificate of Competency" is awarded each program completer. The student's level of competence for each competency is noted on the back of this certificate. This is a valuable document for students seeking employment since their competency level is recorded along with an "Appraisal of Overall Attitude and Ability of Prospective Employee" by the teacher.

State Approved Staff and Program Standards

In an attempt to create the type of educational environment essential to deliver "preparation-type" vocational education, there are other conditions (some would refer to them as constraints) which must be met by the local educational agency if they expect to be reimbursed for the "added costs" of vocational education. This amounts to 140 percent of the cost of general education in my state. Each vocational education program at the secondary school level must meet "State Approved Staff and Program Standards." These standards are nothing more than the ingredients necessary and essential to deliver a quality program of vocational education. Included are such items as program planning, advisory committees, curriculum, vocational student organization, equipment and facilities, certification, professional development, placement and follow-up, etc. Adherence to

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Whether Competency-Based Instruction

(Continued from page 7)

staff and program standards is verified every five years by actual evidence presented by the LEA to the State Department of Education.

High Demand Occupations

Another condition which must be met by the local school in order to receive vocational education funding pertains to preparation for "High Demand Occupations." In order to meet the economic development needs from an employment standpoint, the instructional program designed and delivered by the LEA must address those occupational areas which rank as "high demand" areas as verified by occupational data accumulated by the State Department of Economic Security. This priority list of "high demand" occupations is revised regularly to reflect employment trends existing and projected in the state.

There is a limited amount of state and federal fiscal resources available each year to support vocational education programs at the local level. These available monies are allocated to LEA's who offer instructional programs delivered to teach students those competencies associated with "high demand" occupations. For example, when all LEA programs designed to satisfy the first ranking "high demand" occupations are allocated vocational education funding (assuming the program is competency-based and program standards are being met); the second ranking occupational category is allocated funding, and so forth, until all vocational education funds are expended.

This system may appear harsh, but in reality it promotes the preparation of people for occupations which are in demand.

Summary

The title of this article should be "Whether Competency-Based Instruction, Staff and Program Standards and High Demand Occupations." Through state legislation for vocational education in my state, an ideal climate for developing and delivering quality vocational education has been created. Matching occupational opportunities (jobs) with actual employment opportunities, adhering to staff and program standards which specify the basic ingredients of quality vocational education and teaching students those competencies associated with existing and projected occupational opportunities provide an environment to deliver "occupationally-oriented" instruction designed to prepare people for the world of work.

Thus, I cannot only cope with competency-based instruction, staff and program standards, and preparation for "high demand" jobs; I can be an advocate of their use in vocational education. I know this approach works! Based upon published placement and follow-up data on vocational agriculture program completers in my state (Zurbrick, 1984), these graduates indicated that 98 percent had developed occupational competencies in vocational agriculture, 91 percent had used the developed competencies, and 96.1 percent would re-enroll in vocational agriculture if they were able to replan their high school course of study in the light of their post-high school experience. Whether competency-based instruction — most definitely!

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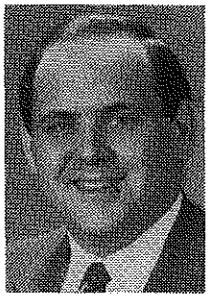
The Council
Current and Future Projects



By John Pope and Larry Case

(Mr. Pope is Executive Assistant to the Chairman, The Council; Dr. Case is Chairman, The Council.)

Since the inception of the National Council for Vocational and Technical Education in Agriculture (The Council), many questions have been raised concerning its purposes, activities and reasons for existence. This article is the second in a series of articles attempting to answer many common questions concerning the past, present and future of The Council.

1. What are some current projects of The Council and what difference will they make? Studies and programs being conducted by The Council address the importance of a strong agricultural education at the secondary, post secondary and adult levels. The following is a list of ongoing activities:

• National Study for Agricultural Education in Secondary School — A jointly commissioned study by the U.S. Department of Agriculture and U.S. Department of Education, conducted by the National Academy of Sciences to examine agricultural education at the secondary level. This reports gives recommendations for program improvement at the secondary level. The report also provides state leaders and policy makers with current national concerns to be addressed. It demonstrates the importance of the agricultural education program.

• National Task Force for Postsecondary and Adult Education in Agriculture — Appointed to evaluate the status of agricultural education at the postsecondary and adult levels. A national conference for leaders in postsecondary and adult education in agriculture was conducted by this task force in October 1986. A nationwide report on postsecondary and adult education in agriculture gives recommendations for program improvement in these areas. The report focuses attention on two levels of education that are becoming more important in today's society. The outcomes produced in the report are useful for local, state and national leaders. It will help establish a national agenda for postsecondary and adult education.

• Committee to Assess Legislative Needs — Appointed to survey grass roots likes, dislikes and areas for improvement for National legislation for vocational education in agriculture. Results of this study were forwarded to the AVA Ag Ed Division which incorporated input into the proposed vocational education reauthorization legislation. The study report provides a basis for the agricultural education community to suggest changes in national education legislation.

• National Task Force on Infusing International Agriculture into the Vocational Agriculture Curriculum — Appointed to develop and implement a program to increase the teaching in vocational agriculture at all levels about international relationships and their effect on American agriculture. Agriculture no longer is limited to the United States, rather we compete in an international market place. This program gives supervisors, teacher educators and teachers the opportunity to experience firsthand international agriculture, thus giving them the opportunity to infuse international components into the curriculum through inservice education, thus making American agriculture more competitive in a world economy.

• National Task Force on Agriscience and Emerging Occupations and Technologies — Appointed to seek new avenues of infusing high technology, science and business concepts into the vocational agriculture curriculum. A National conference was held in October 1988. The conference showcased new instructional units in vocational agriculture with emphasis on science and high technology. This activity provided a practical approach to addressing science and technology in the local and state agricultural education programs.

• Infusing Aquacultural Education into the Vocational Agriculture Curriculum — A program to increase the instruction of aquaculture into the curriculum. Thus far, no systematic curriculum and/or instructional materials are developed and coordinated for this important food source. Agriculture is always seeking alternative enterprises and education is vital to create understanding in the adoption of the latest technology in this growing industry.

National Summit on Agricultural Education — To be held on an annual basis beginning February 1988. The purpose of this event is to set forth a mission, goals, and a strategic plan for the total of agricultural education. In rapidly changing times, planning, effective execution and communications are essential elements of a viable program. This effort will help to assure agricultural education of cooperative successes in the future.

• National Task Force on Agrimarketing — Appointed to develop model curriculum and instructional materials in

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FEATURE COLUMN

Teaching Tips

The In's and Out's of Concept Building

By Rose Jones, Special Editor
(Dr. Jones is Special Editor for Teaching Tips.)

You've just completed your discussion of metamorphosis with your students. Now it's time to determine if they understand the concept. Is giving the students an examination the only way to determine if they've learned the concept? Try the "In-Out Box."

What you want to accomplish by using the "In-Out Box" is a way for students to transfer what they know about metamorphosis into a new meaning. Remember, if your students have a concept secured within their frame of reference, they must be able to create mental images of the key traits common to the elements within the group. Using "metamorphosis" as an example, we would expect these students to identify the traits common to those creatures that undergo metamorphosis. The "In-Out Box" helps students check their "mental images."

Step 1: Introduce the concept, which in our case, we have already completed. "Metamorphosis" is our concept.

Step 2: Provide unlabeled examples of the traits common to the group. (See diagram below.)

IN	OUT
Butterfly*	Mouse*

*Teacher generated examples

You might say something like this: "Butterfly is an example of the group; mouse is an example of something out of the group."

Step 3: Next, ask your students to inquire (hypothesize) about what the concept might be. "Can someone hypothesize about the category we're dealing with?" If no one can hypothesize about the category, ask your students to try providing an example for the "In" or the "Out" box. Confirm or reject their responses, putting correct attempts into the appropriate box.

