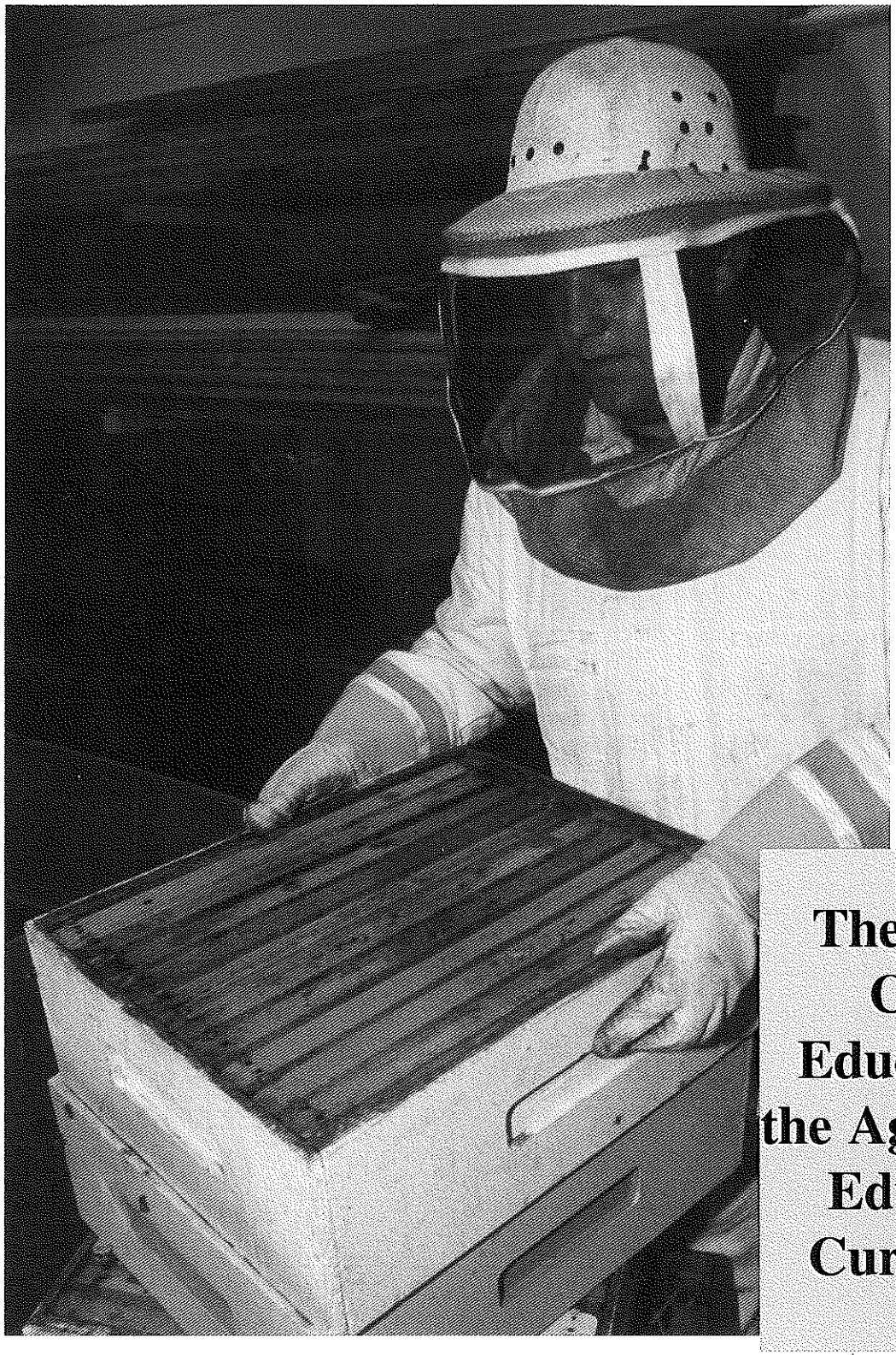
May-June
2002
volume 74
issue 6

The Agricultural EDUCATION MAGAZINE



The Role of Career Education in the Agricultural Education Curriculum

Is it Career Education or Education About Careers?

By Robert A. Martin

Recently, I heard a friend of mine say that she loved her job; she did not look upon her job as work. For her, the choices she made for her profession were the right ones.

