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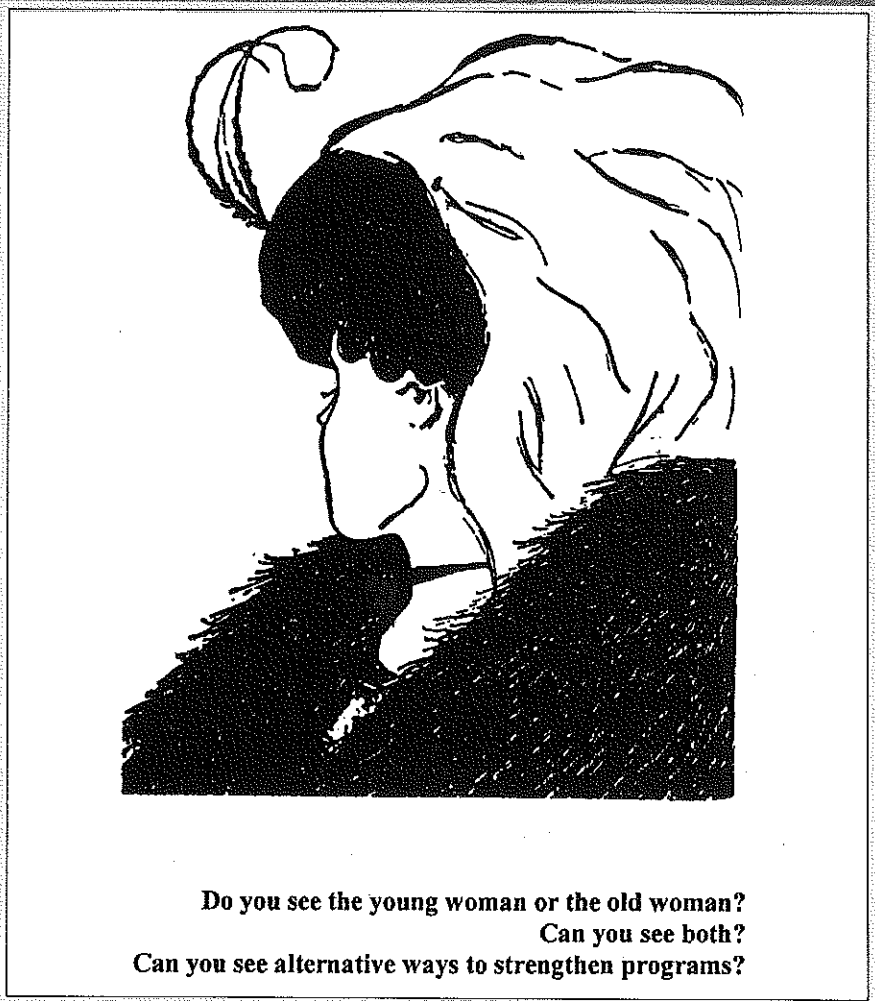

Do you see the young woman or the old woman?
Can you see both?
Can you see alternative ways to strengthen programs?

Strengthening Programs

THE
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ARTICLE SUBMISSION

Articles and photographs should be submitted to the Editor, Regional Editors, or Special Editors. Items to be considered for publication should be submitted at least 90 days prior to the date of issue intended for the article or photograph. All submissions will be acknowledged by the Editor. No items are returned unless accompanied by a written request. Articles should be typed, double-spaced, and include information about the author(s). Two copies of articles should be submitted. A recent photograph should accompany the article unless one is on file with the Editor. Articles in THE MAGAZINE may be reproduced without permission.

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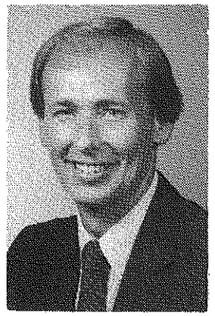
Setting Targets for Program Improvement



BY ED OSBORNE

Dr. Osborne is associate professor and program chair of agricultural education at the University of Illinois, Urbana-Champaign.

Now that the hectic pace of the school year has ended and a more flexible summer schedule is at hand, it's time to step back and take a hard look at your program. Many believe that mature teachers are those who can and do accurately assess their teaching effectiveness. They continually ask themselves the same types of evaluative questions about their agriculture program. They are always pursuing program improvement strategies as a result of their self-analysis of program strengths and weaknesses. This is a key characteristic that clearly separates the best teachers from average and mediocre teachers.

In most cases no one in a local school system is better able to accurately evaluate the agriculture program than the agriculture teacher. This, of course, assumes that the teacher is well versed in the elements of a top notch secondary agriculture program of today. This also assumes that the teacher has the ability to apply program quality criteria and develop and implement an effective problem solving strategy for strengthening the program. While input from administrators, advisory council members, FFA alumni, students, and others is valuable, it's not enough. Agriculture teachers must conduct their own program analysis and pursue their own program improvement plans.

While working with Illinois Model Sites for Student Teaching, my colleagues and I have developed a form for teachers to use in conducting their annual or semiannual program assessment (see Form 1). The form consists of 45 "quality indicators", but can be easily adapted to suit unique features of the local program. Using the form is simple; all that is required is a pencil, a clear mind, and some uninterrupted quiet time (hard to find, I know). Teachers rate the quality of each of the 45 program characteristics by circling the appropriate response (P = poor, F = fair, G = good, and E = excellent).

After working through the 45 items, review your ratings on each item. Mark those items rated poor or fair, and then develop three to four improvement strategies for strengthening that element of your program. But before developing your improvement strategies, be sure to correctly diagnose the reasons that each particular element of your program is weak. Without thinking through the problems and causes for weakness before moving ahead with improvement strategies, our efforts are intuitive rather than based upon thoughtful analysis of the circumstances. Of course, the latter approach is much more likely to bring about significant program improvement.

After several improvement strategies have →

Form 1. Agriculture Program Evaluation

Quality Indicator	Rating			
1. Effectiveness as a classroom teacher	P	F	G	E
2. Effectiveness as a lab teacher	P	F	G	E
3. Skills developed by students	P	F	G	E
4. Knowledge gained by students	P	F	G	E
5. Student attitudes toward learning	P	F	G	E
6. Balance of classroom and lab instruction	P	F	G	E
7. Effective use of computers in *teaching*	P	F	G	E
8. Effective use of computers in managing instruction	P	F	G	E
9. Scope and quality of adult instruction	P	F	G	E
10. Number, quality, and variety of instructional materials	P	F	G	E
11. Incorporation of new thrusts (science, marketing, international ag, etc.) into curriculum	P	F	G	E
12. Ag literacy courses or lessons taught	P	F	G	E
13. Up-to-date written courses of study	P	F	G	E
14. Written professional improvement plan that is updated annually	P	F	G	E

15. Participation in professional organization activities	P	F	G	E
16. Number of students in agriculture	P	F	G	E
17. Quality and diversity of agriculture students (background, ability, etc)	P	F	G	E
18. Connection of SAE programs to classroom and lab instruction	P	F	G	E
19. Quality of SAE programs	P	F	G	E
20. Teacher supervision of SAE programs	P	F	G	E
21. Student participation in SAE programs	P	F	G	E
22. Quality/scope of FFA program	P	F	G	E
23. Student participation in FFA activities	P	F	G	E
24. Student participation in science fairs	P	F	G	E
25. Development of an annual budget for the program	P	F	G	E
26. Scope/diversity of land lab	P	F	G	E
27. Quality of land lab learning experiences	P	F	G	E
28. Effective use of advisory council	P	F	G	E
29. Effective use of alumni association	P	F	G	E
30. Use of community resources in teaching	P	F	G	E
31. Annual review of program, including goal setting	P	F	G	E
32. Scope and quality of classroom facilities and equipment	P	F	G	E
33. Scope and quality of lab facilities and equipment	P	F	G	E
34. Scope and quality of ag science facilities and equipment	P	F	G	E
35. Order and attractiveness of classroom	P	F	G	E
36. Order and maintenance of lab areas	P	F	G	E
37. Organization of office space and files	P	F	G	E
38. Relationships with administrators	P	F	G	E
39. Relationships with other teachers in my school	P	F	G	E
40. Contacts with junior high and elementary teachers for ag literacy lessons	P	F	G	E
41. Student rapport	P	F	G	E
42. Relationships with parents, citizens, and community groups	P	F	G	E
43. Collaboration with extension advisors on program activities	P	F	G	E
44. Leadership exerted within the community	P	F	G	E
45. Personal attitudes toward teaching and learning	P	F	G	E

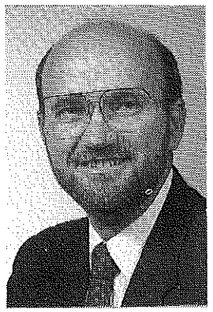
been identified for each weak program characteristic, select two or three elements that need your priority attention and proceed with your improvement strategies. After you feel you have moved these weak spots of your program to a "good" or "excellent" status, return to the checklist, select several more of the weak areas, and implement your improvement strategies for those items.

Many people are not very good at pinpointing problems and effectively solving them. Some educators (at all levels) seem to be good at talking about frustrations but pretty ineffective in resolving problems or weak spots in their programs. Program improvement is particularly challenging for agriculture teachers because there are so many elements of an agriculture program that constantly demand attention and good management. Using this program analysis form helps teachers organize their energy and ideas about improving their program. Take some time this month to systematically reflect on your program's strengths and weak spots and develop a carefully conceived plan for program improvement during the coming year. You'll be pleased with your progress! ■

About The Cover

A perceptual illustration adapted by the Theme Editor from *The 7 Habits of Highly Effective People* by Stephen R. Covey (1989), New York: Simon & Schuster. Covey contends that we often view future possibilities from existing "maps" in our heads, and that the "maps" often fail to accurately reflect the territory ahead. He guides the reader through processes for constructing new and appropriate "maps."