IN	OUT
Butterfly	Mouse
Fly	Gazelle
Grasshopper	Human
Mosquito	Baboon
Clam	Shark

Step 4: Continue encouraging students to generate examples and have them frequently hypothesize about what the category might be.

Step 5: Once your students state the correct hypothesis, confirm it. Repeat the definition according to its essential attributes (in this case, the definition of "metamorphosis.")

The Council Current and Future Projects

(Continued from page 9)

the area of agricultural marketing. The task force will begin work on their agenda in the Spring of 1989.

• National Task Force on Supervised Occupational Experience — Appointed for the purpose of studying, recommending and developing activities which will result in desirable changes in SOE programs. This study comes in the light of new competencies involved in agriscience, agrimarketing, enterprise/entrepreneurship development and the globalization of the agriculture industry. This task force will begin work on their agenda in the Spring of 1989.

2. After 1988-89, has The Council proposed issues for future consideration? Yes. Through a process conducted with the entire agricultural education profession, a list of eight priority concern areas have been identified for future consideration by The Council. The priority concerns identified are: *Role and Mission of Agricultural Education, *Curriculum, *Marketing Agricultural Education Programs, *Governmental Relations, *Professional Development, *Evidence of Impact of Vocational Agriculture, *Agricultural Employment Information, *Regional Organization. The concerns will be returned to each entity of the profession to generate specific issues in each area. These issues will in turn go back to The Council Board of Directors who will set the program of activities for The Council in 1989-90 and beyond. This process will be continued in the future to assure program renewal.

The Council is constantly seeking input from the agricultural education profession. If you have comments or desire further information concerning specifics about current or future Council programs contact The Council at P.O. Box 15035, Alexandria, VA 22309.

Recordkeeping Competencies

By Duane Wahlstrom

(Mr. Wahlstrom is Head Agricultural Department, Northwest Iowa Technical College.)

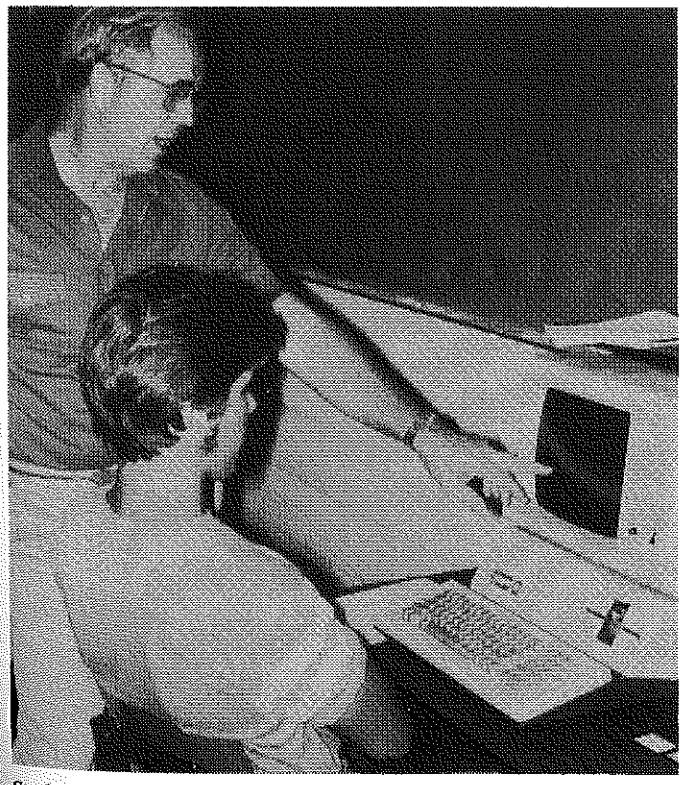
As vocational educators, it is our obligation to apply new technologies to some basic principles of education when teaching post-secondary students and adults. We need to recognize, acknowledge, and make the most of differences in experiences and maturity of our students. In our efforts to improve the ability of vocational education to reinforce academic and competency skills, we must be careful not to take the heart out of our vocational programs.

In some educational systems, the trend is towards competency-based education where a student is expected to perform certain skills before graduation. Competency and accountability are talked about at the same time. Let's look at two definitions:

1. Competence meaning a sufficiency of means for the necessities and conveniences of life.

2. To be competent is having requisite or adequate ability or qualities and having the capacity to function or develop in a particular way.

In Northeast Iowa Technical College, the crops and livestock laboratories have been an integral part of our educational program. The data generated from these laboratories have been used extensively in crop and livestock production courses, finances, and farm records. Many of the records were kept in the traditional, time-consuming way. As computers became more popular and lenders required more information from their farmer clients, recordkeeping changed significantly. The type of data required for financial management is perhaps the same, but the way these data are processed and used in making decisions is considerably enhanced. We are using this technology as a means rather than an end.



Students need assistance in developing computer competencies in the area of recordkeeping. (Photo courtesy of Duane Wahlstrom.)

In 1981, we purchased our first computer-based farm accounting package. It was a single entry system which generated an income statement, cash or accrual, Schedule F (income items and expense items), and a balance sheet. Presently, we are using "The Agricultural Executive Computerized Farm Accounting and Management System." It is a menu driven program on a 10 megabyte hard disk drive IBM or IBM compatible computer. The chief executive officer of today's farm needs to be competent in making important management decisions. A special feature of the software program is that it performs both cash and accrual accounting simultaneously, with only a single entry. While it is capable of many complex tasks, we appreciate it most for these reasons:

1. It will keep accurate and reliable financial records required by successful executives.

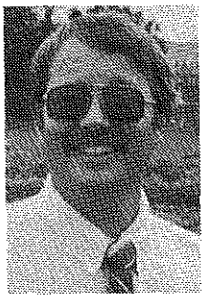
2. It will prepare specific financial reports that lenders typically require of executives to whom they are loaning money.

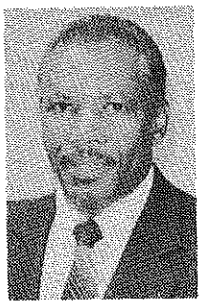
3. It will assist in making more effective and profitable farm management decisions.

The general ledger program is divided into five main areas. These areas include: income, expenses, assets, liabilities, and equity. Students set up their own general ledger accounts and subaccounts, beginning inventories, list of assets and liabilities, and do transactions of income and expenses using input data from the college farm. Enterprises are identified and maintained for the purpose of analysis at the end of the year. Purchases of assets made during the year are entered in the asset account section. A current list of inventories is maintained with allocation of inventories to enterprises done on a monthly basis. At the end of each month, the books are posted and period-to-date data are compiled to year-to-date data.

(Continued on page 15)

Hydroponics - SpaceAge Agriculture





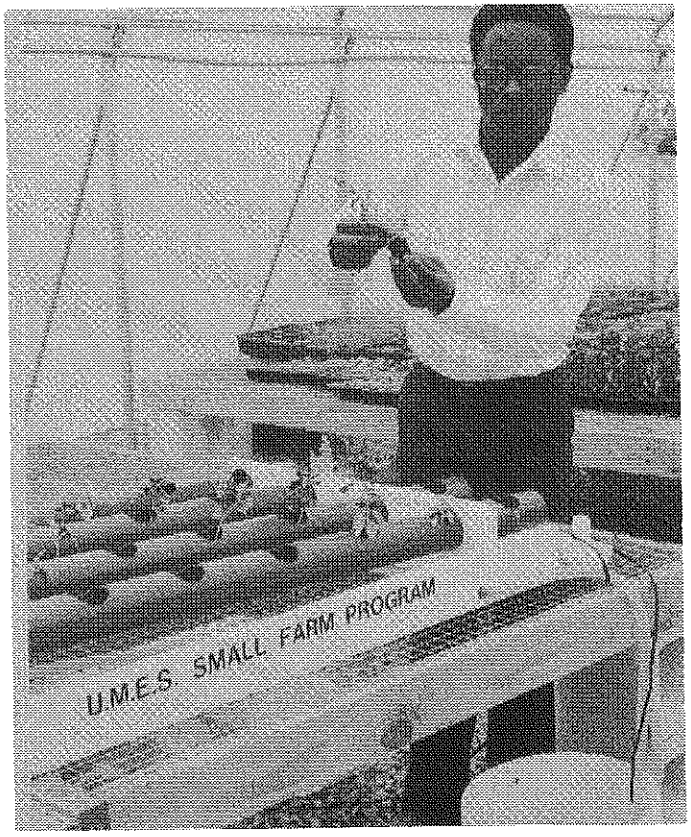
By Thomas S. Handwerker and Mortimer Neufville

(Dr. Handwerker is an Assistant Professor and Coordinator, Small-Scale Agricultural Research, University of Maryland Eastern Shore; Dr. Neufville is Dean, School of Agricultural Sciences, University of Maryland Eastern Shore.)