Choosing a job you love may not be easy, but it is quite possible that career education might make that task easier. Getting a handle on career education may be the real problem. Career education has always been one of those topics that everyone agrees we need more of but we can never seem to agree what it is exactly. Consider this question, "Is it career education or education about careers?"

The term "career education" implies that students are gaining knowledge and skills related to at least a career area or cluster within which there are many jobs. This implication would seem to indicate that the knowledge-base and skills could be well-defined, sequenced, packaged, and delivered in such a way to arouse student interest. Of course, these learning events would be capped-off with real world experiences to complete the package. If this oversimplification of career education is accepted as true, it appears that agricultural education has had a rich history of career education. Our history indicates a strong experiential program has allowed students to act on the skills and knowledge-base gained in our instructional programs, through supervised agricultural experiences (SAE) and FFA organization activities (career development events, etc.).

However, some agricultural educators are having serious doubts about the extent to which this traditional definition of "career education" is actually being conducted. The weak link here seems to be supervised agricultural experience programs (SAE). The agriculture curriculum has changed dramatically over the years, and the FFA career development events have adjusted, changed and grown recently. SAE has not kept pace. If my informal inquiry into this situation is correct, a large number of agriculture students are not conducting SAE programs. How can we say that agricultural education is "career education" if experiential learning through SAE is not conducted by all students studying agriculture?

Additionally, it would be interesting to determine the focus of students currently participating in SAE programs. Do their SAE programs match the instructional program and their FFA experience? Perhaps the time has come to rename SAE and refocus its intent, redesign its structure and enhance every student's opportunity to have an experience guided by real work-site coordinators. Career Experience Programs in Agriculture has a nice ring to it. Taking a careers approach versus a project approach opens the mind to a great many possibilities.

On the other hand, "education about careers" may be defined as those learning events that seek to inform and raise awareness regarding opportunities in a selected career area. These learning events may be formal or non-formal educational programs. These opportunities to inform are more likely (but not necessarily) focused on the very young learner (K-8), non-agriculture students, or parents and others. While these programs are useful and certainly have their place in the education of all students, they are not in-depth career education programs in the true sense of the concept.

We are kidding ourselves if we think that "education about careers" is the same as "career education"? Education about careers is temporary awareness that may or may not be acted upon at some future point in time. In contrast, "career education" implies a commitment to a knowledge and skills-based curriculum, a focused and empowering out-of-school supervised experience program and a fulfilling FFA personal development and enrichment experience.

Can "education about careers" exist without "career education"? Quite likely it could and does. Can "career education" exist without "education about careers"? Not likely. So, is it career education or education about careers? We need both. Some people would argue, however, that we are losing the real essence of career education as practiced for years in agricultural education. For both to flourish, we need a strategy. It appears the profession has not yet found a way to identify and articulate a plan that places a high priority on these areas of concern. We often respond positively to a crisis. I believe we have one brewing. What will be our response?

There is no question about the priority of our authors in this issue of The Magazine. Please read these thought-provoking articles. Thanks to each author contributing to this issue. A special thank you goes to Dr. Connie Baggett for his work as Theme Editor in soliciting and organizing the articles for this issue. His efforts are very much appreciated. Enjoy!

Robert A. Martin is Editor of The Agricultural Education Magazine. He serves as Professor and Department Head of Agricultural Education and Studies at Iowa State University.

Theme: The Role of Career Education in the Agricultural Education Curriculum

Authors writing for the May-June issue of The Agricultural Education Magazine discuss how career education is emphasized in the agricultural education curriculum. Skill development is the key to career opportunities in agriculture. (Photo courtesy of College of Agriculture, Iowa State University.)

Subscriptions
Subscription price for *The Agricultural Education Magazine* is $10.00 per year. Foreign subscriptions are $20.00 (U.S. currency) per year for surface mail, and $40 (U.S. currency) foreign airmail (except Canada). Single copies and back issues less than 10 years old are available at $2 each ($3.00 foreign mail). All back issues are available on microfilm from UMI University Microfilms, 300 North Zeeb Road, Ann Arbor, MI 48106. UMI University Microfilms telephone number is (313) 761-4700. In submitting a subscription, designate new or renewal and provide mailing address including ZIP code. Send all subscriptions and requests for hard copy back issues to the Business Manager: Rosco Vaughn, Business Manager, National Council for Agricultural Education, 1410 King Street Suite 400, Alexandria, VA 22314, Phone 800-772-0939.

