Research Findings: Using What We Know to Improve Teaching and Learning

*Research on the Teaching of Agriculture*

*SAE Research Findings*

*Improving Leadership Development*
Research and Practice — Operating in Isolation

M ising researchers in agricultural education would readily agree that the quality and quantity of agricultural education research has dramatically improved in the past 20 years. Perhaps so. But how has practice in agricultural education changed as a result of what has been discovered through research? We may be hard pressed to identify specific changes that have occurred due to research findings. Instead, researchers tend to discuss findings among themselves, while decisions made by practitioners continue to be based mostly on intuition and very little on what has been learned through research.

Problem solving teaching (PST) serves as a good example to illustrate the separate tracks that research and practice have taken. Although PST continues to be promoted as the preferred approach to teaching and learning in agricultural education, its effectiveness has been examined by only a handful of studies. The empirical evidence to support or refute problem solving teaching is too limited to be conclusive. Furthermore, many teachers and teacher educators do not use PST. Research and practice in this case are out of sync.

Another example is the research on levels of cognition reached in instruction and testing. Although a healthy stream of research has developed on this topic, its impact on practice has been limited. Why? Because in agricultural education, the primary consumers of research have been other researchers. And, in general, most teachers continue to base their instructional and testing decisions on philosophy and intuition. By contrast, private companies cannot often wait to get research results from scientists in agronomy and engineering. In fact, research in these areas is often funded by business- ers and agencies, which quickly turn that research into new products and methods. What new products and practices have been developed in agricultural education as a result of research discoveries?

Who are the consumers of research in agricultural education? Who should be the consumers of research in agricultural education? Based on informal observations by this writer, agricultural education research is mostly internally consumed. That is, the consumption and outcomes are by other researchers. However, the real consumers of agricultural education should be agricultural educators in the field. Both researchers and practitioners in the field are to blame for the isolation of research and practice.

Research in agricultural education is often criticized for lacking a sustained focus. Yet even when clear findings emerge, they often go ignored, or at least, do not result in widespread change. Nonetheless, the quality of research in agricultural education is improving. Given this, we must ask ourselves: How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process? How can researchers and practitioners in the field be more actively engaged in the research process? How can researchers and practitioners in the field be more actively part of the research process? How can researchers and practitioners in the field be more actively involved in the research process?
Using Research Findings to Enhance Educational Programs—From Bookshelf to Practice

One of the most common complaints about educational research is that it is conducted, published, and then sits on the bookshelves of researchers, teachers, and administrators with little, if any, attempt to put it into practice. This criticism is not only true of educational research, but of other types of research as well. However, this criticism is most acute in the field of education.

Recent Progress
In recent decades, significant strides have been made in agricultural education research. Some of these accomplishments are as follows:
- The quantity of research conducted at various universities throughout the country has substantially increased. One need only look at the Journal of Agricultural Education and the National Agricultural Education Research Meeting to note the number of papers that have been written, submitted, presented, and published in the past 20 years. The growth is dramatic.
- The quality of this research has increased tremendously. The academic rigor and statistical and research methodologies have greatly improved in the past 20 years.
- The relevance of the research has also increased. Research topics are more relevant to practitioners and address some of the most critical issues in the profession. Likewise, there has been an emphasis at many universities toward "programmatic research." Programmatic research is conducted, over time and space, to solve a variety of problems related to a specific topic. Programmatic research usually involves numerous studies conducted by several researchers over several years.
- Despite all of these advances, many of the research findings do not find their way into practice. They are not used by educators to solve problems and improve programs. This is unfortunate, because research has answered many questions that would help practitioners and improve programs.

Challenge for Researchers and Practitioners
The challenge for researchers is to conduct research significant to the profession and to clearly communicate the findings and their application to practitioners in meaningful ways. In turn, the challenge for practitioners is to use research findings to help improve educational programs for students, adults, and other clientele who are the direct beneficiaries of their programs. To do this, a variety of things must occur:

- Knowledge of the research findings. The first challenge for practitioners is knowledge regarding research findings. Researchers must take the necessary steps to translate their research into useful information about their findings in a clear, concise fashion.
- Understanding research findings. Educators must understand the research’s implications, limitations, and application to their programs.
- Application. The third challenge is to apply research findings to educational programs. Research has relevance when it improves programs, increases learning, and solves significant problems.
- Improvement of programs. As a consequence of knowing, understanding, and applying educational research findings, the ultimate aim of research—to improve programs—is reached, thereby enhancing the education of clientele participating in programs.

It is appropriate that this issue of The Agricultural Education Magazine is dedicated to a review of research literature and its application to practice. In this issue, a very competent and distinguished group of scholars has synthesized research findings as they relate to classroom instruction, supervised agricultural experience, FFA, adult education, and curriculum planning. It is their intent to identify ways in which practitioners can use those findings in further developing their educational programs.

I am reminded of a quote by Joel Baker. He said, "Vision without action is merely a dream. Action without vision just passes the time. Vision with action can change the world." In this issue the authors have provided a vision of what could be a consequence of analyzing and applying research findings. If we take what is written here and put it into action, we can "change the world" for students who study in our programs and significantly improve their educational experiences. The challenge is ours. I trust that we will respond appropriately.

Philosophy and Research on the Teaching of Agriculture

Wherever a good teacher is found, a story may be uncovered of a long patient search for better ways of instructing young people. It is a story of growth through efforts. (LaMotte, 1929, p. 4)

Is it time to rethink what we know about teaching? Terms such as the national information infrastructure, distance education, video conferencing, advance placement credit, interactive video, and computer-assisted instruction are commonplace. Are the traditional methods applicable to modern technology? Will the good teacher of the past be a good teacher in the future? What is good teaching? Should we look to research for answers about how we should teach, or should we base our practice on the particular philosophy we embrace?

Good teachers are interested in teaching, have a passionate desire to be superior teachers, seek to understand the principles which govern teaching and find better ways to apply them in their work, try ways to perfect their actual teaching skill, and find genuine pleasure and satisfaction in teaching (LaMotte, 1929).