Strengthening Programs -- A Priority For All?



BY EARL B. RUSSELL

Dr. Russell is associate professor of agricultural education at the University of Illinois, Urbana-Champaign.

Every agricultural educator wants to be part of a solid, strong, and respected educational program. We intuitively know that constant improvement is key to being associated with such a program. While we may keep the concept of an "ideal" program in our heads, we also know that we will never arrive at such an ideal. Continuous improvement is a journey, not a destination.

Such a view is compellingly presented by Stephen Covey in his best-selling 1989 book, *The 7 Habits of Highly Effective People.* He elaborates viewpoints aimed at strengthening individuals and how they can subsequently strengthen work settings, institutions, and organizations. Agricultural educators can gain much from a careful study of this book.

Examples of Covey's ideas that have particular relevance to strengthening agricultural education programs include the distinction between one's "Circle of Concern" and "Circle of Influence." The former deals with all the things we might worry about, but which may be beyond our ability to control; while the latter focuses on the areas under our control. The more proactive we become, the more initiative we take to bring about positive changes within our "Circle of Influence," and the greater our capacity becomes to bring about improvements.

A related concept is the distinction between "Production" and "Production Capability." We can spend our entire energies producing more, working harder than ever, and so deplete our physical and mental resources that our capacity to produce comes to a screeching halt. Focusing on constant, balanced improvement in both our outputs and our talents can create the desired and necessary balance between "Production" and "Production Capability." This is a fundamentally important concept for agricultural educators who are committed to strengthening their programs, because a healthy balance is key.

Authors of articles in this issue on the theme, "Strengthening Programs," are to be commended first for their initiative in taking decisive steps to bring about improvements in programs in which they are engaged, and second, for going to the effort to document their efforts for the benefit of members of the profession. By these means they have expanded their "Circle of Influence" among the rest of us, have enhanced their own "Production Capability," and have provided mechanisms for us to expand our "Production Capability" as well.

The Substance of Improvement

Countless examples of program-strengthening activities could have been reported in this issue. In fact, substantially more articles were submitted for consideration than space could accommodate in a single issue. Those selected here are excellent examples of different perspectives and approaches which can be taken to making agricultural education programs better.

The Baker article is impressive in its account of how a dormant program in a small school experienced a rebirth. The collaborative activities reported here typify how many other programs might go about improvement in the future.

An urban emphasis on food science by Hunter is also presented as an example of a Tech Prep program. Much can be learned from this article. Students in agricultural education are more likely to have experience with food and food products than in any other aspect of agriculture, whether the school is in urban, suburban, or rural areas. Are we capitalizing on this experience factor as well as we should?

Moore and Flowers suggest curricular improvement through an expanded model of supervised agricultural experience, and McCaslin and Torres present a thoughtful rationale for using evaluation to strengthen programs of agricultural education.

Reading and acting on these and other articles in this issue can provide a sound footing for strengthening programs. We can be enabled to expand our "Circle of Influence" and our "Production Capability." Let's understand and act on new perspectives. ■

Coming in August . . .

Teacher-authored articles on the theme

What Teaching is Really Like!

Small Schools Benefit from Collaborative Relationships

BY MEECEE BAKER

Ms. Baker is an agriculture teacher at Greenwood High School, Millerstown, PA 17062.

With 240 students in grades nine through twelve, Greenwood ranks as one of the smallest public high schools in Pennsylvania. Greenwood doesn't field a football team. The agriculture program there has no laboratory facility. Only three administrators oversee the total district operation. How can such a small school support a successful agriculture program? The answer: collaborative relationships.

Greenwood's collaboration begins in the agriculture department itself. The staff consists of Wayne Zeigler, part-time aide, and myself. Zeigler is a local grain farmer and reputable computer whiz. We complement each other in both our interests and abilities. Ironically, Zeigler brought me kicking and screaming into the computer age. He also offers a solid production background and serves as an excellent resource for that part of the curriculum. On the other hand, I bring a biological science and economic slant to our classes. We often share Ziegler's computer talents with others in the school system. Even the administrators have taken advantage of his computer lessons.

Collaborative relationships among the administration, faculty, community, and agricultural agencies provided the necessary foundation to reopen Greenwood's agriculture department after nearly 20 years. Even more important, those relationships continue to ensure the viability of that same program today.

Strong advocates of agricultural education are Principal Ed Burns and guidance counselor Terry Cameron. Both have been instrumental in developing a course selection system that allows for flexible scheduling. Students who pick agriculture as their major track are asked to select a minor: academic, business, industrial arts. They benefit from the agriculture curriculum, and at the same time take advantage of all the academic, business, or industrial arts courses offered. A direct result of this has been increased enrollment of agriculture students in postsecondary education (50% of the agriculture majors graduating in 1991).

Principal Burns, who has helped judge the State FFA Interview Contest and sometimes chaperons the students during the State FFA Activities Week, believes any stigma attached with being an agriculture major is gone. "The student body no longer looks down on the agriculture program," he says, "and I believe this is due to three factors: the willingness of the faculty to be flexible and cooperative in their programming, the leadership development that is a valuable part of the agriculture curriculum, and the involvement of agriculture students in the school as a whole."

Faculty collaboration is essential in making a small agriculture program work. Although Greenwood has no agricultural mechanics laboratory, the industrial arts department welcomes agriculture students into its electrical, metal, and wood laboratories.

In addition, collaboration also exists between the agriculture and science departments. Jack Richard, life science and physics teacher, and the agriculture instructor team teach a unit in environmental issues each spring. Topics include land judging, wildlife, forestry, aquatics, and current issues. The culminating activity of this unit is student participation in a county-wide "envirothon." Laboratory facilities, equipment, and expertise are readily shared between the agriculture and science disciplines.

The community helps out, too. The members of the Greenwood School District's agriculture advisory board are diverse. The board meets to discuss curricular updating and to plan the adult education program to be offered by the agriculture department in the upcoming year.

Community people often act as resource personnel in both the secondary and adult education classes. The local veterinary clinic, for

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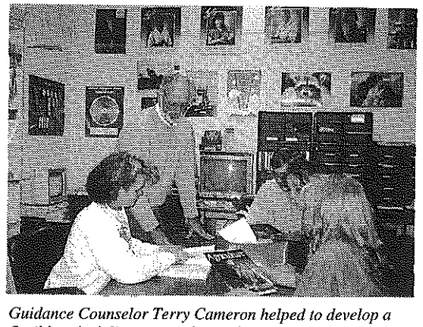


Guidance Counselor Terry Cameron helped to develop a flexible scheduling system for students. He also assists in their college selection and scholarship application. (Photo by Diana Ertman)

Greenwood School District Demographics - -

98.8 square miles

4,240 residents

Enrollment K-12 - 875 students

Student enrollment in vocational programs- 25%

Percent of total student body seeking postsecondary education- 52%

Primary agricultural enterprises - dairy, grain and forage crops, contract poultry

A F. R. E. E. Guide to Strengthening Programs

BY WENDE HUNTER

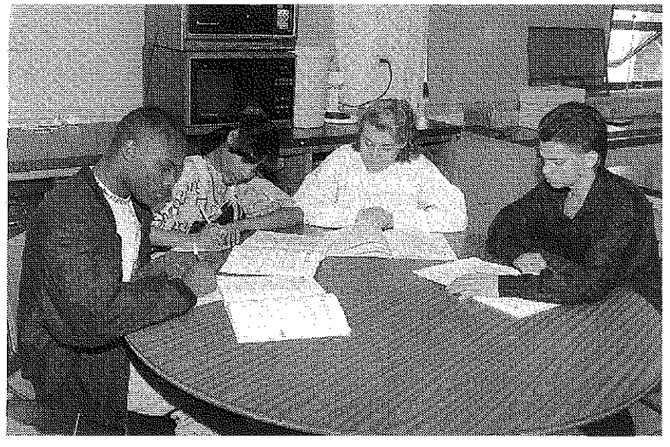
Ms. Hunter is food science teacher and F. R. E. E. coordinator at the Chicago High School for Agricultural Sciences, Chicago, IL.

F. R. E. E. is the acronym chosen for the new Tech Prep program at the Chicago High School for Agricultural Sciences. F. R. E. E., which stands for Food Science for Research, Education, and Employment, is the perfect name for a program that "frees" students who feel "trapped" by the strictures of traditional educational strategies.

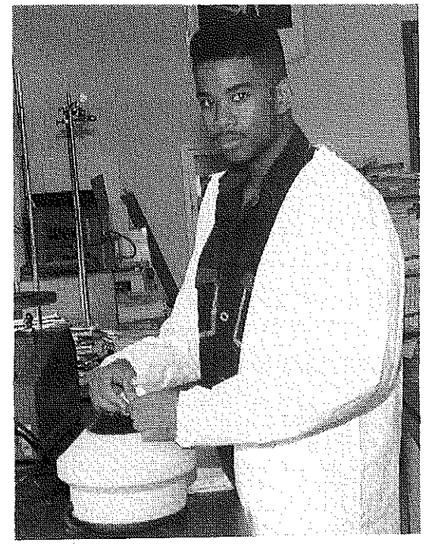
Tech Prep is an educational initiative that integrates traditionally academic course work into a technical training program. It is a program that is totally academic and totally vocational, leading to both an advanced educational degree and a career. It involves both industry and postsecondary personnel in its planning to ensure that the education and training the students receive are relevant to the skills and competencies required to meet both college and the employer's performance standards.