Are you teaching spaceage technology in your agricultural program? Are your students prepared to discuss the environmental parameters that affect production on the new space station? Or about how crops are going to be grown to support a long-term lunar colony? Do your students recognize that this technology is applicable anywhere on earth where resources such as land, water, and soil is a limiting factor restricting traditional practices of agriculture.

Hydroponic production touches on the most basic and advanced aspects of plant/crop production. It requires information and understanding of essential plant elements, plant nutrient uptake, effects of pH, temperature, light and other environmental factors on crop production, greenhouse management, and scheduling.

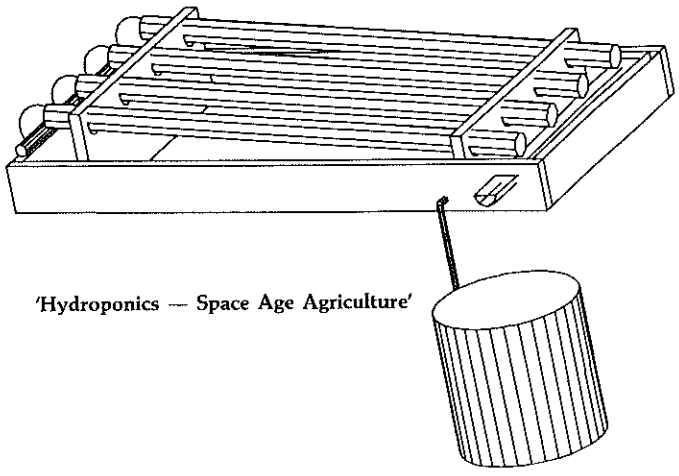
The University of Maryland Eastern Shore (UMES) research group has observed that most growers interested in this new technology had no previous agricultural experience. These growers lacked the experience to make decisions on the appropriate technology that minimized economic risk. To package this technology into a learning tool, members of the Small-Scale Agriculture Research Program at UMES developed a portable hydroponic demonstration model for on-farm practice and experimentation.



Hydroponic garden developed by University of Maryland, Eastern Shore (U.M.E.S.) Small Farm Program Research Program (Photo courtesy of T. Handwerker).

The Hydroponic Garden has become an excellent teaching module for commercial growers and has been incorporated into the teaching curriculum of several Maryland Vocational Agriculture programs. The model helps develop both experience and recognition of assembly-line technology using familiar agricultural practices. The selection of quick-maturing crops provides the growers the ability to investigate the entire growing sequence within a short period.

In the design of the class model, an effort was made to keep the garden small, easily portable, and constructed of inexpensive and available materials. Students with little mechanical experience are able to construct the basic model. Some Maryland teachers have used it as a shop project utilizing skills requiring several different tools. The UMES research group suggests the model design should remain simple and allow modifications only after students have gained experience growing crops in the system.



'Hydroponics — Space Age Agriculture'

The science of hydroponic production can be easily incorporated into a general horticultural program by introducing the management program that follows normal hor-

ticultural techniques. Common techniques such as media preparation for seedlings, seeding, seedling production are discussed and started as part of the 'production sequence.' Any management program using soluble fertilizer touches on aspects of hydroponics.

By the time the fifth true leaf is expanding on lettuce (usually 4 weeks), most students have completed the construction of the hydroponic model and are ready to begin the production sequence. The weekly production of seedlings, transplanting, maintenance and harvest reinforces production techniques and provides the necessary experience for true learning.

Laboratories can be expanded to include observations on plant growth, root development, nutrient management, effects of pH, light, temperature, etc. on production, and marketing.

During a recent workshop at UMES, each teacher built his or her model and suggested the following class routine:

1) The production sequence begins with the establishment of a weekly supply of healthy transplants. Seedlings are produced in any traditional manner that generates a rootball no larger than 1 cubic inch (96 hole plug tray). Seedlings can be established in artificial soil media, felt, cotton or rockwool.

2) Each week seedlings exhibiting at least five true leaves are transplanted into the garden to replace harvested plants. Calculate the number of plants needed by counting the total holes available in the model and divide by the weeks necessary to grow a mature plant after transplanting (i.e. lettuce - 7 week, spinach - 8 weeks).

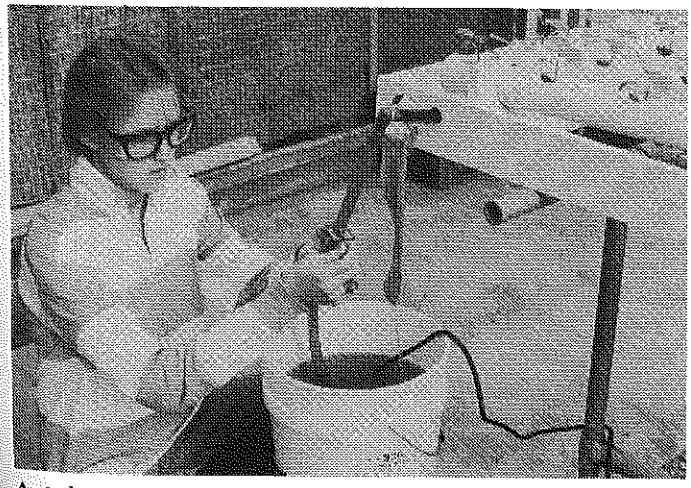
3) A simple filter for catching small particles of media or other matter can be made by enclosing the drain end of the gutter with a knee-high panty hose.

4) The solution is pumped from the 5 gallon bucket by a small aquariam pump (1 pint/tube/min) that recirculates the solution 24 hours per day. The model makes an excellent display for school events but make sure that potential leaks are controlled.

5) The solution in the system is completely replaced every 7 days. The used solution can be use to fertilize the seedlings.

6) Holes are spaced about 6" apart by drilling 2" holes along the top of the 2" PVC tubes. The outside of these tubes should be spray-painted opaque to prevent algae growth inside the tubes.

7) Mature plants are removed on a weekly basis and replaced with the large seedlings. Harvested crops store well if wrapped in a plastic bag with roots still attached.



A student adjusts flow of hydroponic solution with an adjustable hose clamp. (Photo courtesy of T. Handwerker.)

The introduction of the science of hydroponic production into the agricultural curriculum involves steps recognized as 'assumable technology.' Daily monitoring of the model, taking the necessary growth measurements, and maintenance of the system provides and strengthens the class discussions and involvement. Principles discussed in class can be demonstrated with the production model as each plant changes and develops.

With the harvest of the first crop, management techniques can be incorporated involving entrepreneurial skills of business and management.

Multiple models, testing laboratory hypothesis can be incorporated in science laboratory experiments being taught in other areas of the school and can expose your curriculum to a broad scope of potential students.

Hydroponic Growing Solution

The following hydroponic solution has been evaluated at the University of Maryland Experiment Station at Princess Anne, MD and has been demonstrated to be a general growing formula for specialty lettuce and herbs. The research group suggests that any grower should formulate the solution in reference to the stock water analysis and adjust to about 6.5 pH.