The true role of good teachers is revealed by our own experience. We are ourselves different because we have had such teachers. In some way, they reached into our lives, changing our interests, purposes, goals, our attitudes and feelings, our philosophy of life, our understanding of its problems, and our habits, abilities, and skills. They gave us a store of useful knowledge, which for some reason has remained with us. Those who were highly skilled taught us to think straight and far, to avoid mistakes, and to plan our own lives successfully. (LaMotte, 1929, p. 1)

Good teachers do much more than communicate subject matter effectively. How can we know what is it that makes a teacher good or bad? According to Franken and Wallen (1993), we can know through sensory experiences, agreement with others, expert opinion, logic, and the scientific method. Some of what we have learned about good teaching has been based on research (the scientific method), but much of our knowledge is based on the "learning by doing" philosophical position of the agricultural education profession. This philosophical position has been grounded in sensory experiences, agreement with others, expert opinion, and logic.

Learning by Doing
Where shall we start on our venture into good teaching? There are many possible approaches, many entrees... A first principle of good teaching [is] that it should be concerned with meeting the needs of the learners... It should deal with essential knowledge, it should be practical. (Siwertz, 1950, p. 2)

Burkett, Stevens and Hill in 1903 encouraged teachers of agriculture to: Lead the pupils out into the field, make simple experiments before them, and have them also perform experiments. Let them learn directly from nature: a fact gained at firsthand will linger in the mind long after mere secondhand book knowledge has departed. Teach by observation and experiment. The young mind grasps the concrete but wearies with the abstract... In many cases it will be best to perform the experimental or observational work first, and turn to the text later to amplify the pupil's knowledge. (p. 8)

Charters (1913) suggested that agriculture be taught as one of the common subjects in rural and graded schools. The methods for teaching agriculture were described in (1) identification of a practical problem; (2) collection of data; (3) encouragement of intelligent guessing; (4) obtaining information from textbooks, bulletins, experiments, class trips; and (5) drill and memorization when necessary.

In the years prior to the Smith-Hughes Act, most of the agriculture course work in the high schools appears to have been informational rather than vocational. Care was taken to prevent the new training from becoming the old traditional mode of rote memorization of facts. Most of the vocational agriculture students of the time lived on farm and were engaged in home projects. Much of the classroom instruction was based on problems encountered at home with production enterprises. This scheme fit well into the ideas of contemporary educational philosophers who were attempting to direct education away from the regimented methods of the traditional classical teachers (Herren, 1987).
Dewey denounced the formalism of traditional education as having its emphasis on overly structured and precise learning, and pointless detail. He saw the task of the teacher as a guide to the student on his or her journey through meaningful education (Dewey, 1916). He wanted schools to become communities in which intelligence was freed for inquiry, places where knowledge was not offered ready-made, and where the record of knowledge was not mistaken for knowledge (Dewey, 1916).

If children are to become genuine inquirers, they must be asked questions they want to answer; they must encounter problematic situations other than wondering what the teacher wants. They must be active agents, doing things in order to discover the consequences, not mere passive recipients of facts discovered by others (Robertson, 1992).

Problem-Solving Teaching

The problem-solving approach advocated by Dewey consisted of five steps which required the student to: (a) recognize a problem, (b) define a problem, (c) offer many possible solutions, (d) test the hypotheses, and (e) verify the final conclusion (Colman, 1967, p. 112).

Agricultural educators have traditionally encouraged a problem-solving approach to teaching. In 1983, McCracken indicated:

"We should be preparing teachers who use problem-solving as an approach to teaching and learning, teachers who believe in and encourage students to use learning by doing, and teachers who encourage students to assume responsibility for their own learning." (p. 8).

However, in 1993 questions were being raised about the lack of legitimate problems in the agricultural education curriculum.

What is there about agricultural education that has continued too long, that has not kept up with the times? As we examine the programs and structures that have served us well for many years, we find the secondary program attempting to rely on... (p. 10).

Newcomb, McCracken and Warnbrod (1986) asked us to:

Consider the fact that every day people learn on their own, without the presence of teachers. By developing this approach to teaching that people use rather automatically—and use successfully—then could one not teach students in a formal classroom following that same process? Would it not make sense for teachers to teach people by following the same process that people generally follow in learning on their own? (p. 63)

An essential element of learning is that unless the subject matter under study is processed in a meaningful and understandable manner, the learner will not learn or retain it. (p. 21)

Kuhn (1967) suggested the emphasis on teaching for understanding is undoubtedly the most important single development in improvement of teaching in recent years. Using a problem-solving approach in teaching, . . . makes greater use of the accumulated knowledge about learning than does any other approach to teaching. (p. 37) . . . it seems that problem solving, as a technique, can be more successful and problem solving a real and vital educational program, one that goes a long way toward providing for readiness for learning motivation, organization, and transfer of training elements that most educators are familiar with in the learning process. (pp. 65-66)

Research on Teaching

Dewey accorded a high value to science because it is a self-correcting enterprise. He believed it commonplace that was what was regarded as scientific truths at one time in point (time might be rejected later in light of new discoveries). He believed that one could employ faulty methods, discover their faults, and make improvements, that our inherited beliefs were tested and modified through a communal process of inquiry that makes use of intelligence. By discovering the causes and consequences of our actions, we can make judgments about the best course to pursue.

The idea of science are specialists methods odd, but the scientific attitude is available to everyone, not merely an elite. The scientific attitude involves a willingness to suspend action in the face of a problematic situation and an inclination to engage in inquiry in trying to decide how to resolve the problem. The problematic situation is always the impetus for inquiry, followed by a clarification of the problem, the development of hypotheses about how to solve the problem, and their evaluation and testing either imaginatively or overtly through action (Robertson, 1993).

The agricultural education profession has been challenged by scholars who have argued that there is little scientific evidence that problem-solving teaching is more effective to learn the subject material. Clarity other approaches. Moore and Monroe (1986) suggested that "the basis for the problem-solving approach to teaching is a misunderstanding and possible disagreement regarding what problem solving is and how it is demonstrated. Analysis of the rationale, nature, and practice of problem-solving teaching also requires a reassessment of instruments used to quantify both perceptions and actual practice of problem-solving strategies and techniques."

As we look at research conducted outside of agricultural education, we find that much is known about teaching and learning. This research deals with relationships between researchers and among variables, including nearly all of the processes involved in learning. The research is pertinent to teaching thinking, cognitive processing, and teacher expectancy; a number of studies addresses the processes of learning to teach and staff development. Research as the preferred vehicle to discover knowledge about teaching is advocated in the "Scientific Basis of the Art of Teaching" (Gage, 1978). Gage contends that teaching is an art which is based on science. The basis for teaching is psychology. The more recent book by the same author, "Hard Gains in the Soft Sciences: The Case of Pedagogy" (Gage, 1983), indicates that knowledge about teaching becomes more trustworthy as it is confirmed through replications, that is, repeated or less simple investigations. Such confirmations add more to the persuasiveness of the evidence than does the statistical significance, no matter how a single result.