What is CHSAS?

The Chicago High School for Agricultural Sciences (CHSAS) is a college preparatory program which prepares young people for professions in the over 200 careers in agricultural sciences, such as animal science, plant science, and food science. The "Ag" school, located on the 72 acre "Last Farm" in Chicago, serves as a model for agricultural, vocational, and program-focused schools. At the core of the



Tyrone White, Tracie Williams, Gwen Borner, and Ismael Lopez work together to solve a simulated workplace problem in applied communications.



Joshua Augusta using a centrifuge to clarify apple juice.

school's curriculum is the problem solving method, using the hands-on, practical applications approach. Highly motivated students of differing levels of ability travel from all corners of the city to attend this magnet school.

The curriculum offerings include a variety of academic and agricultural science subjects, which will enable students to exceed the required and elective courses necessary for a high school diploma. All students are required to enroll in college prep courses such as algebra, geometry, advanced algebra, trigonometry, biology, chemistry, physics, and foreign language, in addition to four years of agricultural science classes.

The F. R. E. E. Program

In 1991 we began planning our Food Science Tech Prep program. It was very easy for me to envision how and where a student with this type of degree would fit in the food industry, because that is my background. My degree is in food science, and I worked in the food industry for 10 years before becoming a teacher. As a food scientist, I knew that laboratory technicians with this type of education and training would be highly desired in the food industry.

As a teacher, I saw how this program →

might revitalize some of the students in my classroom who stared back at me with dull eyes or disrupted the classroom. These students, who had no idea how algebra, chemistry, English, or agriculture could ever impact their lives; who thought college or a rewarding career was beyond their reach, monetarily or academically; who were convinced that they were powerless over a system that has a high unemployment rate for high school graduates and scholarships only for the top 20% of the class, can again believe there is a purpose to school if engaged in a Tech Prep program.

How To Begin

At the heart of every successful Tech Prep program is an advisory board or planning team. The F. R. E. E. Advisory Board was built gradually as we realized all the facets to planning this program. Members include academic teachers, vocational teachers, high school administrators, college administrators, counselors, industry representatives, parents, students, and community representatives.

Frank Norwood, Diana Sanchez, Kim Reyes, and Shanitra Taylor get ready to sterilize media for a food microbiology lab.

We found that the best way to develop this program was to work backwards, that is, to identify the competencies that we wanted the students to graduate with and then design a program that would fulfill these expectations. We relied very heavily on industry to determine these competencies, and we were not surprised that about half of them were not job specific. Better communication and basic math skills topped the list, as might be expected.

Developing The Program

Based on the competencies determined by the advisory board, we began to develop the F. R. E. E. program. Remembering that integration of academics is a key element to this program, both vocational and academic teachers were involved in writing curriculum. Academic teachers were asked to research a competency required by F. R. E. E. and develop a lesson plan to integrate their academic subject into the F. R. E. E. class. For example, the chemistry teacher, Sam Hall, was asked to prepare a lesson plan on solubility, and he came up with a lab activity on syrup production to demonstrate how temperature influences solubility. This is a wonderful example of how a scientific principle can be presented in a very applied, non-threatening manner.

It was decided that students opting to enter the F. R. E. E. program would not be "tracked" in their other classes and would take a full academic schedule including algebra/trigonometry, physics, and foreign language. Tech Prep is not just another vocational program for the "dummies"; it best serves students who fall between the 25th and 75th percentile in academic ability. The agricultural options courses for F. R. E. E. students are:

- Introduction to the Food Industry
- Applied Communications
- Food Chemistry
- Food Microbiology

We agreed that to make this program attractive and credible to the students and to cement the industry commitment there had to be a job component. We decided to offer summer jobs, in keeping with our academic focus, instead of a work study program. This served us two-fold: an incentive for students to get into the program and an incentive to pass all classes so that their summer would be free to work.

Implementation

Recruitment efforts began in February 1992, when all sophomores were given a presentation on the F. R. E. E. program. Students watched a video on careers in the food industry produced by the Institute of Food Technologists and were encouraged to try to picture themselves as one of the people they saw in the film. At the same time, I asked all sophomore teachers and counselors to recommend students they thought would benefit from the program.

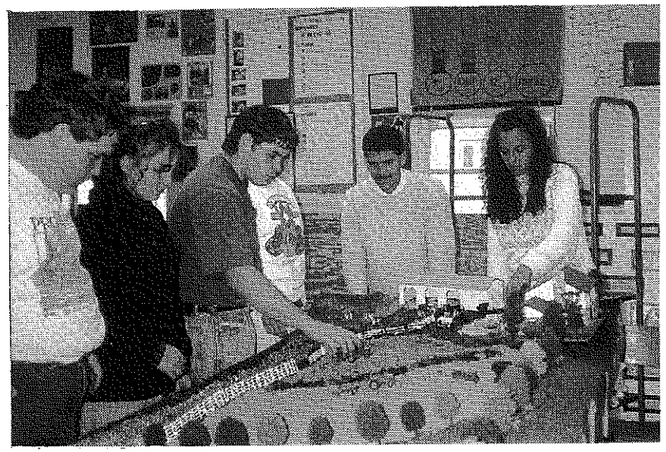
We accepted 23 students into the program on April 22, 1992 and began our 1st year of Tech Prep in September. Our goals were:

- to improve student G. P. A.
- to improve attendance
- to improve student work habits in two areas
- to increase standardized test performance in reading and math
- to increase student participation in →

Small Schools . . .

(continued from page 6)

example, sponsored a class on bovine reproduction. Nearly 100 farmers were in attendance to hear the lecture and eat ice cream sundaes provided by the clinic. One veterinarian also mentored a young student in the FFA Agriscience competition. As a result of her project, she was a scholarship winner.



Principal Ed Burns is a valuable part of the agriculture department. Shown here, Burns is inspecting an exhibit for the state farm show. (Photo by Diana Ertman)

Collaboration with other agricultural agencies proves to be beneficial to all groups involved. County extension agent Dave Swartz and I work together throughout the year doing animal registration for the state farm show, county fair events, adult education, and day school classes. Swartz, a fellow Penn State classmate, has taught programs covering dairy nutrition, manure management, and ground water protection for the Greenwood agriculture department. "This type of cooperation helps us reach more people," he says, "and we really complement each others' program." In addition, Roger Dressler, from the Pennsylvania Department of Agriculture, presents a pesticide certification workshop to the school each March.

Although Greenwood School District is rural, few families generate their entire income from production agriculture. The relevancy of the department's contemporary programs needed to be marketed to the community. This was done by forming a series of mutually beneficial collaborative relationships which have enabled the school district to provide an agriculture program that touches the dairy owner and the hobby gardener, the high school student and the adult learner, the town resident and the country farmer. ■

A F.R.E.E. Guide . . .

(continued from page 8)

school clubs/activities

– to increase parent involvement by 50%

The initial results are positive, showing a 10% increase in both G. P. A. and attendance from last year and a 20% decrease in tardiness. The rest of the goals have not been adequately studied, but one interesting unplanned phenomenon has occurred. In general, the students selected for Tech Prep have never been selected for anything. That 25th - 75th percentile, often referred to as the forgotten majority, is neither offered extra help to improve nor given awards for their excellence. There is an obvious change in these students' self-esteem that has taken place as a result of their participation in Tech Prep. They have found their place at CHSAS and feel they are an important piece of its puzzle.

Challenges

Lest this article create too lofty an impression of what the Tech Prep curriculum can accomplish, let me digress and talk about some of the tough parts of developing this program.

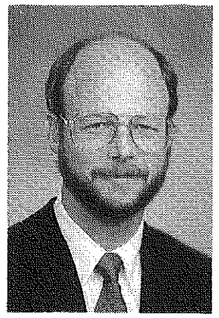
First, you need to create a program that can translate into real jobs in your area. You need an industry to support your efforts. In these times of economic insecurity this can be a tough task.

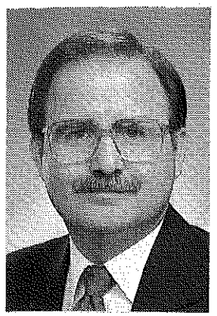
Second, you must have the support of a postsecondary institution. Some postsecondary institutions may see Tech Prep as a threat, or think Tech Prep is just another buzzword or program in education. We found vast differences in attitude, depending on which colleges we talked to. In short, you have to find a college that wants to work with you to develop a new program, not just fit you into their old curriculum.

Third, you need administrative support. We are lucky at CHSAS to have a principal, Dr. Barbara H. Valerious, who recognized the importance of developing programs that foster student successes, for every time students succeed, they will try again. Dr. Valerious has shown her support by allowing the Tech Prep team to attend planning sessions and conferences, fostering support for the Tech Prep program from all faculty members and the Local School Council, and honoring the Tech Prep students by asking them to talk to visitors at the school.

Lastly, you need a group of progressive teachers who are willing to change with the times. Vocational teachers need to become more academic, and academic teachers need to be more vocational. New curricula that integrate academic disciplines into vocational classes must be developed, for the workplace of 2,000 will have to deal with rapid advancements in technology. ■

Blending Outcomes Based Education and Tech Prep





BY DAVID WHALEY, DAN R. LUCERO, AND GLEN RASK

Dr. Whaley (top) is program chair of agricultural education, Dr. Lucero (center) is program chair of vocational education, and Dr. Rask (bottom) is associate professor of agricultural education at Colorado State University, Fort Collins.