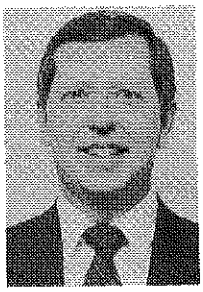
FINAL PPM	NUTRIENT
210 ppm	Nitrogen (N)
57 ppm	Phosphorus (P)
252 ppm	Potassium (K)
201 ppm	Calcium (Ca)
50 ppm	Magnesium (Mg)
5 ppm	Iron (Fe)
0.12 ppm	Molybdenum (Mo)
0.6 ppm	Manganese (Mn)
0.5 ppm	Zinc (Zn)
0.18 ppm	Coper (Cu)
0.6 ppm	Boron (B)

Summary

The true benefit of the hydroponic module lies in the recognition by both administrators and school faculty that this technology involves some of the most basic of scientific and agricultural concepts in a spaceage application. The operation and management of a hydroponic model provides the Vocational Agriculture program an opportunity to expose other classes to many aspects of agricultural science. Science teachers, teaching basic science, are using demonstrations presented by vocational agriculture students, using the Hydroponic Garden, to introduce the concepts of plant growth and development.

Hydroponics provides excitement in a learning experience for both the novice and experienced agricultural student. This Hydroponic Garden can develop a stronger understanding of the soil/water chemistry, nutrient uptake, and environment factors affecting plant growth. Maybe you can use it to strenghten your agricultural program here on Earth as well as on the Moon!

Competency Identification In Agribusiness



By Dennis J. Lettow

(Mr. Lettow is Sales Training Manager, Pioneer Hybrid International.)

Ask for advice and you are likely to get it, but it may not be what you want. Part of my job has been to conduct training schools for new agribusiness sales representatives. I have asked sales managers what they thought should be included in the sales school. Some of the answers were:

"You know what you oughta teach — product knowledge; they have got to know their products."

"You know what you oughta teach — how to sell."

"You know what you oughta teach — how to read the annual report; that will give them company conviction."

"You know what you oughta teach — photography! They do such a poor job of taking pictures of customers for testimonials."

The lack of consistent and/or insightful responses was somewhat disconcerting for a person attempting to determine what should be taught in an agribusiness sales training school. The prevailing attitude seemed to be, "You were a salesman, you oughta know." Yet, when I announced to the regional sales managers that I was going to teach the new sales personnel to sell just like we did in my district, you should have heard the complaints. One manager complained that they did it differently down south.

Such is the dilemma of a sales trainer. Management is concerned because it takes too long before newly hired sales personnel are ready to be placed in the job for which they were hired. The new employees sometimes feel they are "spinning their wheels" doing routine tasks. Another undesirable situation occurs when newly hired people are placed in a job when they are not ready.

With these concerns in mind, one company came up with a solution to both situations. The solution involved conducting a job competency study on which the training program was based. Further, the identified competencies were used in a variety of other ways. While this solution is not a new idea, it seemed like a logical solution to a baffling problem.

The philosophy of some sales executives has been that selling is more an "art" than a "science." As such, it is not possible to list all the things a salesperson needs to be able to do. This philosophy would suggest that the only way to train a new sales representative would be to spend enough time riding with a good salesperson and observing this individual's actions. Such a program would be very expensive and may not be effective in all cases.

Job Competency Study

The idea of a job competency study was met with some skepticism by the vice president of sales, but after some consideration was given the "green light." Our next step was to present the idea to the regional sales managers. They all wanted a part of it. "After all, we do things a little different in the south," said the southern region sales manager.

Four regional focus groups consisting of successful sales representatives were formed. Each group dealt with the question of competence by answering the question, "What do you need to know and be able to do to be effective in your job?" The results from all four regions constituted a list of 535 competencies complete with similar wording and duplications. The 535 competencies were then narrowed down to a workable list of 114.

The next step in the study was to use a large sample of sales personnel in assessing each competency. Each person was asked to score each competency on a five-point scale indicating importance of the competency and frequency of use. Thus, the importance of each competency was established.

Moving from the basic research to a useable training program was the next step. An advisory council of sales managers and sales personnel helped the training department identify the desired training content and sequence. Consideration was given to what training the sales manager should provide and what skills could be developed through on-the-job experience. Also, consideration was given to training schools, self-development materials and other sources of training for developing competencies. Not all competencies are developed in the same manner.

Using Competencies

The word "competency" is not readily understood by all persons. Upon mentioning "competency" to one field manager, he very sharply replied, "No one is going to do competency testing of my people — that's my job." Top management often feels that hiring, developing and motivating people is the job of management. The use of competencies in the education of new employees can assist significantly in this development and add some commonality to the process.

The competencies are now used in a variety of ways beyond identification of subject matter content for the training school. One field manager has taken a list of competencies and put them in the form of a questionnaire. This questionnaire provides the employee a chance to "score" themselves on how comfortable they feel about their ability to perform each competency. The sales manager uses this same questionnaire to evaluate his personnel based upon his

personal observations. Others who work with his salespeople are asked to score them and give feedback. So that each person gets feedback from three directions — their boss, themselves and their peers/customers.

The real value of what this sale manager does is to help his people develop a very personalized improvement plan for those "competencies" needing the most improvement. How do his people feel about it? They say, "Great! He really cares about making sure we know how to do things right."

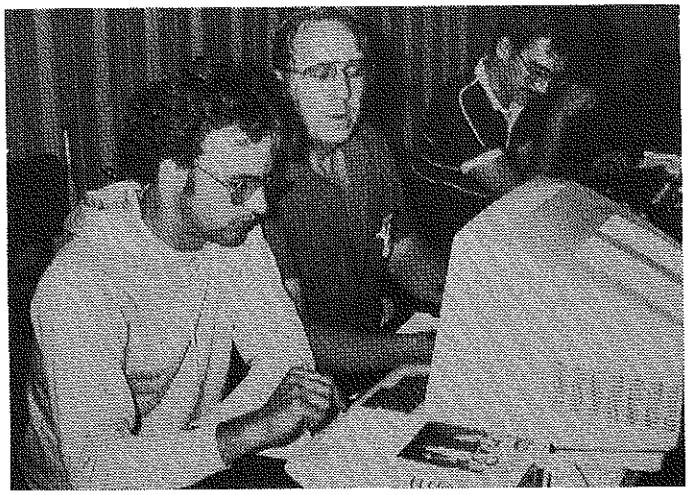
Summary

It is becoming more difficult in agricultural industries to have exclusively the best products on the market, at a price that is the most competitive on the market, and to be able to create customer awareness of these products without having the competition quickly doing the same thing. The one strategy that will build repeatable successes for any company, as well as the whole agricultural industry, will be the human resources.

To be assured of success in the marketplace, an industry must hire new people with the right competencies, train them in the specific competencies of their job, and provide sound performance appraisals and continued self-development. Specific competencies must provide the framework for developing more knowledge, sharper skills and better attitudes than ever before.

Recordkeeping Competencies

(Continued from page 11)



Duane Wahlstrom uses hands-on activities to develop competencies in record keeping. (Photo courtesy of Duane Wahlstrom.)

Post-secondary students are enthusiastic and are willing to accept and respond to a new challenge. We also teach adults these same competencies through the continuing education program at the college. To date, fifty farmers have enrolled and completed a 15-hour course on this computerized farm accounting system. Upon completion of the course, several of the farmers have purchased the software and the necessary hardware.

Terms such as cash flow, financial ratios, cost of production, and break-even prices are becoming vital components of the vocabulary of agricultural producers in the 1980's and the 1990's. As lenders require more information to monitor the borrower's financial position, it may not be too far from our vision to look at the possibility of using a computer modem on the farm to supply information directly to the office of the lender.

Recordkeeping should be fun. The analysis of records is important in today's agriculture to assist farmers to manage their financial position. Skills and competencies required of today's agricultural executives provide a means for the acquisition of the necessities and conveniences of life.