Knowledge Base for the Beginning Teacher (Reynolds, 1989) was an attempt to codify knowledge high school studies, and also demonstrate that teaching does have a distinctive knowledge base. We do know that there are some powerful determinants of effective teaching. They include: (1) use of cu, engagement, corrective feedback, and reinforcement; (2) having high expectations for students; (3) use of frequent testing; (4) use of questioning; (5) having homework expectations that increase student engagement with subject matter; (6) use of inquiry methods where students develop hypotheses and conduct their experiments; (7) students learning under teacher supervision as opposed to working on their own; (8) having subject matter well organized, relevant, involving some degree of redundancy; (9) being clear and (10) demonstrating enthusiasm (Osborne, 1983).

Five teacher behaviors showing the most promise in influencing student achievement are: clarity, variability, enthusiasm, task-oriented and/or business-like behaviors, and student opportunity to learn through criterion material. Clarity involves explaining and demonstrating concepts in a manner that can be understood by students, making a focus on understanding, and answering questions in an intelligent and complete manner. Variedness requires teachers to use a variety of task and techniques, even within a single teaching period.
SAE Research Findings

Experiential learning has long been recognized as being important to teaching and student achievement in agricultural education programs. Experiential learning has been provided through several means, including FFA activities, land laboratory, field trips, and supervised agricultural experience programs (SAE). SAE includes "the actual, planned application of concepts and principles learned in agriculural education. Students are supervised by agriculture teachers in cooperation with parents, employers and other adults who assist them in the development and achievement of their educational goals. The purpose is to help students develop skills and abilities leading toward a career" (National Council for Agricultural Education, 1992). Most agricultural educators have agreed that SAE helps teachers be more effective in causing learning to occur; assists students in understanding the relevance of classroom instruction, and promotes close cooperation with parents and the community. Research related to SAE has focused on a broad range of subjects over the past 50 years. The focus of this article is to provide an overview of research related to SAE.

SAE and Learning

Probably the most fundamental question that has been investigated through the years has been whether or not SAE participation is related to achievement in agricultural education.

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Several researchers have investigated this topic using a variety of research procedures. Many of these studies have indicated a positive relationship between SAE participation and student achievement in agricultural education. Morton (1979) found a positive relationship between the quality of supervised agricultural experience program and achievement as measured on a written test of agricultural knowledge. Similarly, Noschild and Cheek (1988) found a positive relationship between SAE scope and student achievement in horticulture for students enrolled in ornamental horticulture. Arrington and Cheek (1980) conducted a similar study with 10th grade students enrolled in general agricultural education programs in Florida and found a positive relationship between SAE participation and achievement as measured with a written test. Cheek, Arrington, Carter, and Randell (1994) found a moderate, positive correlation between SAE participation and student achievement in agriscience programs in Florida.

Gibson (1987) studied senior agricultural education students in Kentucky and reported a positive relationship between quality of supervised agricultural experience programs and student overall grade point average. Boyce (1989) concluded that students who have supervised agricultural experience programs will have higher grade point averages in vocational agricultural education. Brumley (1967) reported that first-year animal science students at Oklahoma State University who had participated in animal-related SAE programs in high school had higher knowledge levels.

Other studies have not found student achievement to be related to SAE participation. Potter (1984) reported that program scope was not related to student achievement and student achievement in agriculture course work. Tytle and Arrington (1985) found no positive relationship between SAE scope and student achievement in livestock production.

What Factors Contribute to SAE Effectiveness?

Teacher Characteristics

Research related to SAE has also attempted to identify factors that contribute to SAE effectiveness. Several studies have focused on the identification of teacher characteristics associated with SAE program quality. The amount of supervision provided by teachers has probably been studied more than any other factor. Many of these studies have confirmed the positive relationship between the amount of teacher supervision (supervisory visits) and SAE program quality and/or scope (Thomson, 1965; Arrington, 1981; Harris, 1983; Gibson, 1987; Aynsley, 1989).

Another factor related to supervision that has been found to be positively related to SAE...
quality is the amount of time committed to SAE by the teacher. Research has indicated a positive relationship between the amount of time the teacher works on SAE and the amount of time students work on SAE. A student who was involved in SAE and rural youth, McMillon and Ausville (1976) found a positive relationship between percent of students living in rural areas and SAE scores.

Arington (1981) reported a positive relationship between SAE program scope and student involvement in SAE programs. He further reported a positive relationship between student residence on a farm and SAE program quality.

As more students from urban areas enroll in agricultural education, urban teachers and students have to look beyond traditional agricultural production in SAE programs. Briefs (1978) found that over one-half of the schools they visited had provided a facility for SAE. Simmer (1979) studied agriculture programs in Florida and found that 90% of the schools had available laboratory facilities, and 47% were using these facilities for student-owned projects. Anyasho (1979) found a positive relationship between farm school being provided for SAE and the quality of supervised experience programs. Due to changing demographics of agricultural education, it is evident that agricultural education will have to change to accommodate the new student body. An additional factor that may be related to SAE quality is FFA involvement. Check et al. (1994) found a strong positive correlation between FFA involvement and SAE scope. The researchers posed an interesting question: do high achievers participate more in SAE and FFA, or does participation in SAE and FFA improve achievement?

Contemporary Changes to SAE

In 1992, the National Council for Agricultural Education, in cooperation with the National FFA Foundation, formed a task force to redefine and modernize agricultural education. This task force is reflecting today's agricultural industry and educational programs. Three areas of types of SAE emerged from the efforts of the task force: exploratory, entrepreneurial, and placement. Exploratory SAEs provide students the opportunity to explore new products, processes, and careers in a wide range of agricultural careers and subjects. Entrepreneurship SAEs assist students in developing skills and competencies required to manage and own an agricultural operation or business. Placement SAEs involve the student in employment-related experiences paid or unpaid. National Council for Agricultural Education, 1992. These changes to SAE will provide students additional opportunities to apply agricultural education practices, principles, and occupations. However, as we begin to encourage youth to participate in these types of new SAEs, it is important that the SAE program must be focused on providing opportunities and areas in which to reinforce the efforts of students. The National FFA has implemented the task force to address the issue of contemporary awards and contests (Egan, 1994).