Article Submission
Articles and photographs should be submitted to the editor or theme editors. Items to be considered for publication should be submitted at least 90 days prior to the date of the 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). One hard copy and one electronic copy of the article should be submitted. A recent, hardcopy photograph should accompany the article unless one is on file with the editor. Articles in the magazine may be reproduced without permission but should be acknowledged.

Editor
Dr. Robert A. Martin, Professor and Head Department of Agricultural Education and Studies, Iowa State University, 201 Curtiss Hall, Ames, IA 50011, Phone (515) 294-5904, FAX: (515) 294-0530.
E-mail: drmartin@iastate.edu
Design and Layout: Stacie M. Turnbull

Publication Information
The Agricultural Education Magazine (ISSN 073224677) is the bi-monthly professional journal of agricultural education. The journal is published by the Agricultural Education Magazine, Inc. and is printed at M&D Printing, 616 Second Street, Henry, IL 61537.

Periodicals postage paid at Mechanicsville, VA 23116; additional entry at Henry, IL 61537.

POSTMASTERS: Send address changes for *The Agricultural Education Magazine* to the attention of Pam Holbert, Administrative Assistant, 1410 1410 King Street Suite 400, Alexandria, VA 22314, Phone (800)-772-0939.

It is the Best of Times; It is the Worst of Times for Career Education

By Connie Baggett

Over the last several months, I pondered what would be the better title for the theme article for this issue of the magazine. I pondered such titles as "Where has Career Education gone?" or "For whom the bell tolls, it tolls for Career Education" or "Those were the good ole days for Career Education." Obviously, these are cliché titles that some of us seasoned educators remember relative to other aspects of life. I realized that all of these could be an appropriate title for what I have written.

It was the best of times when I was teaching about careers in agriculture at the secondary school level in North Carolina in the late '70's. I became certified in career exploration through NC State University. Yes, I was teaching and working toward adding this area to my agricultural teaching certificate. Everyone knows that going to school and teaching school is a very demanding role to play but my strong will to be as effective as I could gave me the strength to continue.

My career education program in the Durham County Schools reinforced my philosophy to help budding teenagers to explore the world of work and to determine those areas that most interest them. Because my students in this career exploration program were 8th graders, I had an enormous task of helping these young minds to value education, agriculture, and being a productive member of society when they grow up. Using the Tarboro Curriculum, I introduced students to careers in cluster areas: Agribusiness and Natural Resources, Environmental, and Marine Science. It was amazing how these students dove into the activities of the different occupational clusters and these students learned and showed appreciation for the jobs studied (Table 1). As you read this, I am sure that you know that my heart was really in the agricultural and environmental clusters.

Obviously, there are many agricultural and environmental occupations that were not covered. However, many of the students involved in the career exploration program signed up for the 9th grade agriculture program. Like many agricultural programs, students learned more in-depth subject matter in the 9th grade.

During my Ph.D. program, I hypothesized that interest was learned (Baggett, 1982). My hypothesis was based upon the work that Donald Super, a psychologist, published in 1976. He theorized that interests are learned and that people do not have innate interest from birth. To make a long story short, my reserach found that students do learn interest in agricultural careers after having been exposed to career information. As part of an experimental design, I used the Vocational Education Production teaching material titled "Careers in Agriculture." Interestingly enough, female students had the highest gain score between the two sexes. Christie (1996) conducted a similar study and made similar conclusions. These two studies reinforce the need to have career education as part of any instructional program in the agricultural sciences.

These are the best of times. If we continue to build career education into the agri-science education curriculum, these are the best of times. I've been there and done that and there are many teachers still doing that. As I read over the articles submitted for this publication, I see written evidence that many programs include career education as an integral part of the instructional program. I implore you to read what these contemporary authors are saying about their contemporary programs of instruction.

Table 1: **AgriScience Occupational Education Clusters**

Environmental Cluster	**Agribusiness and Natural Resources**
Air Pollution Control Aide	Agronomist
Exterminator	Cattle Feeder
Forest Aide and Technicians	Dairy Farmer
Nursery Workers	Farm Equipment Dealer
Garbage Collector	Farm Equipment Mechanic
Sanitarian	Grain Buyer
Watershed Tender	Grain Farmer
Water Treatment Plant Operator	Poultry Farmer
	Seed Grower

With the explosive use of computers and computer technology, career education of world agriculture is at your fingertip. Search engines such as Yahoo and Ask Jeeves are excellent in identifying universal resource locations (URL) for careers in agriculture. I was amazed to find employment opportunities world-wide, doing things I like to do. If this is not the best of times, I don't know what is.