Involving Industry: Staying In The Hunt

By Dale Perritt

(Dr. Perritt is an Associate Professor, Department of Agriculture, Stephen F. Austin State University.)

Ann Richards' now famous quote, "that old dog won't hunt," made during the keynote address at the National Democratic Convention conjures up images of an old Walker hound more interested in reminiscing about the past than being involved in the chase. To stay in the hunt a good hound must have sound feet and legs, a good heart, a good nose to stay on a fresh trail, good ears to follow orders, keen eyesight, and a desire to be the leader of the pack. When one or any combination of these qualities is missing it may be correctly assumed that "that old dog won't hunt."

Not unlike other instructional areas where technological change is rapid, teachers of agricultural mechanics face a monumental task of just staying in the hunt and on the right trail. They, too, must be physically as well as mentally prepared to meet the daily challenges that await them. They must take the time to look, listen, and seek the advice of fellow workers as well as experts in the field.

All too often when planning the curriculum for a course of study, we limit our resources to the things with which we are familiar and comfortable. The failure to reach beyond our knowledge base will result in a classroom environment of "what was" rather than "what is." A cold trail in the classroom reaps the same results as one in the field, a lot of running and barking with very little results.

Leading the Pack

When considering the path that agricultural mechanics has taken over the years, it is evident that industry has and will continue to set the standards for instructional content in agricultural mechanics. New technologies, however, are developed, produced, and marketed to the consumer long before we as teachers have the opportunity to become fully acquainted with them. The lag time between adoption by the consumer and application by the teacher creates a pool of knowledge needed by the student but not yet addressed by the teacher.

Losing the Trail

To the agriculture teacher, whose job description entails enough to keep two people busy, the idea of having a readily available support base for technical assistance is a pleasant one. A short circuit, however, seems to sometimes exist between industry and the agricultural mechanics instructor. The failure of teachers to utilize industry to the maximum potential seems to stem from three common misconceptions or problems.

First, "the people in industry are too busy to help me." At least part of this statement is true. People involved in the mechanized agricultural industry are busy. But, I have seldom found them too busy to take a genuine interest in the agricultural education program. From technical assistance with contests to instructional assistance with teacher inservice workshops, industry representatives are more than willing to share their knowledge and resources.

Secondly, "I feel insecure about talking to people who have a much broader technical base than I have." Certainly we all have areas of technical ineptness and for the most part we are very hesitant to admit that we lack technical skills. Until we identify our weaknesses and take steps to correct them we will be limited in the scope of our instructional program. Employing the aid of industry representatives for technical assistance and to serve as members of local advisory councils can be a very positive step toward program improvement. For the most part industry has a very good perspective of the role of the agriculture teacher. They understand the broad scope of the total program and are willing to work with teachers on a "we will start from where you are" basis.

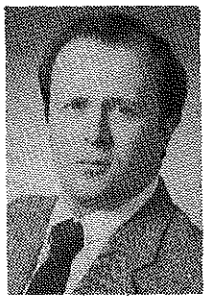
A third reason for the failure to better link our instructional program to industry is a result of a lack of creativity on the instructor's part. Often teachers fail to inventory and use the resources available to them in their own community. It is much easier to do what we have always been doing than to venture into instructional areas that may generate teacher anxiety.

Tapping the Resources

Once the teacher of agricultural mechanics understands the need and importance of utilizing industry as a support base the only thing left to do is ask for help. In most cases it is up to the teacher to instigate the contact. You must decide that the things industry has to offer your program are important enough to invest your time in making personal contacts and writing letters. Once the contacts have been made you must be willing to implement the things you have gleaned from industry into your course content. The assistance you receive may range from technical assistance with agricultural machinery and equipment to instructional materials such as machine components, technical manuals, and video tapes. When making requests for assistance be certain to explain how industry's time and effort will benefit the students enrolled in your class. In most cases your request for assistance will be met with enthusiasm.

(Continued on page 23)

Agricultural Mechanics Inservice - A Success Story



By Leon G. Schumacher

(Dr. Schumacher is an Assistant Professor, Agricultural Education and Engineering, University of Missouri-Columbia.)

Although we often talk about how to involve industry in our educational programs, do we practice what we preach? Do we actively seek out advice from business and industry as we initiate change in our curricula? Do we actively involve experts from industry as we teach rapidly changing concepts in agricultural mechanics? Involving industry takes time and a good deal of coordination, however the results are worth the effort.

Cooperation is the Key

Approximately 20 years ago, the Missouri Farm Electrification Council (MFEC) Education Committee met with representatives from the University of Missouri-Columbia, College of Agriculture to discuss how to educate rural Missourians about the safe use of electricity. As a result, money was donated by MFEC to purchase teaching aids for Missouri's secondary agriculture programs. Teaching aids designed to teach such concepts as voltage drop, proper fusing, proper grounding, and Ohms Law were donated to encourage agriculture teachers to improve their instruction in electrical use and safety.

The cooperation initiated during the 1960's has resulted in positive effects yet today. From 1986 through 1988, MFEC has provided $4,000 to fund inservice instruction and update electricity teaching aids and references for agriculture teachers to use while teaching electricity. As a result of this cooperative effort, approximately 150 agriculture instructors have been better prepared to teach electricity to their students.

The inservice activity consisted of eight four hour sessions, scheduled at eight locations throughout the state. During two sessions, industry representatives were asked to present part of the program. Industry representatives were also asked to help coordinate a tour of a local power plant.

Benefits of Cooperation

As the agriculture teachers met and visited with local industry representatives, they discovered how willing industry was to work with them. For example, when one of the agriculture instructors asked an industry representative how they might be able to help them teach electricity, his response was: "Tell me what you need and I will try to get it for you."

When the agriculture teachers see University professors actively teaching a course with help from industry they are more likely to involve industry experts as they teach their classes. In short, an example has been set for them to follow. Agriculture teachers are able to see first-hand the benefits which representatives from industry can provide to the classes they teach.

Agriculture teachers who have participated in inservice classes taught by industry experts have strongly supported activities jointly sponsored by industry and the University of Missouri-Columbia. For example, agriculture teachers have traveled to the Briggs and Stratton Factory School at Menomonee Falls, Wisconsin; John Deere Training School at Wichita, Kansas; Tecumseh at Grafton, Wisconsin; Farmland Training Center at Kansas City, Missouri; and other industry training centers. Industry representatives have presented workshops at the Missouri Vocational Agriculture Teachers Association Meetings, have served in an advisory capacity when developing new agricultural mechanics curricula, and have assisted in revising the state FFA agricultural mechanics contest. They have also judged the FFA agricultural mechanics at the Missouri State Fair.

Planning Is Essential

The key to the success of these activities is tied directly to the coordination provided by teacher educators and state supervisors of Agricultural Education. Initially, inservice activities must be promoted among agriculture teachers. This can be accomplished at district agriculture teachers' meetings as well as on an individual basis. Before promoting the activity, the inservice coordinator should preview the program. A preview often provides the insight needed to enable the inservice coordinator to effectively promote the activity.

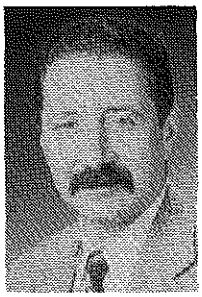
Agriculture teachers who attend must go home with a positive feeling about the activity, or the next time the course is offered few teachers will attend. To accomplish this, the coordinator must discuss the intent and purpose of the instruction, how the teachers will use the information, and the background or experiences of the teachers with the industry representatives. A short two or three line statement which lists the agriculture teacher's years of teaching experience, courses where they will apply this information, and their reasons for taking the class is the minimum that the inservice coordinator should provide the industry representatives.

Remember To Say Thanks

The cooperation between education and industry cannot be a one-way street. We cannot expect industry to be will-

(Continued on page 22)

Incorporating Agriscience into Agricultural Mechanics



By Philip Buriak

(Dr. Buriak is an Associate Professor, Department of Agricultural Engineering, University of Illinois, Urbana.)