Conclusion

Several conclusions seem appropriate, relative to how we can use these research findings to improve teaching and learning through SAE. Teacher supervision is a primary key to having quality SAE programs. 2. Providing teachers with extended contracts contributes to effective supervision of SAE programs. 3. Teacher involvement with fairs and livestock shows contributes to the SAE program. 4. Teacher undersizing of SAE contributes to SAE quality. 5. Teachers who want stronger SAE programs need to be committed to teaching about SAE in the classroom. 6. Opportunity is an important factor contributing to SAE participation. Teachers are more likely to provide those students with limited resources the opportunity to maintain SAE programs in school laboratories.

Involvement in the FFA seems to correlate with SAE scope. Appropriate awards and contests are being developed to reinforce SAE involvement in contemporary and diverse areas of agriculture.

References


Breen, C.W. (1972). The relationship of selected variables to the supervision provided to students of vocational agriculture by their teachers. Unpublished doctoral dissertation, The Ohio State University, Columbus.


Gilles, C.L. (1957). The use of professional time during the summer supervision of SAE programs in agriculture in Ohio. The Ohio State University, Columbus.


Schmidt, C.L. (1965). An examination of the relationship that exists between the number of farm visits made per boy by the vocational agriculture instructor and the labor income from the student's supervised farming program. Unpublished master's thesis, University of Minnesota, St. Paul.


Using FFA Research to Improve Teaching and Learning

As of June 20, 1994, FFA involved 426,523 members. Nearly cost-half million agricultural education students and their teachers believe FFA to be important enough to pay their dues. As an integral part of the agricultural education program, the FFA is a valid area of inquiry. Our research may reveal new information about a puzzling situation; it may help us dispel rumors; or it may help us affirm what we suspect to be true.

If we ask teachers and students to devote their precious time to FFA, we must provide empirical evidence as to the value of this experience. Some students, teachers, and beginning teachers are particularly interested in information that helps better prepare them for advising their chapters. Are the benefits educational, social, psychological, or political? Why enroll in agriculture and join FFA? Answers to these questions and many others need to be sought and shared with the profession. Most importantly, information that can make a difference in how we effectively use FFA as a classroom tool must be communicated to those who make a difference—classroom teachers who are the FFA advisors.

Research Sources
Research is the pursuit of knowledge. Those seeking answers to FFA questions include university faculty, graduate students, administrators, chapter members, National FFA staff, foundation sponsors, business and industry, and community members. Recently, research firms have conducted FFA research in cooperation with agricultural educators. Numerous research designs and instruments have been used to collect information. For example, we gather data with mailed questionnaires, telephone surveys, car window surveys, magazine reader cards, focus groups, and personal interviews.

The FFA is that classroom tool often used to meet affective domain objectives—to help students develop leadership, citizenship, cooperation, responsibility, and scholarship. It is not easy to measure effect when there are so many other influences on student development. We primarily rely on self-reporting, assume honesty in the answers, and are careful in our generalizations. Researchers have developed formulas in order to calculate participation scores permitting more sophisticated analyses. Repetition and the use of qualitative, as well as quantitative, methods have strengthened our research. Over time, trends have emerged from our research giving us more confidence in the results. An exception can always be found somewhere, but for the most part, we are confident that the recommendations hold merit.

Doctoral research represents an important contribution to the FFA knowledge base. However, between 1906 and 1986, only 24 (slightly over 2% of the 970 agricultural education dissertations) focused on FFA issues (Moore, 1987). Since 1986, eight more doctoral dissertations have been completed focusing on FFA issues such as recruitment, the relationship between advisor attitudes and proficiency award recognition, contests and career aspirations, and leadership skills and styles. Recently, master’s theses, university staff studies, and National FFA Organization-sponsored research have generated important, timely information.

Applying What We Know about the FFA
Active participation and leadership opportunities should be encouraged, because student leadership traits are enhanced by participation in FFA activities. Those activities should be varied and varied (Carter & Townsend, 1983). Leadership opportunities exist at levels of school or chapter size, number of teachers, or size of community (Malpede & Voth, 1984). Community leaders confirm that the vocational agriculture/FFA experience had a positive impact upon their lives (Brunson, 1988).

In North Carolina, the current governor, superintendent of public instruction, numerous legislators, and business leaders admit that agricultural education and FFA contributed to their careers by helping them develop self-confidence and public speaking abilities. Every state has similar stories of former students who continue to loyally support FFA. Quality leadership instruction pays benefits.

Contests and Awards
One of the reasons students join FFA is to participate in its activities (Marshall, Herrin & Brixer, 1990). Contest participation develops interpersonal benefits (Couch, 1981). Dormony & Seevers (1994) showed interesting light on participation. In predicting youth leadership life skills development scores (YLLDS), achievement-oriented FFA members, or those who seek challenging activities, scored higher than others. So, if contests are to be meaningful experiences, they need to include challenge and a balance of cooperative, competitive, and personal growth opportunities.

The National Contest Story (Blakey, Holchau, Seefeld, Shinn, Smith, & Vaughan, 1995) revealed that students participated in contests and awards because they liked the feeling of winning; they hoped to win prizes; liked to go on trips; enjoyed teamwork; and learned from the contest preparation. Students and adults concurred that classwork and FFA activities were closely intertwined and benefited each other as students learned knowledge and skills in class, and FFA members maintained interest through application and contest practice.

Perceived barriers included: other school activities, after school work, shyness, conflict with part-time jobs, students feeling that they did not fit, parental support, and negative stereotypes. Advisors need to keep these in mind, especially as they try to encourage gender and ethnic equity in contests. Since teamwork and cooperation are valued, contests need to include team and large group activities, in addition to traditional individual activity.

Tests were equally motivating for those with broad agricultural interests, the adult groups did not. Students indicated interest in new contest areas like environmental science, computers, and agricultural chemistry. In preparing students for the year 2000, students believed that the contests should keep current with industry, teach responsibility and leadership, and teach skills for specific careers. It is interesting that the research has shown that students who participate in contests usually have agriculturally related career aspirations but do not necessarily consider career interest as an important reason for selecting a contest area.

The National FFA has proposed 16 new contests with guidelines for future implementation as funding becomes available. Recognition for all participants must be addressed at the local, state, and national levels. Forms of recognition need to include plaques and trophies, articles in the newspaper, recognition at local banquets, and recognition from family and friends. Recognition helps build student self-esteem and program image.