In a world where the information we have on any given subject doubles every two and a half years, where 50 percent of the jobs performed today didn't even exist 20 years ago. . . and where 20 years from now 90% of the information a worker has to cope with on the job will have been created after today, the only constant is change. And the only security in such a world is understanding that change and adapting to it.

P. D. Fyke,
Chase Manhattan Bank

Colorado agricultural education has a rich history, dating back before the Smith Hughes Act of 1917, in supporting production agriculture. In a state where rural counties outnumber the larger urban or suburban metro areas six to one; where cattle, corn, and hay are the top agricultural enterprises; where the overall revenues generated from production agriculture exceed 27 billion dollars; and where jeans and boots are the attire of choice for many of the residents, production agriculture has been valued for generations.

Yet, present day agricultural education is in transition away from its production agriculture roots. Fewer entry level entrepreneurial opportunities in production agriculture, greater efficiency of agricultural practices, an emphasis on advanced technology, and an accessible global marketplace have brought about changes in traditional agricultural education delivery systems. Young men and women completing agricultural education programs in the 1990s are more likely to be consultants, processors, and suppliers rather than the actual producers of food and fiber. Today's progressive instruction may more likely emphasize animal and plant genetics, commodities marketing, computer applications, and integrated resource management.

The modern workplace requires advanced technical skills and an ability to understand complex theories and processes in rapidly changing and emerging technologies. Most jobs that offer growth, challenge, and earning potential require a working knowledge of math, science, technical principles, and information/communication skills. However, industry has acknowledged that students are inadequately prepared for the world of work. According to the Wisconsin Board of Vocational, Technical, and Adult Education (1992, p.3), "The majority of high school graduates enter adulthood without the education and skills to allow them to achieve their full potential." Further, the lack of highly skilled technicians is reported as preventing the American industry from being more competitive in the global marketplace.

Given this need to facilitate a shift away from traditional agricultural education practices and the parallel need to produce a more highly skilled and better paid agricultural technician, a Tech Prep initiative was launched for agricultural education programs in Northern Colorado. Through this effort, secondary and postsecondary agriculture programs were joined in a partnership to produce integrated and articulated curriculum and to identify delivery strategies for the present and future industry.

Given this need to facilitate a shift away from traditional agricultural education practices and the parallel need to produce a more highly skilled and better paid agricultural technician, a Tech Prep initiative was launched for agricultural education programs in Northern Colorado.

Initially, the Tech Prep project established a consortium of participants, which included two community college campuses and 17 secondary programs. Agricultural education staff at Colorado State University agreed to serve as inservice coordinators and evaluators. According to Dr. Clay Whitlow, Vice-President of Educational Services, Colorado Community Colleges and Occupational Education System (1993, p.1), "This integration model expands the limit of program content and redefines the limits of instructor responsibility. It is based on students' needs, recognizing that there are opportunities for employment in continuing education."

Essential to the success of the Tech Prep effort was the adoption by consortium members of the Outcomes Based Education (OBE) format for constructing the articulated curriculum. OBE is the process of defining curriculum content in terms of learner outcomes (what is to be taught). It presumes an empowerment-oriented instructional design in which "the outcome is defined as a successful demonstration of learning that occurs as at the culminating point of a set of learning experiences" (Spady and Marshall, 1992, p.14). →

Under this OBE implementation approach,

Fewer entry level entrepreneurial opportunities in production agriculture, greater efficiency of agricultural practices, an emphasis on advanced technology, and an accessible global marketplace have brought about changes in traditional agricultural education delivery systems.

local staff take the curricular content and structure that currently exist and determine those essential components truly needed for students to learn a high degree of performance. Once these curricular outcomes are identified, they are used as the basis for curriculum, instructional design, and evaluation. Finally, outcomes at the secondary and postsecondary levels are aligned to produce a continuum of essential educational experiences which eliminate or reduce loss of credit, delays, and unnecessary duplication.

Participants in the Northern Colorado Tech Prep Consortium agreed to undertake an intensive examination of existing curricula and to produce a revised curriculum utilizing OBE. Initial meetings with consortium members were focused on efforts to get high school teachers, postsecondary instructors, and school administrators to "buy in to" the need to restructure existing curricula in agricultural education. Panels of agriculture industry representatives were brought before consortium members to discuss their perceptions of the industry's need for a trained workforce. Industry leaders confirmed the need for well prepared employees and stressed the importance of life skills in concert with high level technical skills for today's workforce. Education leaders experienced in OBE also shared their insights and recommendations with consortium members.

Early efforts produced the document *Essential Life Skills for Today's Workforce: Suggested Outcomes and Competencies Needed for Use in Developing Secondary Agricultural Education Programs of Study in Colorado* (Rask and Whaley, 1992). This document addressed educational outcomes in the following categories: a) interpersonal skills, b) work ethics and behavior, c) self-management, d) higher order skills, e) communication skills, and f) mathematical skills. The document was used as an essential reference by agriculture instructors as they defined the essential life skill outcomes of their instructional programs. Subsequent efforts were designed to produce and adopt technical and skill-based outcomes in agricultural content which are needed by program completers. Both documents were utilized at each instructional site to aid teachers in developing a progressive curriculum in agricultural education. Local program advisory committees and educators from science, math, and counseling disciplines were asked to provide input and validate the identified outcomes.

As outcomes were identified, consortium members initiated efforts to develop and adopt articulation agreements between the secondary and postsecondary sites. Although most Tech Prep articulation agreements traditionally operate on a "2+2" basis (two years of high school and two years of postsecondary education), this consortium engaged in a "2+2+2" cooperative relationship, which included articulation with Colorado State University. Currently under development, these agreements will initially be used to maximize the continuum of educational experiences in agriculture, from secondary through the postsecondary levels.

Further efforts were launched in the Colorado consortium to assess the effectiveness of the total Tech Prep effort. Baseline data were collected on student retention rates, grade point averages, college board exams, and college admissions. Portfolio assessments of program completers will be compared with baseline data to determine the effectiveness of this Tech Prep initiative.

The experiences of this Colorado Tech Prep program in agricultural education have produced strategies and recommendations for future efforts:

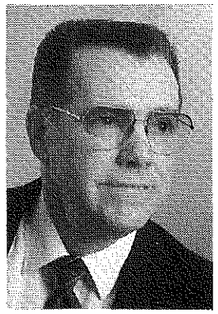
1) Teachers and school administrators (principals) are the ones who facilitate systemic programmatic changes, thereby directly affecting the success of OBE and resulting Tech Prep efforts. Teachers and administrators must be included in all phases of planning, implementation, and evaluation of Tech Prep programs. Faculty members from each school should participate in the identification and evaluation of learner outcomes. Counselors should also be included in promoting student recruitment into the program and monitoring student progress. Secondary faculty should view Tech Prep as a means of assisting their students in moving more rapidly and with a higher level of technical competence into the workforce or to an advanced educational level. Postsecondary faculty must view Tech Prep as an asset to their programs, providing the postsecondary institutions with enthused, competent, and qualified learners.

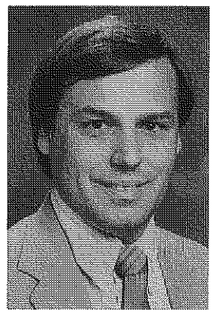
Outcomes Based Education provides a viable curricular approach for rethinking the content and delivery of relevant instruction.

2) Outcomes Based Education provides a viable curricular approach for rethinking the content and delivery of relevant instruction.

(continued on page 14)

A Statewide Alliance for Improving Adult Education





BY RICHARD TREAT AND RANDEY WALL

Mr. Treat (top) is District 1 FCAE field advisor for agricultural education, Joy, Illinois. Mr. Wall is ornamental horticulture instructor at Illinois Central College, East Peoria.

Many changes in agricultural education in Illinois were spawned by the Illinois Leadership Council for Agricultural Education (ILCAE)[1] starting in 1984. One of the most significant results of these changes was the development of a K-Adult plan for improving agricultural education. While most of the early efforts were focused on improving the secondary and K-8 programs, adult agricultural education has recently begun to receive more attention.

In the spring of 1991, representatives of the major contributors to adult agricultural education in Illinois formed the State Adult Agricultural Education Committee (SAAEC). It was composed of representatives from secondary and community college agriculture programs, universities, Cooperative Extension, Farm Bureau, Illinois Leaders in Agriculture (Young Farmers), and the State Department of Adult, Vocational, and Technical Education. A field advisor from the Facilitating Coordination in Agricultural Education (FCAE)[2] project was appointed as chairperson.

It was determined at the first meeting that the SAAEC would function as an advisory committee to the Illinois State Board of Education and to the Illinois Committee on Agricultural Education (ICAE)[3] The committee also agreed that their purpose would be "to determine the most efficient and effective delivery systems for adult agricultural education in Illinois, and to promote their implementation." In a subsequent meeting, the committee reviewed and adopted the definition of adult education in agriculture as previously adopted by the National Adult Education Task Force (1991). This was particularly helpful as it provided a framework and focus for the committee's work.

[1] ILCAE is composed of over 125 leaders from agricultural industries, community organizations, and educational institutions. ILCAE lobbies the legislature for funds specifically for agricultural education.

[2] FCAE is a State project administered through the Illinois State Board of Education, with the Illinois Committee on Agricultural Education (ICAE) serving an advisory role. FCAE addresses the aims of Public Act 84-1452 involving the implementation of identified goals for improving education in and about agriculture in Illinois.

[3] ICAE is composed of 13 members sanctioned by Public Act 84-1452 which was signed into law Sept. 9, 1986. ICAE is mandated to develop curriculum and strategies to establish a continuing source of trained and qualified individuals in agriculture.