These are the worst of times. When teachers get so involved with the science of agriculture that they forget about or neglect the vocations of agriculture, these may be the worst of times. There are still places for experiential learning in the agri-science education program where students can test methods, techniques, and theories learned through the program. Unfortunately, as the pool of prospective teachers becomes small, the pool of truly excellent teachers becomes smaller. Maybe the new cadre of teachers do not appreciate the vocations of agriculture. But, career education, SAE, SOEP, and cooperative education are natural for agri-science education.

These are the worst of times when I hear responsible school employees and officials telling students that there are no job opportunities in agriculture. The mistaken conclusion that agriculture is going to be left up to third world countries is dangerous and irresponsible. When we find individuals with this mentality, we need to educate them, use them as uninformed examples, and use the occasion to teach career education. On the other hand, we need to acknowledge that only about two percent of the population is involved in production agriculture because this is an efficient enterprise. Two percent of about 250 million Americans is a large number of people. The agricultural industry needs intelligent and active learners to maintain the industry. I believe that we have a moral obligation to inform young people about opportunities in agriculture and agriculturally-related occupations. Career education in the curriculum is the most organized and effective way to do this. Oh, how I dread the worst of times.

Reference:

North Carolina Department of Public Instruction. (1981). Competency Occupational Exploration. 990 pp.

Baggett, C. D. (1982). The Influence of Selected Career Information Material on Career Interest of Secondary Students. 134 pp.

Christie, N. L. (1996). The Influence of Selected Career Information Material on Career Interest of Secondary Students in Pennsylvania. 136 pp.

Super, D. (1976). Career Education and the Meaning of Work. Washington, DC: U.S. Government Print Office.

Connie Baggett is an Associate Professor in the Department of Agricultural and Extension Education at Penn State University.

A FFA member shows a youngster how maple syrup is produced. (Photo courtesy of Tim Rogers, ANR Communications undergraduate, Michigan State University.)

Career Education: What is the Fit?

By Warren H. Hitz, Jr.

As legislation at the national, state and local levels continues to impact the classroom/laboratory environment, the role of career education becomes somewhat less clear and sometimes the contention of debate. When you stir in the economy and social issues, there is often much debate about exactly what the curriculum should include and how it should be taught. In his book, *The Limits and Possibilities of Schooling,* Christopher J. Hurn suggests, "reasonable and thoughtful people no longer agree on what knowledge is of most worth". So what about agricultural education and the role of career education, what is the fit?

The world of work has long been an integral part of vocational agriculture as indicated by the Smith-Hughes Act of 1917. The primary objective of this legislation was to prepare people for work on the farm. The Vocational Education Act of 1963 enlarged the lens of vocational agriculture beyond the farm, to include all areas of agriculture. This brought with it an expanded network and complexity of knowledge and skills incorporated under the umbrella of agriculture. The demands of the classroom have grown from the small family farm to include the global agribusiness/biotechnical marketplace of today. This magnified view of agricultural education reflects an associated set of accompanying career opportunities.

In the early stages of agricultural education, the focus of career education was somewhat narrower than today, more opportunity to focus on "the career" in production agriculture. Some suggest that this approach has changed little in many programs across the country; however, current trends lead one to believe that career exploration and job readiness in several agricultural clusters may better serve the students. From here students may choose specific occupations and related specific skills that can be followed with post-secondary training. Recommendations to revise and broaden the relevance and scope of the agricultural education curriculum to prepare students more effectively for post-secondary educational experiences appear to support this expanded approach.

At Milton Hershey School, a private school in Hershey, Pennsylvania, the concept of using this "big picture" curriculum integration incorporates the entire K – 12 setting. The Agricultural and Environmental Education program (AEE) is utilized to learn about and through agriculture and the environment. Applied and experiential-based learning projects are used as platforms for standards-driven learning. Embedded in these projects is career education in the form of purpose and relevance. These projects address the questions of why the particular knowledge and skills set is important and where it should be used as well as who uses this information. This approach affords sequential career educational building blocks that are age appropriate and intended to stimulate inquiry and discovery. Each student may internalize these career opportunities differently based on their own abilities, interests, learning style, and social influence.