Conclusion
Program image is crucial for recruitment (Blakey, et al., 1993; and Rossetti & McCuln, 1992). Recruiting from middle school poses a slightly different challenge than recruiting at the high school level. Middle schoolers are greatly influenced by the image of the program and by the agriculture teacher. Also, hands-on activities and FFA activities are important influences on whether a student enrolls in agriculture and belongs to the FFA. In 1992 there were 53,000 middle school agricultural students, but only 33, or 17,222, were FFA members.

Administrators and teachers are often blamed for students not enrolling in agriculture courses. While schedule conflicts have some influence, primary barriers cited by students include a negative program image and a desire to participate in activities not offered in agriculture.
for participating in other activities. The message is clear: if we want to attract students to FFA, we must provide them the program and a better "deal" than what they can get somewhere else. Also, to avoid "burnout" of that continuing FFA member, middle school and high school FFA activities must be very different and present appropriate age-level challenges.

Recruiting at the high school level includes recruiting into the program and into FFA. There are few states where 100% membership status is available now. Students in agriculture because they want to be in FFA, enjoy working outside the classroom, plan on an agricultural career, are interested in pursuing scholarships, and have friends in the program. Parents and friends are more influential on enrollment decisions for female and minority students. Advisors must be sure that opportunities for minority students exist and that these students have the chance to be as successful as others. Female and minority students must feel like they fit, and they must see successful role models.

FFA Publications

Publications are the means for and object of our research. Do you read your FFA New Horizons magazine? Connors, Elliot, and Krueger (1997) discovered that 78% of the members and 81% of the advisors read at least 50% of the magazine. FFA members and their advisors frequently read the cover story, features, FFAnewteacher articles, "Chapter Scoop," and joke pages. Advisors read "News in Brief," "Looking Ahead," "Front Line," and "My Turn." Members find these reasonable in length, have pictures, and are of local or personal interest get the most attention.

Members are willing to pay more for the magazine if it will offer them more issues and articles, particularly career information. The current distributes system based on membership reporting is a problem. Member copies are often delayed. The magazine is a valuable, respected classroom tool. Knowing that students and advisors find it useful provides more opportunities for disseminating agricultural information.

Summary

In the limited space of this article, it is impossible to reference all the research that has implications for the FFA. The time has come to carefully catalog what we know and to provide a means for updating the profession with new findings. We need to disseminate the information in a pragmatic manner throughout the profession's publications. Teacher education programs need to work closely with the National FFA Organization and state associations to ensure that appropriate undergraduate and graduate courses provide up-to-date, comprehensive FFA information. Summaries of studies should be presented to the FFA Board of Directors by teacher educator consultants. The researchers and the consumers of our research need to talk about what has been found and how it should be used to best benefit our programs.

References


THE AGRICULTURAL EDUCATION MAGAZINE

Teaching for Higher Level Cognition in Adult Education Programs

The goal of adult education programs should be to encourage learners to solve their own problems or be wise decision-makers. This would be a common goal for adult programs delivered through vocational or extension education. Achieving this goal would call for higher level cognition or critical thinking abilities. Do adult education instructional programs really teach learners to think at these higher levels of cognition?

Work in America has evolved into new organizations and structures which are extremely flexible to allow for greater scope of interaction and collaboration among workers having diverse functions and backgrounds. In order to face such frequent and dramatic work and life changes, agriculturalists need to be able to detect, understand, and resolve unfamiliar problems just as would persons in other lines of work. Doing so requires continued learning through life and using skills and knowledge flexibly. These challenges are heightening the importance of well-developed cognitive capacities at all organizational levels (Thoman, 1992).

Bloom et al. (1956) proposed a hierarchy for the cognitive domain of learning which represented a continuum from (the simple) knowledge through comprehension, application, analysis, synthesis and evaluation (the complex), and many have defined higher order cognition and critical thinking as the upper four, more complex areas. The question posed by the current research is what are the levels at which we are teaching adults? Specifically, the objectives were to describe the levels at which adult instructors intend to teach and actually teach, and to use selected student and teacher pedagogical characteristics to attempt to explain any variability in the intended and actual levels of cognition.

While much research has been conducted in cognitive psychology, a paucity of studies extensible related to adult education. The outcomes could have importance for adult educators, because even if our content is technically correct and appropriate but adult educators are teaching at lower levels of cognition, then they would not be preparing adults to function in the current workplace. Educators need to reflect higher levels of cognition in their objectives, teaching activities, and teaching methods to improve learning and utility of the instruction.

By Larry B. Miller
Dr. Miller is professor of agricultural education at The Ohio State University, Columbus.

THE AGRICULTURAL EDUCATION MAGAZINE

What's Been Learned?

This article synthesizes four research studies conducted over five years, and examines adult education programs in agriculture and vocational education as delivered by three primary adult education agencies: extension, secondary vocational programs, and agricultural education. Investigation was a descriptive study and ranged from surveys to post-factor research with reliable and valid instruments. The data selected for use. The primary variables investigated were "intended level of cognition," as measured by examination of lesson planning or interviews related to objectives of instruction, and "actual level of cognition," as measured by analysis of the actual instruction. Antecedent variables included pedagogical characteristics of the learners and the teachers which were used to help explain any variability in the primary variables.

Miller and Kimmoja (1992) found that participants perceived that their achievement was relatively high in adult classes and they had a positive attitude toward the content taught in the classes. However, they rated their resources for using the content and other outside influences as deterrents to using the knowledge. Participants only reported "some use" for what they had been taught. Teachers intended to teach, on the average, at the "application" level of cognition, but the actual level of instruction averaged near the "analysis" level. Only one class reached the "synthesis" level of cognition; several reached the "analysis" level but often skipped the application level. Kimmoja and Miller (1989) reported the actual level of cognition at which instruction was delivered averaged higher than the reported intended level. "Use of the instructional content was featured during teaching with liberal application of slides, video tapes and Brochure. They found learners were relatively positive about..."
Using Research Findings to Plan a Curriculum

Maurio, 15, liked doing mechanical things. But, Mario almost didn’t take a second-year advanced school course in agriculture that fall. He would not have, except for the fact that a new teacher came during the summer—a teacher who opened the mechanics lab on Tuesday and Thursday mornings to help some students with projects, who arranged to take other students on tours of the S&H programs and to visit a few agrileasiness in the community on Wednesday mornings, and who asked Mario to help get the mechanics lab ready for fall classes. In doing so, Mario discovered all of a sudden that he could run a pretty decent electric arc weld, much better than anything that he had done in his freshman year only three months previously.