After the initial meeting, the committee spent considerable time sharing information concerning how each organization conducted adult education and what kinds of programs were included. This awareness development proved essential to understanding one another's problems and gaining an overall perspective that would be necessary to develop an effective and efficient delivery system.

The SAAEC recognized that each community had many more contributors to adult agricultural education than were represented on the committee. To obtain valuable information pertaining to these grassroots contributors, five district level focus group meetings were conducted around the State. These focus groups consisted of two representatives each from secondary programs, community college programs, Cooperative Extension, and Farm Bureau. The focus group members were selected based on their interest and experience in adult education. Four purposes were identified for these meetings:

1. Gather local input regarding the nature and scope of current cooperative activities;
2. Identify success, benefits, and barriers related to the cooperative efforts;
3. Identify the need for new or expanded cooperative efforts; and
4. Identify the need for coordinating adult education at the local, regional, or state level.

The focus group meetings proved to be quite worthwhile and provided a valuable perspective to the SAAEC. Of particular interest was the fact that while most members of the focus groups were involved in some degree of cooperation with one another and with other local agencies, there was no overall coordination of programs or any comprehensive local planning. Thus, there were reported instances of competing programs, duplication of programs, and underutilization of available expertise and facilities. A descriptive survey was used to gather additional information from the focus group members. There were 34 respondents to the survey, and the following results were obtained.

1. The focus groups primarily consisted of experienced, well-educated males. Their main involvement in adult education entailed organizing, coordinating, and promoting the programs. Few did any actual teaching.
2. Seventy percent indicated that they cooperated with other programs. Major cooperators were community colleges, Cooperative Extension, and agricultural business and industry. Less often mentioned cooperators were public service and health agencies.
3. Agricultural producers were the largest group served, followed by the general public. Agricultural service and supply was the most served industry group. Farm Bureau programs were primarily for managers; community college and Cooperative Extension programs were oriented more for employees.
4. The total median number of adult programs provided by each focus group was 55. Cooperative Extension provided the greatest median number with 32.
5. Seventy percent of adult programs were in agriculture subject matter areas. Twenty percent of the programs were in agriculturally related subjects. (Percentages are median numbers.)
6. The focus group members generally believed that their programs would benefit from more coordination, but they felt that barriers currently exist that prevent coordination from occurring. However, they also believed that the barriers can be removed.

The SAAEC recognized that the above information was gathered from a select group of individuals who had interest and experience in adult education and was not statistically representative of the entire state.

The efforts of the SAAEC and the results from the district meetings (including the survey) were summarized into a resolution advocating cooperation and coordination among all entities involved in adult agricultural education. This resolution, shown below, was submitted to all agencies for approval by their respective executive boards or executive officer. It was approved and signed by representatives of all agencies involved in the SAAEC during the Annual Illinois Farm Bureau Conference on December 8, 1992.

Members of the recently formed State Adult Agricultural Education Committee in Illinois: (front row, L to R) Doug Stockley, Illinois Association of Community College Agriculture Instructors; Wallace Appleson, Illinois Community College Presidents Council; Art Englebrecht, Illinois Association of Vocational Agriculture Teachers; William Schreck, Illinois State Board of Education; (back row, L to R) Jim Oliver, Illinois Cooperative Extension Service; Randey Wall, Illinois Committee on Agricultural Education; John White, Jr., Illinois Farm Bureau and Illinois Agriculture Association; and John Adams, Illinois Leaders in Agriculture.

RESOLUTION

Each of the undersigned entities hereby adopts the following resolution:

WHEREAS, *the food and fiber industry in the State of Illinois consists of progressive and innovative businesspersons, and requests timely, educational information which improves their management decision making, and net income;*

WHEREAS, *we recognize the need for adult agricultural education and place it as a high priority; and*

WHEREAS, *we realize the need for a coordinated effort between all entities conducting adult agricultural education in Illinois,*

NOW, THEREFORE, BE IT RESOLVED, *that we, the undersigned, encourage a cooperative effort to provide a comprehensive program of adult education in agriculture based on local needs.*

FURTHER RESOLVED, *that this effort be implemented in the following manner:*

1. *The University of Illinois Cooperative Extension Service (CES) shall serve as an information clearinghouse to facilitate improvements in adult agricultural education,*
2. *Organize adult agricultural education by community college districts with one person serving as coordinator,*
3. *All program planning or advisory committees should include representatives of appropriate agricultural entities,*
4. *Recommend the Agricultural Education Supplemental Funding Application for secondary agriculture programs be modified to reward educators for their efforts with adult education programs that result from cooperation with another entity,*
5. *Develop coordinated adult education planning schedules for all entities,*
6. *Seek the addition of a new Facilitating Coordination in Agricultural Education (FCAE) staff position to promote programs in adult education and agricultural literacy,*
7. *Seek additional financing to fund adult education program costs,*
8. *Support pilot projects and utilize new communication technology which promote improvements in adult agricultural education, and*
9. *All entities involved adopt policies which advocate and reward cooperative efforts in planning and implementing adult agricultural education.*

→

The SAAEC believes that the resolution will have a number of positive implications for Illinois adult agricultural education. These include: 1) more efficient use of the resources available for adult education; 2) better coordination and better attendance at programs; 3) less duplication of programs, which may allow expansion of offerings; 4) better communication among agencies, enabling programs to assist local coordinating committees in programming; and 6) expanded access to additional resource persons and their areas of expertise to better meet client needs.

The resolution signing was viewed by the SAAEC as an important first step. Without the approval and support of top management, the committee did not believe their efforts would have much effect. The committee is now addressing the second part of their adopted purpose--implementation. Strategies for organizing coordinating committees in each of the 54 community college districts are being developed. The first coordinating committees will be formed within districts that have community college agriculture programs. These committees are expected to be in operation by the fall of 1993. A model coordinating committee has already been formed within one district, and information obtained from this project will be used to develop operational guidelines for other committees. In addition, the Cooperative Extension Service has agreed to establish the adult education database and clearinghouse within their facilities on the University of Illinois campus, with initial planning already underway.

The SAAEC has come a long way from its initial meeting. While there may certainly be other ways through which adult agricultural education can be improved, this approach so far has shown great promise in Illinois. Some of the more important actions which contributed to the success the SAAEC to date are: 1) identifying individuals who were committed to improving adult education to serve on the committee, 2) developing a well-defined purpose and viable objectives, 3) providing time to allow committee members to learn about each other's organizations (size, scope, philosophy, strengths, and weaknesses), 4) gathering grassroots input on which to base recommendations, and 5) obtaining recognition and acceptance of the committee and its resolution from top management. ■

Blending Outcomes cont . . .

(continued from page 11)

Yet, OBE is not without controversy. Headlines in *The Coloradan* (March 10, 1993) reported that "Parents try to stop outcome-based education." A February 14, 1993 article in this same local newspaper stated "Outcomes-based education: True test of skills or touchy-feely failure?" Obviously, without the essential "buy-in" of all those affected by the Tech Prep efforts, there will be suspicion and misunderstandings. Therefore, open communications are needed at every step.

Linking secondary and postsecondary programs in agriculture is one of the primary goals of this Tech Prep Consortium. The demand for this effort has been created by the changing economic, technological, demographic, and educational forces of the agricultural industry. Through collaborative efforts by teachers and administrators in Northern Colorado, a new strategy for delivering appropriate agricultural education has been implemented. Through an Outcomes Based Education format, a new curriculum has enabled Tech Prep participants to better meet the needs of this vibrant industry.

For business and industry, successful Tech Prep programs have implications for regional and national competitiveness. "In states where workers lack high school credentials and essential work skills, where large numbers of high school students opt out of further education, and where employers are asking for better qualified technical workers, Tech Prep has the potential to revolutionize occupational preparation" (Scott, 1991, p.63). Tech Prep can be the vehicle necessary to introduce and implement school reform and change. ■

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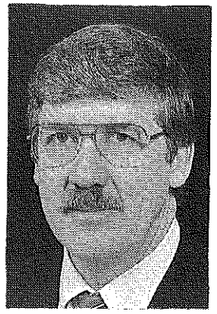
Futures Studies as Curriculum Building Blocks for the 21st Century



BY MAYNARD J. IVERSON

Dr. Iverson is associate professor and head of agricultural education at the University of Georgia, Athens.

We should all be concerned about the future, because we will have to spend the rest of our lives there!

-- Charles Kettering

The mind of man is capable of anything -- because everything is in it, all the past as well as all the future.

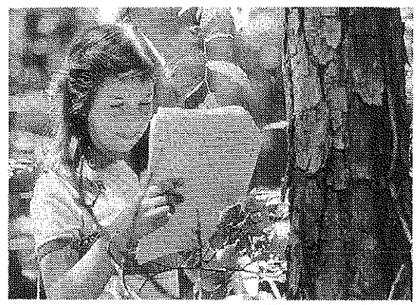
-- Joseph Conrad

Curriculum is the key to the future of agricultural education, for it is the **prediction** of the future skills of our students. Unfortunately, while buildings, equipment, and personnel may be relatively permanent, curriculum is perishable; it has a short "shelf life" and can become outdated before we realize it. When this happens, outsiders will often call our attention to the need for change.

This happened in the 1960s with the Vocational Education Act of 1963 and the 1968 Amendments, which legislated a broadening of the vocational agriculture program. In the 1980s, state legislatures got into the act; in many states, the agricultural education program was impacted by state legislative mandates and by the increase in local control. A number of states, including Georgia, responded by hosting "futures conferences." At these events participants representing major constituent groups made recommendations for improving the agricultural education program. Curriculum modification was a frequent recommendation (Sheppard, 1989). The publication of the National Summits gave further impetus to curriculum change.