Quality instruction begins when objectives are identified that reflect our educational goals. Reflect on the goals of your current instructional program. What outcomes do you hope to achieve?

What are the goals of agriscience instruction? Again, what outcomes do you hope to achieve? I believe that the desired outcomes of agriscience instruction should be no different than the desired outcomes of your current instructional program. Allow me to explain.

The National Science Board, a commission on precollege education in mathematics, science, and technology, believes science and technology instruction should be designed to produce the following outcomes:

- Ability to formulate questions about nature and seek answers from observation and interpretation of natural phenomena;
- Development of students' capacities for problem-solving and critical thinking in all areas of learning;
- Development of particular talents for innovative and creative thinking;
- Awareness of nature and scope of wide variety of science and technology-related careers open to students of varying aptitudes and interests;
- The basic academic knowledge necessary for advanced study by students who are likely to pursue science professionally;
- Scientific and technical knowledge needed to fulfill civic responsibilities, improve the students' own health and life and ability to cope with an increasingly technological world;
- Means for judging the worth of articles presenting scientific conclusions. (Educating Americans for the 21st Century.)

Review of these outcomes shows them to be congruent with, if not identical to the outcomes desired in agricultural education.

I cite the Commission because I consider agriculture, particularly agricultural engineering/mechanics, to be synonymous with mathematics, science, and technology. Mathematics, science, and technology are the foundation upon which all areas of agricultural engineering/mechanics must rest.

By designing curriculum that incorporates mathematics, science, and technology knowledge oriented toward practical issues in agriculture, and introducing these practical issues as problems which require the inquiry, collection of data, and the communication of the results and ideas, our programs will better address the needs of our students.

What then is AGRISCIENCE? Agriscience is instruction in agriculture emphasizing the principles, concepts, and laws of science and their mathematical relationships, supporting, describing, and explaining agriculture.

My objective is to discuss how best to rethink or reorganize our curriculum and our instructional presentations to be in line with our desired outcomes and this definition of agriscience.

Agricultural engineering and mechanics is applied mechanics and applied physics; the applications directed to agriculture. As such, basic physical principles, concepts, and laws of science interact to govern the applications. These applications are often complex, requiring a thorough understanding of science.

Students will not fully understand a complex agricultural engineering application, nor will they be able to transfer knowledge gained studying that application to another until they first understand the principles, concepts, and laws governing the application. Here lies our starting point . . . the identification of the basics common to most agricultural engineering applications.

Two approaches can be taken in the design of agriscience instruction. We can look to the concept and design our instruction to demonstrate and explain that concept, or we can evaluate our current instructional plans and match the concepts to the objectives that now guide our instruction, providing focus and emphasis to the concept. I prefer the latter approach.

Once we have determined the concepts interacting in the agricultural context, it becomes a simple task to modify or develop instructional plans that brings the concepts to the forefront. The ideal plan would also incorporate many of the outcomes sought by the Commission, i.e., improved mathematics, written and verbal communications, problem solving skills, and scientific and technological knowledge. The following is an example of a laboratory activity designed to explain and demonstrate power transmission relationships and the law of conservation of energy. A ten-speed bicycle is required for the activity.

(Continued on Page 22)

Perceptions Are Reality!

(Continued from page 3)

It is now time for agricultural education to broaden its mission at the secondary level to serve additional clientele. We need an additional delivery system, one specifically developed for this broadened mission. The profession would be making a serious mistake to refurbish or repackage the vocational agricultural education delivery system for this broadened mission. It would be perceived as "the same old thing in a new superficial package." Remember, perceptions are reality!

Figure 1 presents a model for agricultural education in secondary schools. The model encompasses a dual delivery system to serve both the "education in agriculture" mission and "education about agriculture" mission recommended in the National Research Council Report (National Research Council, 1988).

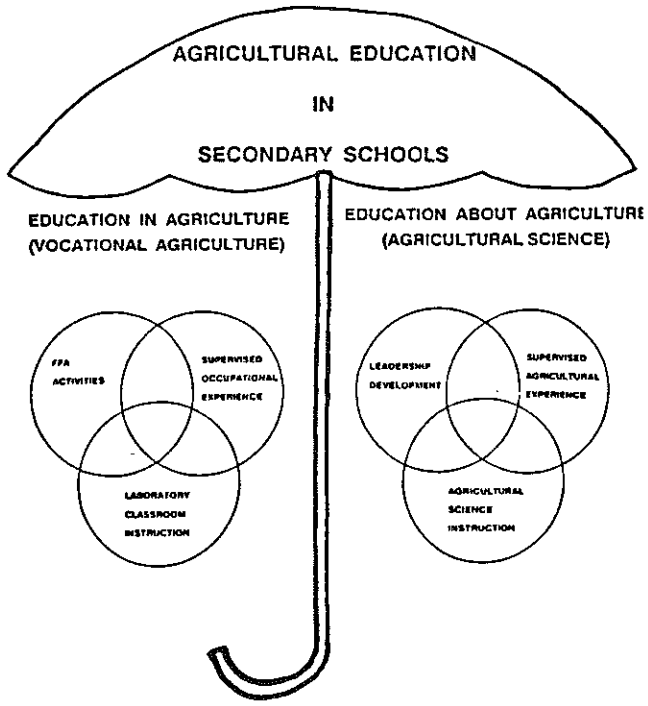


FIGURE 1: A Model for Agricultural Education in Secondary Schools (McCormick et al., 1988).

While this model does not answer all of the questions about what, when, where, who, how and how much, it certainly provides a vision of the future. It has the important advantage of suggesting substantive changes designed to serve a greater clientele. One marketing theory holds that to be successful you must find a "hole" in people's minds and prepare a product to fit that "hole." Agriscience, biotechnology and emerging technology are "holes" that are now perceived as futuristic, desirable and forward moving. The success of agricultural education programs at the secondary school level offering such courses was described in the February, 1989 issue of *The Agricultural Education Magazine*. Why can't the success of these few programs be incorporated into the broadened mission?

Finally, the proposed dual delivery system has the advantage of controlling the perception that nothing has changed by the fact that both delivery systems would be available. Certainly two delivery systems specifically designed with different characteristics and different program objectives are likely to serve a broadened clientele group. Agricultural education needs to serve more than 2% of the secondary school population in this country.

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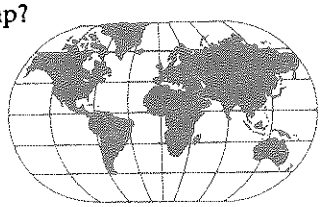
International Agriculture
What In The World Is Going On?

How many of the following countries can you locate on a map?



Mali
Somalia
Dominican Republic
Belize
Guam
Sierra Leone

What is the official language of the following countries?

Brazil	Malaysia
Cameroon	Canada

The following people are the political leaders of what countries?

Thatcher	Shamir
Mulroney	Gorbachev
Botha	Gemayel

Increasing International Awareness

Although as educators we may be aware of the importance of an international perspective, many of us lack a basic understanding and working knowledge of different cultures and societies. We tend to focus on the familiar and maintain a rather confined viewpoint regarding world affairs. Improved communications technology and an increasing trade interdependence are forcing us to acknowledge the fact that we live in a global community. No longer can we ignore our international neighbors.

Agricultural educators can be an important link in helping students develop an international outlook. At a minimum, classrooms should have a world map or globe for an immediate reference. Do not assume that students can automatically locate continents and countries. Discuss current events when appropriate to help students conceptualize and verbalize their thoughts and opinions about international issues. Take advantage of foreign exchange students or other international visitors in your community or state; they may not have an agricultural background, but they can provide an enlightening commentary on their home country. Ask students to complete an international awareness quiz similar to the one at the beginning of this article. You may be surprised at their answers and reactions.

Many opportunities are available to help increase our students' knowledge and understanding of the world in which we live. One of the primary objectives of this column is to assist in raising the international IQ of teachers and students!