Why had Mario not been keen on taking that second course? After all, he was interested in agricultural, cultural, and the previous teacher had spent a lot of time during Mario’s freshman year teaching electric arc welding and other skills in agricultural mechanics. In fact, almost 40% of the first year curriculum in agriculture at that school was devoted to agricultural mechanics.

The answer? The class spent three weeks trying to learn to arc weld. They stuck the rod to a lot of metal, and the scrap box was full of practice beads and welds, of which probably 95% were not good. The teacher made it seem so easy when he demonstrated, but Mario and several of the other students learned that the “bang” of maintaining the proper arc length, using an even weaving motion, and keeping a constant speed of travel, even though they were using E-601 rod on mild steel in a flat position.

But the teacher did not know that most 14- and 15-year-old students have not matured enough physically to have the hand-eye coordination necessary to maintain the proper arc length, the proper weaving motion, and the proper welding speed. If those freshmen had been introduced to welding instead, where there exists considerably more latitude for “improvisation” in “hearing a satisfactory joint, or had been taught to use a carbon arc rod to solder whereby the rod could be dragged along the metal, therefore sacrificing a problem of maintaining arc length, they would have learned faster, been more pleased with their achievements, been less frustrated, and would have liked the course better.

Better yet, if the teacher had waited to teach “real” arc welding in the sophomore year, just one year later, the students would have had the coordination that would have learned faster, and would have been better pleased with their work.

This application of research findings would have helped both the teacher and Mario, and made the teaching-learning process both more effective and enjoyable.

What Does This Mean?

While agriculture teachers seek to develop students through study and application of scientific principles, problems, and activities applicable to agriculture and agriculturally related occupations, they should first of all recognize that students at different ages have different objectives, physical and emotional needs and desires. The 14-15 year-old students have characteristics and needs different from the 16-18 year-old, and both possess characteristics different from those of 19-24 year-old young adults.

Because of these differences, this article addresses primarily the characteristics of 14 and 15 year-old students to be served, especially in the first two years of agriculture in the secondary school curriculum. In doing so, we examine also the attendant implications for both curriculum content and for effective teaching and learning. This is especially important considering that in 1986, Sedlack, Wheelar, Paullin, and Cusick reported that “one-third of secondary school students actively resist the narrow, academic, and passive curricula offered to them, an additional one-third resist mathematics and science as compared in Reynolds, 1980, p. 234”.

What Do We Know About 14-15 Year-old Adolescents?

1. They need to be involved with other individuals.

Implications: Establish group projects. Make group assignments. Instead of sending one student to the lumber yard to get pieces of lumber for a class project, have more people, even if they desert to the Dairy Queen on the way.

2. They can be irresponsible or unpredictable and may vacillate between their actions.

Implications: Make individual assignments that are part of a series of activities needed to complete a group project so that peer pressure is brought to bear if the student does not follow through. Plan and carry out activities with specific steps for which exist definite rewards for accomplishing or definite penalties for for-forgiveness.

3. They are inclined to be obstinate and dogmatic in opinions and attitudes and to be rebellious against conventions, especially in early adolescence.

Implications: Involve students in group activities...
12. They need and strive for independence, but may not realize that it must be demonstrated or exercised with reasonable safety.

Implications: Let students do individual work in the classroom or laboratory, but teach, demonstrate, and give tests on safety regulations. Incorporate units on safety throughout the curriculum.

13. They need vocational counseling, work experience, and opportunity to develop abilities and earn an income in one or more of these areas.

Implications: Supervised agricultural experiences, including opportunities to earn money, must be built into the curriculum. Time and topics related to vocational counseling need to be built into the curriculum.

14. They need time for play and recreation.

Implications: Show ways by which supervised agricultural experiences may turn into hobbies. Include playful activities in exercises that are designed to develop creativity. Help FFA officers and committees design and incorporate recreational activities in the chapter program of work.

15. They need a philosophy of life and stimulation and guidance in thinking through their own problems and in forming their opinions and attitudes on important issues.

Implications: Include “life” discussions in instruction. Use current articles from newspapers and magazines about agricultural issues and incorporate material about “policies” that should be followed in teaching-learning activities. Include topics on emerging issues in each unit of instruction wherever possible. The 15 characteristics and needs of the student during these ages were identified years ago by R.W. Cline and W.A. Schaefer (1945, p. 4-5) at the University of Arizona. However, there are other ways we must consider. Among them are the following:

Adolescents begin to wonder about the kind of world in which they will live for the rest of their lives: (Robson and Robson, 1979).

16. Adolescents begin to wonder about the kind of world in which they will live for the rest of their lives: (Robson and Robson, 1979).

Implications: Include a unit on “futuring” as related to agriculture in different courses in the curriculum. Include in each unit a section on “future trends and issues” as it relates to that topic. Use newspapers and magazine articles to enlarge students’ horizons about different aspects of agriculture.

17. They need privacy, a universal need, but they also need interaction with others; consequently, there must be a balance between privacy and interaction (Heyman, 1974, p. 14).

Implications: Assign individual projects, but also have students participate in group problem-solving activities and group projects. See #1.

18. They possess an ethnic culture and often bring ethnic diversity to the school setting (Barnes, 1977).

Implications: Mix students of different backgrounds when engaged in group activities and projects; Rotate student groups among work groups; allow students to attain diversity and to minimize the formation of cliques. Use as articles showing aspects of agricultural life are conducted in different parts of the world among people of different cultures.

19. They need a chance to be appreciated, influential, and needed (Lippitt, 1975).

Implications: Use students in peer teaching activities and as a way of individualizing instruction. Students learn to act cooperatively rather than competitively. An increase in academic achievement occurs when cooperative learning takes place (Fitts, 1990, p. 25).

20. They need to be motivated in order to think creatively (Karns and Lottman, 1971).

Implications: See #1 above. Engage students in brainstorming activities. Use successful role models as resource personnel to share with students their methods of tackling problems.

What Does It All Mean?

In summary, don’t forget Mario. As teachers, we must actively involve students in the teaching-learning process. However, that process must consider the characteristics and needs of students, as well as the nature of the content of the curriculum if the methods of this world are to learn effectively and efficiently.