The Time-lag Dilemma in Curriculum Development

Traditionally, curriculum development is based on the past, or at best, the fleeting present



In the 21st century, future foresters will integrate cultural knowledge with biological concepts. Women and minorities will make up a greater proportion of forestry employees than at present. (Photo courtesy of the Agricultural Communications Department, The University of Georgia)

(Figure 1). The traditional model involved surveying incumbent workers to determine what tasks they perform on the job -- not considering what changes will take place before the curriculum is in place (Dede & Allen, 1981). Consequently, there is often a four- to seven-year lag in the process from conception to implementation. Clearly, it is difficult to prepare students for jobs in the future with curriculum that is based on the past. Planning experts generally agree that curriculum should be based on a forward-looking model (Ravich, 1983; Cornish, 1987; Murphy, 1987). A futuristic model, using the Delphi technique, contains traditional components but provides curriculum that is based on future projections by experts in the respective technical fields (Figure 2). Finch & Crunkilton (1984) identified the Delphi technique as one of six major strategies for determining curriculum content.

The Delphi technique is named for the Oracle at Delphi who ancient Greeks visited in order to gain insight into the future. Modern →

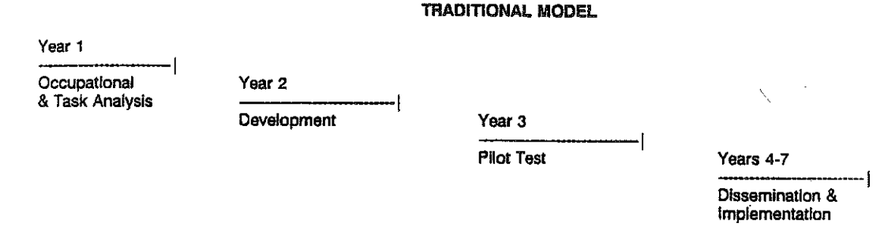


Figure 1. *Traditional model of curriculum development.*

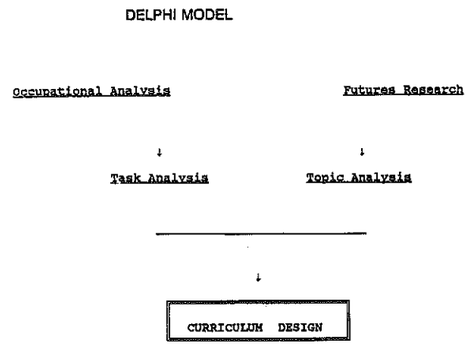


Figure 2. *Futuristic model of curriculum development.*

use of the term began in the 1950s when the Rand Corporation, operating under contract with the US Air Force, asked leaders in defense to predict the country's readiness for nuclear war. Subsequently, researchers in a wide range of fields, including government, medicine, industry, and education, discovered that the technique was useful in program planning, forecasting, policy development, problem identification/solution, and curriculum planning (Uhl, 1983).

Curriculum Research in Georgia

In 1987, faculty in agricultural education at the University of Georgia initiated a futures-oriented series of studies in the curriculum area. Teachers of agriculture who were enrolled in the Education Specialist (Ed. S.) or doctoral (Ed. D.) programs selected technical agriculture areas for "futures" studies using a modified Delphi technique.

The Delphi researchers in Georgia conducted extensive reviews of the literature on their respective areas of agriculture. In most cases, few projections were found that went beyond five years. Consequently, the investigators searched trade journals, popular magazines, conference proceedings, and current media for ideas related to the future of their respective fields. Literally hundreds of statements were generated; the researchers used review panels composed of experts from the technical fields and from education in order to reduce the lists to fewer than 100 statements for the final data-gathering instruments.

At the same time, nominations of the most futuristic thinkers in the field were solicited from state and national trade associations, university departments, and Cooperative Extension specialists in the respective technical areas. The 20 to 30 individuals who received the most nominations were then asked to serve on a Delphi panel. The results of the first-round response were included in the second-round instrument, so each Delphi panelist could observe how the other members had rated the items. Respondents' comments were also included with the second round so that panelists could see the reasons why others responded as they did. After two rounds, when little movement in ratings was observed, the researchers analyzed the results and summarized the items on which consensus had been reached into curriculum areas that would be most important in the future.

Studies have been completed in the areas of nursery/landscape (Flanders, 1988), meats →

Forest Industry

Air Quality	Endangered species	Marketing forest products
Biological pest control	Environmental concerns	Multiple use
Career opportunities	Ethics	Professional and trade organizations
Changing demographics	Forest protection	Public relations
Computers in forestry	Genetic engineering	Recycling
Conservation education	Global markets	Remote sensing technologies
Ecosystem change	Government regulations	Social skills
Ecosystem management	Growth and yield predictions	Urban forestry
Education of resource users	Industry certification programs	Water quality
Effective communications	Integrated pest management	
Employment-seeking skills	Managing natural resources	

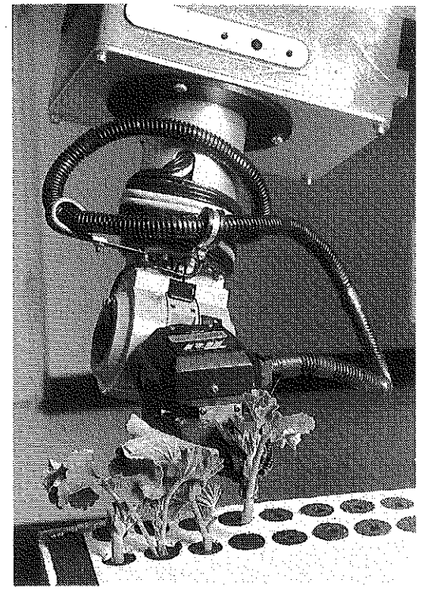
Greenhouse Industry

Advanced irrigation techniques business	Integrated pest control systems	Plant packaging and shipping procedures
Management skills	Marketing/advertising	Problem solving
Career opportunities	Mathematics	Robotics systems
Computer usage	Operation of greenhouse equipment	Science in the greenhouse industry
Educational needs of greenhouse personnel	Orientation to higher education	Standardized plant sizing, grading, and tagging
Effective communication	Orientation to industry organizations	State and federal regulations
Environmental control systems	Personal relations	Supplemental lighting systems
Environmental protection	Plant breeding and genetics	

Dairy Industry

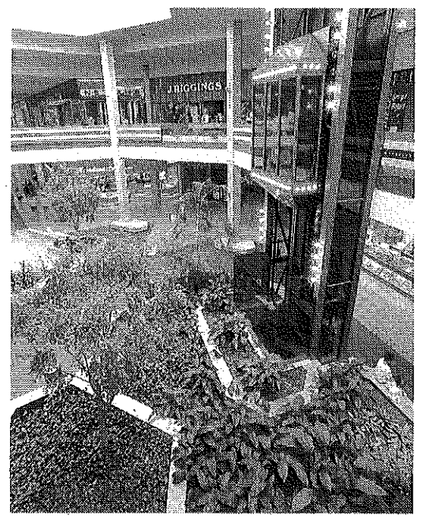
Agricultural ethics	Dairy cattle judging and evaluation	Leadership and personal development
Animal breeding and genetic improvement	Dairy mechanics and technology	Marketing products and by-products
Biotechnology in dairy science	Dairy processing	Milk secretion
Career opportunities	Farm and agribusiness management	Quality control techniques
Computers in dairy science	Forage production and management	Reproductive management
Cooperative business organizations	Herd health	Ruminant nutrition and feeding

Figure 3. *Curriculum content areas identified for selected futuristic programs in Agricultural Education.*



Robots will perform many greenhouse operations in the 21st century. (Photo courtesy of the Agricultural Communications Department, The University of Georgia)

(Varnadore, 1989), greenhouse crops (Kaylor, 1990), dairy production (Collins, 1991), broilers (Embrick, 1991), and the forest industry (McAllister, 1992). (See Figure 3 for lists of futuristic topics in selected technical areas.) Investigations are currently underway in the following industries: beef cattle, cotton, horses, peanuts, seed processing, sheep, swine, and turfgrass. These studies will form the "building blocks" for the agricultural education curricu-



*Already a reality in many urban centers, **interiorscaping** will be widespread in the 21st century. (Photo courtesy of the Agricultural Communications Department, The University of Georgia)*

lum in Georgia into the 21st century.

Conclusions

We believe that the curriculum in agricultural education should be futuristic, that the Delphi technique is an effective method to achieve this futuristic orientation, and that successful curricula of the future will utilize both task analysis and futures research. If we are to avoid the criticism and mandates of outside forces, we must utilize forward-looking strategies in program development. In Georgia, we stand ready to cooperate with agricultural educators in other states who look to the future in program planning and implementation. The results of our futures studies should be tested by teachers and curriculum specialists and then incorporated into the curriculum development process. Your ideas for accomplishing this process are solicited. ■

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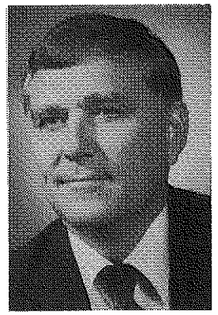
Strengthening Programs Through an Expanded Model for SAE



BY GARY MOORE AND JIM FLOWERS

Dr. Moore is professor and Dr. Flowers is associate professor of agricultural education at North Carolina State University, Raleigh.