Future Issues

The featured column on international agricultural education will appear on a quarterly basis, in the March, June, September and December editions. We would like to focus on a variety of topics and issues throughout the year. All teachers, students, supervisors, teacher educators, and agribusiness persons are encouraged to use the column as an avenue to share personal experiences and ideas related to international agriculture education. Possible topics included in the column:

1. ways to integrate international concepts into the agricultural education curriculum

2. opportunities for teachers and students to participate in international exchanges.

3. comments from agricultural educators who have traveled abroad; their impressions and advice.

4. the impact of the global marketplace on American agriculture.

5. comments from international agricultural educators; their perspectives and activities.

The column will provide an excellent opportunity for the profession to exchange experiences, ideas, and opinions regarding international agricultural education. We look forward to hearing from you!

By Janet L. Henderson, Special Editor
(Dr. Henderson is an Assistant Professor, Department of Agricultural Education, The Ohio State University.)

NOTICE

If you have questions on International Agricultural Education that you would like discussed in the Feature Column on International Agriculture, send them to:

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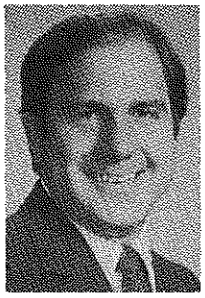
Department of Agricultural Education
The Ohio State University
208 Agricultural Administration Bldg.
2120 Fyffe Road
Columbus, OH 43210-1099

Agricultural Mechanization
Are You Liable?



By Joe G. Harper, Special Editor
(Dr. Harper is an Assistant Professor, Agricultural Education and Communications, University of Nevada-Reno.)

Teaching is one of those endeavors that is a constant stream of ups and downs. One minute we feel great because our students have excelled, we see the benefits of our efforts, and at that moment there is no other place we would rather be. Then before we can turn around everything has changed, things seem disoriented, and no matter what we try it just does not seem to work the way we think it should. There is little doubt that one way to get a group of teachers down is to bring up the topic of teacher liability. It seems that the number of liability cases has been increasing. Recent national child molestation cases have caught the public's eye. Also, there appears to have been an increase in the number of articles related to teacher liability. Teacher liability concerns not only appear to be increasing in frequency, but also broadening in scope. Whereas agricultural mechanics accidents are still a primary concern, there are increasing concerns regarding slander, molestation, equality, product liability and negligence, to mention a few. The concerns expressed by teachers is an area which demands our attention.

No single column, article, or study is going to solve the problems or answer teacher concerns regarding teacher liability. However, it is a very timely topic for teachers of agricultural mechanics and I offer the following suggestions:

1. If you have not done so recently, refresh your background by doing a little supervised study. For starters, Bear and Hoerner have written an excellent chapter in their reference book *Planning, Organizing and Teaching Agricultural Mechanics* (revised 1986). This very informative chapter is written for teachers of agricultural mechanics. Drs. Bear and Hoerner begin their chapter with the following section (p. 73).

   > "Each teacher in the school system has a responsibility to the student, but the shop teachers and teachers in the athletic department have the greatest exposure to hazardous conditions. Most teachers will admit they have a responsibility and the extent of liability can be readily defined if a lawsuit occurs. Legal action is likely against a teacher when all or some of the following allegations are made:
   >
   > 1. that a pupil suffered injury, loss or damage.
   > 2. that a pupil was not at fault for what happened.
   > 3. that the teacher did not exercise sufficient care or supervision.
   > 4. that there is a cause and effect relation between the act (or failure to act) and the accident which caused the injury.
   >
   > The cause and effect relationship is referred to as 'proximate cause.'
   >
   > It is important for teachers to realize that there is no such thing as automatic liability. Liability must be established in a court of law on the basis of appropriate fact and evidence. Therefore, a teacher is liable when a court says so. There is nothing like a lawsuit to attract your attention."

2. Determine your local school system's philosophy regarding teacher liability. Most teachers I have talked with, were unsure regarding how much support they had and the school systems' response to teacher negligence. School systems in our area carry liability insurance which supports a teacher acting responsibly.
3. If you haven't done so recently, take a class or inservice workshop regarding school law for your state. There have been some recent court cases throughout the country which may have had an impact upon your school district.
4. Pay very close attention to teacher responsibility and negligence. You can rest assured that when something happens, the first question will be "Where was the teacher?" and the next question will be "What was the teacher doing?" We are responsible for our students and we must not neglect that responsibility.
5. Keep your laboratories and facilities in excellent condition at all times. The environment in which you expect students to learn is a reflection of your responsibility to teach. We must provide an environment that is safe, orderly, and provides an opportunity for students to learn.
6. Structure the instructional program to insure that students have an opportunity to learn safety and responsibility. While easier said than done, this is an important concept. The curriculum should provide instruction in areas related to safety, work habits, and evaluating situations.
7. Do not cut corners regarding school policies. If the school policy is to report all accidents, then properly report all accidents. If school policy is that students not transport other students in their personal vehicles for official school functions, then do not allow it. Remember, you are responsible for your actions and they can be interpreted as a measure of your responsibility as a teacher.

(Continued on page 23)

Agricultural Mechanics Inservice - A Success Story

(Continued from page 17)

ing to work with us if we do not return the favor. At the very least, a thank you should be sent to the industry representative for their assistance. We must remember that when these representatives donate their time to facilitate our educational efforts they are really donating money, as time to them is money.

One way to thank industry representatives for their support is to host an activity for them. For example, the University of Missouri-Columbua Agricultural Engineering Department recently donated the use of our facility for a John Deere Combine Service Update for John Deere dealers and service technicians. The John Deere specialists were able to take advantage of our central location and facilities to conduct the update activity. The University of Missouri-Columbia received an indirect public relations benefit as approximately 180 dealers and service technicians toured the facility and visited with Agricultural Engineering faculty.

Future Plans

In the future, the University of Missouri-Columbia plans to strengthen ties with industry in a number of ways. Plans are underway for John Deere to use the Agricultural Engineering facility to conduct their 1989 combine workshop. John Deere also plans to use our facilities to conduct a management seminar for their dealers. Industry representatives will continue to provide input for agricultural mechanics curricula and the revision of state FFA agricultural mechanics contest. We have already begun planning for future agriculture teacher inservice activities with industry in Missouri. Have you?

Incorporating Agriscience into Agricultural Mechanics

(Continued from page 18)

LABORATORY ACTIVITY

TITLE:
Mechanical power transmission.

SPECIFIC LEARNING OBJECTIVES:

1. To determine the relationship between diameter and number of teeth to torque and speed (RPM).
2. To determine the relationship between power, torque, and speed (RPM).
3. To apply the law of conservation of energy to mechanical power transmission.

INSTRUCTIONS:

1. Record **all** observations (data) as requested in the data summary.
2. Answer **all** questions and perform **all** calculations. Show work.

PROCEDURES:

1. Measure the diameter of the large pedal sprocket (D1), and the smallest wheel sprocket (D2).

   D1 = _____

   D2 = _____ Ratio $\frac{D1}{D2}$ = _____

2. Count the number of teeth on the large pedal sprocket (N1), and the smallest wheel sprocket (N2).

   N1 = _____

   N2 = _____ Ratio $\frac{N1}{N2}$ = _____

3. Count the number of revolutions of the smallest wheel sprocket (RPM2) for one revolution of the large pedal sprocket (RPM1).

   RPM1 = 1

   RPM2 = _____

4. Compare $\frac{D1}{D2}$ to $\frac{N1}{N2}$. What can we conclude from this comparison? _____

5. Compare D2 to your answer in #3 for RPM 2. Is $\frac{RPM1}{RPM2} = \frac{D2}{D1}$? YES NO

   Describe this relationship in your own words. _____

6. Determine **all** possible speed ratios and arrange them in increasing or decreasing order.

1. $\frac{N6}{N5}$ = _____		6. = _____	
2. = _____		7. = _____	
3. = _____		8. = _____	
4. = _____		9. = _____	
5. = _____		10. = _____	

7. Which speed ratio has the greatest wheel speed? ____

8. Using two torque wrenches in opposition, apply a force of 200 in. lbs. to the pedal sprocket. Measure and record the resultant torque at the wheel sprocket for **all** possible speed ratios.