References


Improving Leadership Development in 4-H and FFA

Introduction

In 1992 we developed a scale to measure youth leadership skills development among 4-H and FFA members. Miller (1976, p. 2) defined youth leadership skills development as "attitudes, self-concept, and organization-specific "development of leadership skills necessary to perform leadership functions in the real world." Our scale asks youth to assess their development of 10 different leadership skills while a member of 4-H or FFA. These skills fall into seven areas: communications, decision-making, getting along with others, learning, management, understanding yourself, and working with groups. In our opinion, the scale has some skills that fit within the traditional "industrial construct" of leadership (e.g., the ability to stimulate others to achieve set goals) and others that fit within the "emerging" or collaborative paradigm of leadership (e.g., leadership is a process of combing the ethics of individuals into the fabric of a community) (Barker, 1994, p. 51).

After pilot testing the scale, it was used in parallel 4-H and FFA research studies. The primary purpose of the studies was to determine if members' participation in leadership activities predicts their leadership skills development. The study also sought to describe 4-H and FFA members' perceptions of which leadership activities contributed most to leadership life skills development and to what extent they participated in planning, implementing, and evaluating those activities. Questionnaires were mailed to 400 4-H and 400 FFA members from Arizona, Colorado, and New Mexico. Close to 60% of these questionnaires in each organization completed a questionnaire.

Summary of the Results

Leadership in 4-H

Four variables—participation in 4-H leadership activities, ethnicity, achievement expectations, and gender—were predictors, explaining almost 17% of the variance in leadership skills development scores. Achievement expectations, a combination of the level of evaluation FFA members expect from others and the level of performance they expect from themselves in FFA activities, explained 16.5% of the variance. Participation in leadership activities was a much weaker predictor of leadership skills development for FFA members than for 4-H members. Female FFA members had slightly higher leadership life skills development scores than male members. Over 80% of the variance in leadership life skills development scores was left unexplained by the three variables.

Over half the FFA members participated in chapter meetings, fundraising, chapter banquet, judging contests, committees, parliamentary procedure, public relations, and SAEP. For activities offered and at the chapter level, 66% of the time participants did not advance beyond the chapter level. However, 88% of the members who participated in judging contests advanced beyond the chapter level. Judging contests, public speaking, holding office, and the Washington Conference Program were cited by over half the participants as top leadership development opportunities. As with 4-H, FFA members were most likely to participate during the implementation phase (58%) and less likely to participate in the evaluation (17%) or planning (48%) phases of their top leadership development activities.

Turning Research Into Practice

The correlational research design used in these studies does not allow us to say with confidence that increasing a 4-H or FFA member's participation causes increased leadership life skills. We say with more confidence that participation helps predict or is related to leadership life skills development. Even if we would take a great leap of faith and entertain thoughts of cause and effect, we could only say that increased participation is causing small increases in leadership life skills, particularly for FFA members.

Some agricultural education professionals will interpret the prediction results in a positive light (e.g., that significant relationships between participation and leadership life skills development in both 4-H and FFA support the value of the programming). Others will focus on the strength of the relationships. If we focus on strength, there appears to be room for improvement in both organizations.

One way to strengthen the relationships between participation and leadership life skills development would be to design new or redesign existing activities that teach the desired skills more fully. A way we would encourage participation in activities that are effective in developing leadership life skills.

Finally, 10 advice, volunteer leaders, and agriculture teachers should involve members in planning and evaluating leadership development activities. Planning and evaluating are skills the members will use all of their lives. If we compare the activity planning phase to a product development model, they have a lot in common. When we do all of the planning for our youth, they lose opportunities to identify and define problems, gather information, identify alternative solutions, and select the best alternative. Evaluation is not only the final stage in problem solving, it is the highest level of cognition in Bloom's taxonomy. Students lose opportunities for developing critical thinking skills if we evaluate leadership development activities for us.

A way to ensure that youth are involved in planning, implementing, and evaluating leadership development activities is to adopt the "program of work" or "program of activities" concept. With this approach, standing and special committees are formed, implemented, and evaluate organization activities. In FFA a purpose of the program of activities (POA) is to provide every member with leadership development opportunities. However, only 20% of the FFA members said they had participated in POA work and only four of the seven POA leadership opportunities thought it was a top leadership life skills development activity. This could partially explain why they were much less likely to plan or evaluate than to implement leadership activities. The profession should re-emphasize the POA concept. Adoption can be encouraged by providing curriculum and instructional materials, and preserving and insuring education for agents, volunteers, and teachers.

As part of their POA training, professionals and volunteers should be taught how to teach collaborative leadership. Youth won't learn to collaborate just because they are put on committees. Our youth should participate in activities where they learn the collaborative leadership skills they will apply during committee work. The problem-solving environment sought for collaboration will necessitate developing trust-building skills and behaviors like self-disclose, active listening, managing agreement through consensus, sharing leadership responsibility, mutual respect, and self-monitoring. Conflict will naturally arise during committee work. Therefore, conflict resolution methods should also be taught. If handled correctly, conflict is a force for change and a source of synergy (where innovation becomes greater than the sum of its parts).

Future Directions

Certainly the results of our research cannot be generalized to all states, and further research along those lines should be conducted. However, because the concept of leadership is evolving, we can extend our research to other agricultural youth organizations are developing leaders for the 21st century. If the answer is "no—are they ready?" we can initiate improvement by first agreeing on the way we conceptualize "modern leadership." Should we subscribe to the industrial construct or the emerging paradigms of leadership? Is General H. Norman Schwarzkopf (Wren, 1994) correct in saying that the industrial model is "a system that is hard to define or difficult to define? If so, we may want to consider a variety of leadership paradigms and the skills they suggest, stressing situational application.

And what about leadership and management? Are they different functions requiring different skills to master? In my view (p. 50) "the function of leadership is to create change while the function of management is to create stability." Certainly tomorrow's professional will need to be able to wear both leadership and management hats. However, we would challenge our professional to look at how many of the leadership activities in agricultural education today emphasize the development of skills that fall under a modern management paradigm.

Recently, National Public Radio carried stories about Ford Motor Company and Boeing and their successful leadership development approaches. These companies are finding it takes less time from conceptualizing to market new models, and rethinking which have fewer (continued on page 23)
Institutional Technology

Locating agricultural education curriculum resources can be frustrating and time-consuming. There is the temptation to return to time and again to sources near at hand. Although these sources have proven adequate in the past, we should be ever alert for alternative sources, many of which serve all of vocational education. In the next few paragraphs you will be introduced to the alphabet soup (NNCCVE, SLR, CCC, V-TECS, MAVC, AAVID) of vocational education curriculum centers, centers, and consortia. For some, these networks, centers, and consortia may already be a part of your learning experience. For others, they may be an introduction to valuable new resources.