The Swiss were not willing to change and have suffered the consequences. At one time they dominated the timepiece market, but today the Japanese are the world leaders. The reason for this is because the Swiss were not willing to change the way they made watches. When they discovered the quartz movement for watches, they rejected the idea. It did not fit into the Swiss paradigm of watchmaking, which said watches must have mainsprings and balance wheels. They didn't even patent their discovery. The Japanese adopted the quartz movement and the rest is history.

Over the years, the project method of teaching and its offspring (the supervised farming program, the supervised occupational experience program, and now the program of supervised agricultural experience) has served agricultural education well. When the idea was promulgated in 1908 by Rufus Stimson of Massachusetts, it was accepted and adopted in agricultural education and in most other areas of education. Agricultural education was the leader in education reform as the "project" replaced the dry, boring, recitation method of that era. But in this era of integrating academic and vocational education and developing critical thinking skills, a new paradigm for Supervised Agricultural Experience must be embraced. If we don't, we may get left behind in the educational arena like the Swiss were in the watchmaking arena.

An Expanded Model For SAE

The National Research Council (1988) in *Understanding Agriculture: New Directions for Education* recommended that the relevance and scope of SOE be broadened. In response to this recommendation, a national task force on SAE was convened to work on enhancing the SAE program. A model developed by the task force was described in the December, 1992 issue of this publication (Barrick, 1992; Hughes, 1992). After considerable discussion of the task force model, agricultural educators in North Carolina took the model and refined and expanded it even further. New components were added, and some of the traditional components that were not readily visible in the task force model were included. The expanded model is graphically depicted in Figure 1. This model recognizes that agricultural education has two outcomes: agricultural literacy and career preparation. The model embraces the traditional components of SAE, such as entrepreneurship and placement, but adds new components designed for students in agriscience classes, agrimarketing classes, and other emerging areas in agriculture. A discussion of each component of the model follows.

Major Components of SAE

Exploratory - This type of SAE is appropriate for beginning agricultural students but is not restricted just to beginning students. This SAE activity is designed primarily to help students become literate in agriculture and/or become aware of possible careers in agriculture. Examples of exploratory SAE activities might include observing and/or assisting a florist, interviewing an agricultural loan officer in a bank, preparing a scrapbook on the work of a veterinarian, and growing plants in a milk jug "greenhouse." The teacher will need to establish minimum standards (hours required for each exploratory activity and/or number of exploratory activities). Records are to be kept by the student. For an in-depth discussion of exploratory programs, see Arrington's article in the December 1992 issue of this magazine.

Entrepreneurship - Simply stated, the student owns and manages some type of agricultural enterprise, such as a crop, livestock, or an agricultural business. Examples of entrepreneurship activities include growing an acre of corn, operating a Christmas tree farm, growing bedding plants, raising a litter of pigs, owning a lawn care service, and a student cooperative growing poinsettias. Moody (1992) describes entrepreneurship programs in detail in the December issue of this publication.

Placement - Placement has been a major component of SAE since the 1960s. Students are placed in jobs in agribusiness firms, in school or community facilities, and on farms or ranches. This is typically done outside of normal classroom hours and may be paid or nonpaid. Students keep records as to hours worked, type of work activities performed, and wages. Examples of placement SAE include working after school at a farm supply store, placement in a florist shop, working on Saturdays at a riding stable, and working in the school green- →

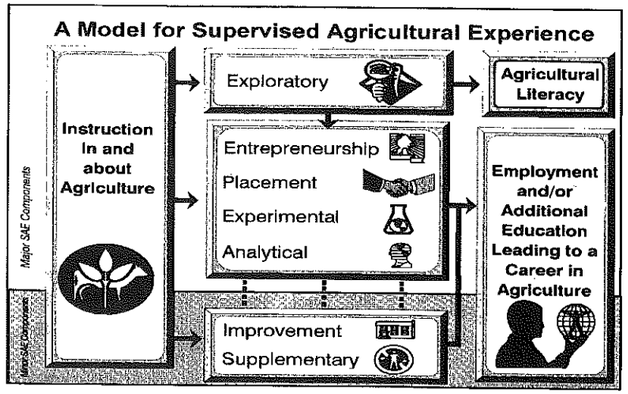


Figure 1. An expanded model for SAE programs.

house after school and on weekends and holidays. The December 1992 issue of this magazine contains an article describing the importance of placement in relation to SAE (Doerfert, 1992).

Experimental - While entrepreneurship and placement SAEs are certainly excellent forms of experiential learning, equal value should be placed on nontraditional SAE programs. Experimental is a new category of SAE where the student plans and conducts a major agricultural experiment using the scientific process. The purpose of the experiment is to provide students with hands-on experience in:

1. Verifying, learning, or demonstrating scientific principles in agriculture.
2. Discovering new knowledge.
3. Using the scientific process.

This type of activity is particularly suited for students in agriculture classes where there is a strong emphasis on biotechnology or agriscience. While it would be desirable for students in these classes to have entrepreneurship or placement SAEs, the reality is that placement and entrepreneurial activities in biotechnology and agriscience are limited in many communities. Experimental SAEs may be the best type for some students. Even in more traditional agriculture programs, experimental SAE activities can provide students whose career goals are in the areas of agriscience with valuable learning experiences. While some experimental activities could be classified as exploratory, there are other experimental activities that are of such scale and scope that it would diminish the importance of the activity to call them exploratory. For example, a student who has conducted a semester length experiment that compares using fish waste from an aquaculture system as fertilizer to using chemical fertilizers in raising lettuce hydroponically has gone well beyond the exploratory level. Or, would a student who is comparing drip irrigation to sprinkler irrigation in the production of tomatoes be considered to be conducting an exploratory SAE? The answer is no! Experimental as a component of SAE is a new category that is needed.

A quality experimental SAE should:

- Focus on an important agricultural/scientific question or principle;
- Have specific objectives;
- Involve a number of steps;
- Be of sufficient size and scope to assure a quality learning experience;
- Require a moderate to substantial time commitment on the part of the student; and
- Be supervised by the teacher.

In conducting an experimental SAE the student will follow the scientific process. Specifically, the student will:

1. Identify a problem to study or principle to demonstrate;
2. Conduct a thorough review of the literature;
3. Design the experiment;
4. Formulate hypotheses;
5. Conduct the experiment;
6. Make regular observations and record them;
7. Arrive at conclusions; and
8. Report the results.

Examples of experimental SAE activities could include comparing the effect of various planting media on plant growth, determining the impact of different levels of protein on fish growth, or comparing three rooting hormones on root development.

Analytical - Not all of the experiential activities in which students may participate can neatly be classified as exploratory, entrepreneurship, placement, or experimental. For example, a student in an agrimarketing class may complete an in-depth market analysis of an agricultural commodity and follow that activity with simulated trading activities in the commodities market over an extended period of time. This is more involved than exploratory but doesn't fit into the other categories.

Another example is a student who is interested in agricultural journalism and writes a series of articles on agriculture in the community for the local newspaper. The student may not necessarily be on the newspaper staff and may not actually have a placement agreement with the newspaper.

These SAE programs involve an extensive amount of research and analysis and require students to place their opinions and thoughts on

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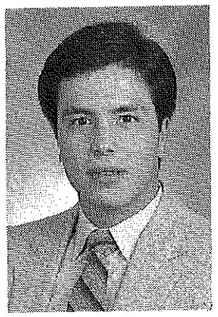
Using Evaluation to Strengthen Programs



BY N. L. MCCASLIN AND ROBERT M. TORRES

Dr. McCaslin (top) is associate professor and Mr. Torres is a graduate associate in agricultural education at The Ohio State University, Columbus.

The last decade of educational reform has placed emphasis on improving the quality and accountability of programs. The educational reform movement first became apparent with the release of *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education, 1983). More recently, other reports (U. S. Department of Education, 1991; Commission on Skills of the American Workforce, 1990; Secretary's Commission on Achieving Necessary Skills, 1991) have echoed the concern for reform in education and recommended future directions.

The report *Understanding Agriculture: New Directions for Education* (National Research Council, 1988) concluded that the quality of agricultural education must be enhanced, "in some cases substantially" (p.4). If people in your community were asked about the quality of your agriculture program, what would they say? Would parents want their children to enroll in your program? Would they view your program as potent, effective, and efficient?

Teachers of agriculture wanting to strengthen and improve the quality of their programs need objective information from which they can make decisions regarding future directions. Evaluation can help provide information for addressing this concern. Worthen and Sanders' (1987) definition of evaluation as the act of rendering judgments to determine the value–worth and merit–of a program reinforces the use of evaluation information to improve programs.

A question often arises in the evaluation process regarding the types of information that can be used in judging the value of a program. Much of the current literature on educational reform has only emphasized information about student outcomes. However, if outcome information is all that is available, what was the "added value" that the program provided? To what extent did students' prior knowledge and/or community expectations impact the outcomes? How can agriculture teachers determine what worked and did not work in attaining desired outcomes? What should be changed if agriculture students are to achieve at higher levels? McCaslin (1990) proposed that evaluation include valid and reliable information of three types:

1. the need for programs as expressed by the clients (that is, students and employers) and society;
2. the processes followed by education programs; and
3. the outcomes achieved by education programs.

Needs for Agricultural Education

What is meant by the term "needs?" Kaufman and Stone (1983) indicated that needs are gaps that occur between "what is" and "what ought to be" in terms of program results. Once these gaps have been identified they must be placed in priority order.

Three sources from which to gather information about agriculture program needs are students, prospective employers, and society in general. Students enrolled in our programs can provide excellent information regarding their interests, knowledge, attitudes, and skills. Prospective employers can provide valuable input regarding the knowledge, attitude, and skills that they seek in prospective employees. Finally, information regarding the educational, economic, and social needs of society should be collected from groups, such as taxpayers and policy makers (e.g., school administrators, school board members, county commissioners, city and town counselors, and legislators).