1. $\frac{N6}{N5}$ = _____		6. = _____	
2. = _____		7. = _____	
3. = _____		8. = _____	

4. = _____ 9. = _____

5. = _____ 10. = _____

9. Which speed ratio provides the greatest torque? ____

_____

10. Based on your observations, what can you conclude about the relationship between power, torque, and speed? How does the law of conservation of energy apply to mechanical power transmission?

_____

_____

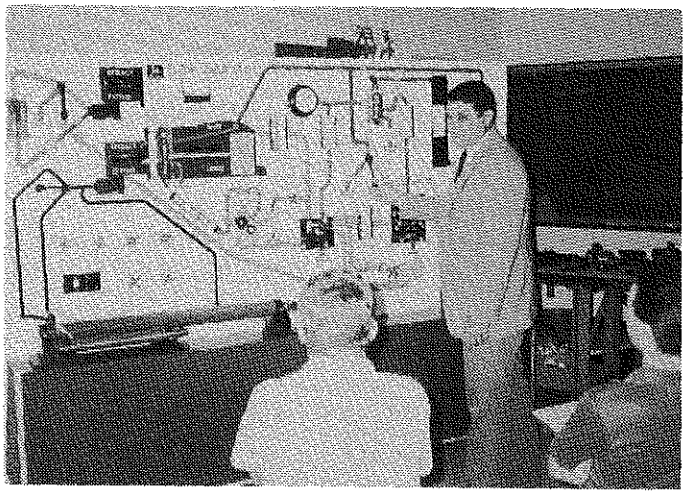
_____

_____

The activity incorporates agriscience into our instruction. Students must observe, collect data, critically think about the results, and communicate their conclusions. At the same time, students have learned information associated with all agricultural power and machinery applications through their own inquiry into the topic of mechanical power transmission.

Involving Industry: Staying in the Hunt

(Continued from page 16)



Dr. Bill Long is teaching a unit in hydraulics using a flow simulator developed by John Deere Co.

Reaping the Rewards

Involving industry in your agricultural mechanics program requires initiative on the part of the teacher. It requires using your public relations skills. It requires spending time in planning and self-evaluation. The teacher who is satisfied with running back in the pack will not consider this "worth the effort." The rewards, however, may be well worth the time. Four years ago a study was completed that indicated a need for teacher inservice in the areas of tractor hydraulics, air conditioning, and tractor electrical systems. The local John Deere dealership was contacted for assistance. The local dealer gave me the name of Mr. Ron Mourning, the Regional Training Service Center Director, as a possible source for help. After a very positive response from Mr. Mourning, a number of inservice workshops were held over the next three years at the John Deere Regional Training Center in Dallas. Approximately 175 agriculture teachers attended the workshops which were taught entirely by the service training instructors. It is hard to measure the value of industry cooperation in the educational process but the positive responses to the teachers who participated in the workshops and the subsequent program improvements indicate the value of industry's assistance in the planning, implementation, and evaluation of agricultural mechanics curriculums. Through industry's assistance the technical knowledge base of the teacher may be broadened, the curriculum content may be strengthened, and the avenue for student placement may be enhanced.

The quality time that a hunter spends in the field will be greatly influenced by the performance of the dog at his side. Likewise, what we teach and how well we teach it will be directly influenced by the partnership we cultivate with our friends in industry.

Agricultural Mechanization — Are You Liable?

(Continued from page 21)

8. Provide a model for students. The teaching and learning experience goes beyond the formal classroom situation. Your actions do, indeed, speak louder than your words. If you were to operate a piece of equipment that was not properly guarded, then your students could consider the unsafe practice as acceptable and you could be perceived as being irresponsible and negligent.
9. A little bit of common sense goes a long way. In the learning environment, the teacher is viewed as the bearer of wisdom. Teach from your experience with a large dose of common sense.

The situation facing our profession is very complicated and, indeed, serious. Recently I was visiting with a friend who makes a specialized piece of equipment as a part-time business. He informed me that his product liability insurance would run in excess of $25,000 per quarter! Needless to say he would be taking some considerable risks by not being insured. Hopefully, our society will not allow a similar situation to occur in education. We, as professionals, must continue to provide a learning environment with the lowest possible risks for our students, ourselves, and society, or we will be paying a price too large to be able to place a monetary value upon it.

Stories in Pictures

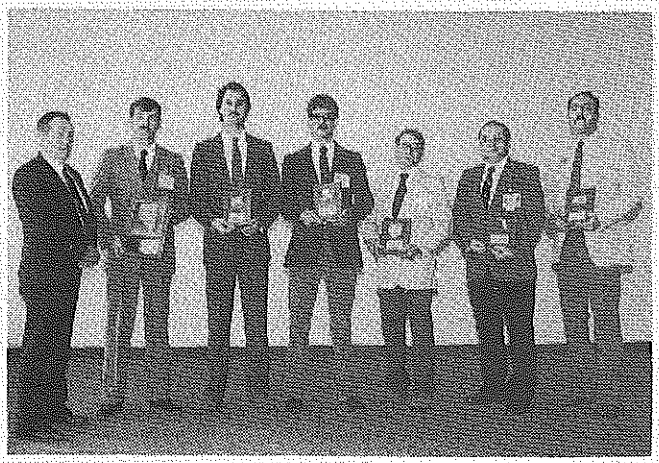
NVATA OUTSTANDING SERVICE CITATION
1988

Left to right: Don Ramsey, Vocational Agriculture Teacher (retired), Jones, OK; Richard E. Linhardt, Teacher Educator-Agricultural Education, University of Missouri, Columbia, MO; Robert Quast, President of the Wisconsin Association and Vocational Agriculture Teacher at Sparta, WI accepted the award for Gerald R. Matteson, Teacher Educator-Agricultural Education, University of Wisconsin, River Falls, WI; Dennis Bushong, President of the Arizona Association and Vocational Agriculture Teacher at Gilbert AZ, accepted the award for Leo C. Peterson, Vocational Agriculture Teacher (retired), Mesa, AZ; Dennis Will, President of the Kansas Association and Vocational Agriculture Teacher at Chapman, KS, accepted the award for Ralph Field, Head-Department of Vocational Education (deceased), Kansas State University, Manhattan, KS; and Carroll L. Shry, Jr., NVATA President and Horticulture Instructor at the Frederick County Vo-Tech Center at Frederick, MD presented the awards.

NVATA OUTSTANDING YOUNG MEMBER AWARD
1988

Left to right: D.R. Margenthaler, Manager, Corporate Support Programs, John Deere, Moline, IL; Cynthia L. Raker, Columbia, IN; Rod S. Crowley, Royal City, WA; Michael S. Tidwell, Marbury, AL; Barbara A. Lemmer, Anamosa, IA; Allen Scheer, Westmoreland, KS; and Thomas C. Hawthorne, Mt. Airy, MD.

Students checking hydrophonics garden for growth characteristics. (Photo courtesy of T. Handwerker.)



NVATA IDEAS UNLIMITED CONTEST AWARDS
1988

Left to right: Duane Watkins, NVATA President-Elect and Vocational Agriculture Teacher, Thermopolis, WY presented the awards: Nevada Association — Tom Klein, Elko, NV (National Winner), North Dakota Association — Kevin Nelson, Carrington, ND, Missouri Association — Perry Brooks, Columbia, MO, Pennsylvania Association — Cecil Lohr, Stoystown, PA, Florida Association — Tom Weber, Sarasota, FL, Kansas Association — Harmon F. Bliss, Jetmore, KS. (Photo courtesy of the NVATA.)