Curriculum Coordination Centers and State Liaison Representatives

The National Network for Curriculum Coordination in Vocational and Technical Education (NNCCVE) is made up of six regional Curriculum Coordination Centers (CCCs) and a network of State Liaison Representatives (SLRs). SLRs serve as a link between the education community of particular state and the regional CCCs and are often on the staff of the state department of vocational education's curriculum materials center. In addition, some states have consortia in their state. SLRs are often curriculum developers. The materials that they produce and distribute in their state might be available through the CCCs, consortia members, and the ERIC database. They may also be available through one of the consortia discussed here or through a state learning resource center. The SLRs, one in each state and territory, provide educators with information about previewing or obtaining curriculum materials and can assist in the development of curriculum and instructional materials. Although specific services vary from state to state, in most instances an educator can call the SLR to assist in locating vocational education curriculum materials. Many states have extensive catalogs of instructional materials, both print and non-print. If an appropriate curriculum is not available, the SLR will call the regional CCC to find one. The CCC will send a loan copy, if available, and/or do an ERIC search to try to find the needed materials. One of the advantages of borrowing curriculum from your regional CCC is that it provides an opportunity for reviewing and evaluating materials before purchasing them. To identify the SLR in your state, contact your state department of education or your regional CCC.

Northeast Curriculum Coordination Center

New Jersey Department of Education, Office of Academic Programs and Standards, Office of Adult and Vocational Education, Trenton, NJ 08625. (201) 290-1000. (800) 290-9678. (CT, MA, ME, NH, NJ, NY, PR, RI, VI, VT)

Southeast Curriculum Coordination Center

Mississippi State University, Research and Curriculum Unit, P.O. Drawer DX, Mississippi State, MS 37762 (601) 325-2530. — FAX (601) 325-3296. (AL, FL, GA, MS, NC, SC, TN)

East Central Curriculum Coordination Center, K-8, Sangamon State University, Shepherd Road, Springfield, IL 62794-9423 (217) 786-6173. — FAX (217) 786-6036. (DC, DE, IL, IN, MD, MI, MN, OH, PA, VA, W, WV)

Midwest Curriculum Coordination Center, Oklahoma Department of Vocational Technical Education, 1500 West 7th Avenue, Stillwater, OK 74074-4364 (405) 743-5123. — FAX (405) 743-5142. Internet: VOTEMAH@onncce.bitnet (AR, IA, KS, LA, MO, NS, NM, OK, TX)

Northwest Curriculum Coordination Center, Clover Park Technical College, Building 15, 4500 Steilacoom Blvd., SW, Tacoma, WA 98498-4098 (206) 589-3744. — FAX (206) 589-5916. (AK, OR, ID, MT, ND, OR, SD, UT, WA, WY)

Western Curriculum Coordination Center, University of Hawaii, West Oahu Center, 94-2216, 1775 University Avenue, Honolulu, HI 96844-0001 (808) 956-7634. — FAX (808) 956-3374. Internet: Lerner@whcc.hawaii.EDU (AZ, CA, GU, HI, NV, CNM, FISM, ROP, Rep. Mur.)

State Vocational Education Resource Centers

The state vocational education resource center may or may not be the home of the SLR. Some resource centers are maintained as a library of vocational education instructional materials. In addition to curricula, they may house collections of audiovisual materials and resource material valuable to vocational educators. They may also provide services such as curriculum development workshops, in-service workshops, program evaluation, public relations, newsletter, or technical assistance. They often maintain an electronic bulletin board that lists suggested activities, information sheets, transcripts, masters, assignment sheets, job sheets, unit tests, and answer sheets. MAVC/V may also develop printed materials, instructional materials, and computer software.

Consoritum

In addition to the vocational curricula that are available through ERIC, a State Liaison Representative, a state vocational education resource center, and the regional CCCs, there are various consortia and commercial producers of instructional and research materials. These agencies offer a variety of types and formats (textbooks, competency-based materials, videos, computer software, position papers) in all areas of vocational and technical education. Contact the agencies for their current product catalogs.

Vocational-Technical Education Consortium of States (VTECS), 1866 Southern Lane, Decatur, GA 30032-5940 (404) 320-6543.

The purpose of V-TECS is to promote the systematic development and implementation of competency-based vocational and technical education by securing the active participation of state departments, vocational and technical education agencies, and other organizations, in the analysis of jobs and the organization of job-related information; the development of vehicles for assessing student achievement; and the design, development, or acquisition of instructional materials that provide a validated link between education and employment.

V-TECS offers catalogs that include worker tasks, tools and/or material lists, information on how to implement those tasks, and the standards of component task performance. All components are validated by workers in the specific occupation. V-TECS curriculum guides include units of instruction that complement the V-TECS catalogs with the support knowledge needed for task performance, learning activities, test development, and student information. Materials are developed by instructors and workers in the particular occupation.

V-TECS also has a criterion-related referenced test items and offers customized in-service programs, workshops, seminars, and technical assistance. It maintains a network of professionals who can meet the demands of a particular program.

Mid-America Vocational Curriculum Consortium (MAVCC), 1500 West 7th Avenue, Stillwater, OK 74074-4364 (405) 377-2000.

MAVCC is an organization of 10 states, develops competency-based instructional materials mutually needed by those states. Publications are for self-use only. MAVC also develops competency-based curriculum guides that provide instructors with a valuable tool for better lesson planning, classroom instructions, evaluation of student progress, and testing for program accountability. The guides include lists of objectives, test items, suggested activities, information sheets, transcripts, masters, assignment sheets, job sheets, unit tests, and answer sheets. MAVC/V develops printed materials, instructional materials, and computer software.

References

Directory of State Vocational and Technical Education Curriculum Coordination Centers, 1994, Appalachian State University, East Central Curriculum Coordination Center.

Wagner, J.O. (1990). ERIC Digest No. 97, Columbus, OH: The Ohio State University, Center on Education and Training for Employment, Review of Adult, Career, and Vocational Education.


Leadership Development...

(continued from page 21)

defects with collaborative leadership. Are we reflecting leadership trends in agricultural education? Let's start the dialogue.

References


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