Processes of Agricultural Education

What should we do to help ensure and enhance a high quality program? How can we identify a strong, accessible, and relevant program? One way is to gather evaluative information on the processes of agricultural education. Process information provides the evaluator with a basis for understanding and interpreting the results or outcomes of a program.

Six types of process information can be used in evaluating the quality of agriculture programs. These include: 1) Organizational Information; 2) Program Information; 3) Support Services and Activities Information; 4) Staff Information; 5) Student Information; and 6) Community Information. Information about the program can be obtained through interviews, observation, reviews of existing documentation, and surveys. ➔

In agricultural education, organizational information answers the question of how the program behaves and operates within a broader environment of the school system. Information related to organizational structure, facility location, organizational climate, administrative style, teaching style, and the type of school (e. g., comprehensive, vocational-technical, career center) are types of organizational information.

Program information relates to how agricultural education is conducted. This information is important in determining what changes need to be made or in determining how to implement similar programs in another location. Possible areas for gathering information on the program include goals and objectives, instructional content, instructional delivery methods, administrative support, recruitment activities and efforts, facilities and equipment, and cost.

Support services and activities offered by and to the agriculture program are important in process evaluation efforts. Such services and activities include career counseling, job placement services, adult education programs, program planning and evaluation activities, the FFA organization, and teacher development activities.

Staff information on the agriculture teacher(s) and administrators is an important element of process evaluation. The types of information required from staff include demographic characteristics, educational experiences, educational competence, occupational experiences, and occupational competence.

The need for process information regarding the type of students served is also important. This includes data on both students' demographic characteristics and their educational achievement.

Although sometimes overlooked, the community serves as another important source of process information. Community information helps answer questions regarding involvement and relevance. What does the program do to involve students in the community? Additionally, how does the program make instruction relevant to the community? Types of community information include: linkage with business and industry, articulation with other educational agencies or programs, and the type of community.

Outcomes of Agricultural Education

The current emphasis in evaluation is on documenting educational effectiveness in terms of student outcomes. In agricultural education we often refer to outcomes as the results or accomplishments of students in our programs. Other terms such as core standards, measures of performance, and performance standards are also used in reference to student outcomes. An outcome might consist of a single statistic or a composite measure.

Traditionally, agriculture teachers have only thought of student outcomes in economic terms as measured by their experiences in the labor market. More recently, these student outcomes have been expanded to include educational and psychosocial outcomes. Examples of these three types of outcomes are presented below:

Economic Outcomes
- Labor Force Participation Rates
- Employment and Unemployment Rates
- Training-related Placement
- Type of Employment
- Earnings
- Employer Satisfaction with Work
- Employee Satisfaction with Work

Educational Outcomes
- Academic Skills
- Higher-order Thinking Skills
- Knowledge of the World of Work
- Occupational Skills
- School Attendance and Dropout Rates
- Continuing Education Rates
- Student Satisfaction with Education

Psychosocial Outcomes
- Aspirations
- Attitudes and Values
- Self-esteem
- Citizenship
- Leadership

Summary

If agricultural education is to provide students with the knowledge, skills, and attitudes they need to compete in the marketplace and lead meaningful lives, then evaluation of our programs becomes important. We have suggested that agriculture teachers wishing to strengthen and improve their programs consider a broad and comprehensive approach to evaluation. This evaluation approach includes information related to the needs, processes, and outcomes of agricultural education programs. ■

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A Laboratory Experiment in Agriscience

BY SHEILA BARRETT & PHIL BROWN

Ms. Barrett is an agriculture teacher at Fullerton H. S. in Fullerton, CA. Mr. Brown is an agriculture teacher at Porterville H. S. in Porterville, CA.

Live Chick Embryos

Materials

Glass plate or bowl

Dissecting microscope or hand held magnifying glass

Fertile chicken egg (72 hours old)

Filter paper

Scissors

Special Notes to the Instructor

** Before beginning this exercise, all students should have an understanding of chick embryology before opening their fertile egg.

** Fertilized eggs can be obtained by contacting sources located in the Poultry Press Magazine, P. O. Box 542, Connersville, Indiana 47331 (317) 827-0932.

Procedure

Part 1

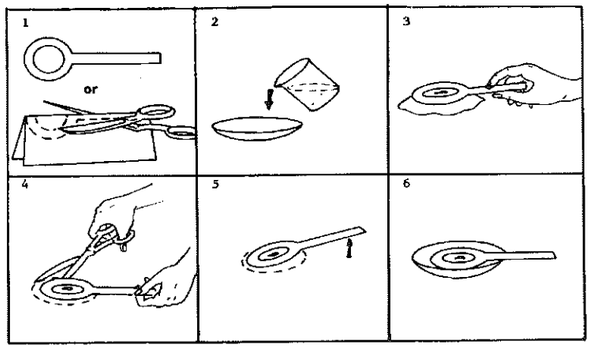
1. Each pair of students will be provided with a chick embryo that has been incubated for 72 hours.
2. Each pair of students will have a small dish or bowl to place the fertile contents of the egg into. Add a little warm saline (0.9% NaCl) to the bowl prior to cracking the fertile egg.
3. Take an egg from the incubator, hold it in exactly the same orientation, and carry it carefully to the work area.
4. Turn the egg sideways and wait 1 minute for the yolk to adjust.
5. Tap the egg on the edge of the dish until the shell cracks.
6. Hold the egg in the saline, pry the shell apart at its bottom without disturbing the upper surface of the yolk.

Instructor: If the embryo is fertile the students should see the embryo and its beating heart immediately. If you do not see the embryo then one of two things has occurred; (1) the embryo failed to develop or (2) the yolk is turned upside down so that the embryo is hidden.

Part 2

After the students have observed as much structure as you can in the dissecting microscope, remove the embryo from the yolk, and transfer it to the glass bowl so that you can see it more clearly. Complete the following steps:

1. Fold a piece of filter paper in half and cut out a spoon with a hole just larger than the embryo.
2. Add a teaspoonful of warm saline in the bowl. The top of the yolk MUST NOT BE COVERED BY SALINE
3. Lay the filter paper spoon on the yolk so that the embryo shows through the hole.
4. Press down gently on the paper with your probe, if necessary, so that it is wet all around and sticks to the membrane.
5. Cut the membrane in a circle around the outside of the filter paper to free the embryo.
6. Lift the spoon in the dish and observe the attached embryo under the dissecting microscope.
7. A drop of Vital Stain such as 1% Neutral Red may be added to bring out the embryo's structure.



Remember: The chick embryo must be kept warm and moist. The egg is opened in saline and the embryo is transferred with a paper spoon.

Streng. Prog. Through . . .

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the line. Students who choose an analytical SAE must identify an agricultural problem that is not amenable to experimentation, and design a plan to investigate and analyze the problem. The student will gather and evaluate data from a variety of sources and then produce some type of finished product. The product could be a marketing display or marketing plan for an agricultural commodity, a series of newspaper articles, a land use plan for a farm, a detailed landscape design for a community facility, an advertising campaign for an agribusiness, and so forth. An analytical SAE is flexible enough so that it could be used in any type of agriculture class, provides valuable experience, and contributes to the development of critical thinking skills deemed so important in education today.

Minor Components of the SAE Program

Each student in the agricultural education program should have an exploratory, entrepreneurship, placement, experimental, or analytical SAE, or a combination of these. They provide experiential learning activities that will help students learn more about agriculture and can lead to agricultural literacy or establishment in an agricultural career. In addition to these major SAE activities, there are two minor components of an SAE program--improvement and supplementary activities. These minor components in and of themselves do not comprise an SAE program, but they can be valuable supplements to the SAE program. A comprehensive SAE program will include both improvement activities and supplementary activities.

Improvement - Improvement activities include a series of learning activities that improve the value or appearance of the place of employment, home, school, or community; the efficiency of an enterprise or business; or the living conditions of the family. An improvement activity involves a series of steps and generally requires a number of days for completion. Examples of improvement activities include landscaping the home, building or reorganizing a farm shop, computerizing the records of an agricultural business, and renovating and restocking a pond.

Supplementary - A supplementary activity is one where the student performs one specific agricultural skill outside of normal class time. This skill is not related to the major SAE but is normally taught in an agriculture program, involves experiential learning, and contributes to the development of agricultural skills and knowledge on the part of the student. The activity is often accomplished in less than a day and does not require a series of steps. Examples of supplementary activities include pruning a fruit tree, fertilizing a lawn, helping a neighbor castrate pigs, and changing oil in a sod cutter.

Summary

The SAE components described in this article should provide agriculture students with valuable, experience-based learning activities that will help prepare them for the future. The new SAE components can be exciting and fun for students if the agriculture teacher introduces them properly. Additionally, students should be hard pressed to have a valid excuse as to why they can't have an exploratory, experimental, or analytical SAE. Any student can participate in these types of activities. ■

Note: The authors have developed an SAE record book that fits this model. For more information contact them at Box 7801, North Carolina State University, Raleigh, NC 27695.

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The Agricultural Education Magazine 1994 Themes

Issue/Theme	Due to Theme Editor	Theme Editor
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March *Decisions and Dollars: The New Financial Records and Management Information Curriculum*	December 1, 1993	Dr. Jack Elliott Dept. of Ag Education College of Agriculture University of Arizona Tucson, AZ 85721
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May *Teaming Up with CES*	February 1, 1994	Dr. Julia Gammon Ag Education & Studies Iowa State University 201 Curtiss Hall Ames, IA 50011
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