The *Landis Valley Project* is an example of an integrated project done with the 8th grade. This project examines the last 150 years of agriculture and its impact on society. Students enter this project having studied life during the second half of the 19th Century and having visited the Landis Valley Farm Museum in Lancaster County, Pennsylvania. This standards-driven interdisciplinary project focuses on several objectives:

- Recognition of advancements in agricultural technology and production practices.
- Recognition of advancements in food production, processing and preservation.
- The use of plants and herbs as a food source and for medicine.

Following the initial study of the historical perspective, students spend one day rotating through a series of activities in several programmatic areas and related fields:

- Animal science – handling horses, food production, processing and preservation as related to animal products.
- Dairy science – technological advances, food production, processing and preservation as related to dairy products.
- Horticulture – current farming methods, pest control.
- Agricultural technology – advancements in equipment/ technology and the impact on the relationship of production to the number of people served.

During these activities, students are asked to examine different careers related to the various areas. The discussion includes viewing jobs, their requirements and expectations and how these roles have changed. When looking through the current and future lenses for career possibilities, the students begin to formulate a network of related career pathways, specific jobs connected to these pathways and the necessary education and training required of these options.

Fifth-grade students at Milton Hershey Schools study careers, economics, and production. Students then create their own agricultural businesses and present the business at a sales day. (Photo courtesy of Warren H. Hitz, Jr.)

This exposure is not meant to be a vocational training ground, but more of an awareness that is grounded in application. Quite often, we find students uncover interests that allow them to follow-up with 4-H club involvement, science fair projects and employment or internships. Recently, through the *Landis Valley Project,* one student found his interest in dairy science. Though not from an agricultural background, his next four years involved working at our dairy where he successfully showed animals at the local and state levels, was involved in herd management and maintained the Dairy Herd Improvement Association (DHIA) records, participated in genetic research and embryo transplants and was certified as an artificial insemination technician.

He graduated with honors and is now attending college majoring in dairy science. This is one example of how the incorporation of career education in the agricultural curriculum allows students to uncover and examine areas they may not normally see or even consider as a career.

Much is written about the multiple job/career experiences that people will face during their lifetimes. This may lead one to surmise that students should be afforded opportunities to learn about many careers, their requirements and rewards, and how various career pathways can connect. It may be to the advantage of agricultural education to ensure that career education is an integrated part of the entire program in a systematic or networked approach rather than a narrow focused specific career skill set. The emphasis shifts from "*the* career *in*" agriculture to "career*s through*" agriculture. This is not a "one size fits all" approach, but rather the development of a broad range of career opportunities as an integral part of the curriculum you provide.

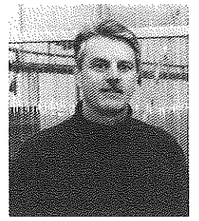
References

Committee on Agricultural Education in Secondary Schools. (1988). Understanding agriculture: New directions for education. National Academy Press. Washington, DC.

Gray, K. C., Herr, E. L. (1998). Workforce education: the basics. Needham Heights, MA. Allyn & Bacon.

Hurn, C. J. (1985), The limits and possibilities of schooling: An introduction to the sociology of education 2nd Edition. Newton, MA. Allyn & Bacon.

Paterson, M. (1996). Agricultural and environmental education at Milton Hershey School. The Agricultural Education Magazine,69(2).,17-20.



Warren H. Hitz, Jr. is the associate director of Agricultural and Environmental Education (AEE) at Milton Hershey Schools in Hershey, PA.

Implementing Career Education Programs During Contemporary Times

By Eddie A. Moore

Contemporary Challenges

Career education is not a new concept in American education. A review of literature and research indicates that elements of career education were included in a number of historical federal legislative acts. These include the Morrill Act (created land-grant colleges), Smith-Hughes Act (established funding for vocational education), and the National Defense Education Act and amendments which focused on counseling and guidance.

Emphasis on career education in our society could be viewed like the stock market over the years in that at times it goes from a warm temperature to a very hot temperature depending upon a variety of circumstances. For nearly ten years (1991 - 2000), the U.S. economy had never been better for most Americans. The U.S. economy began to take off during the last year of President George Bush's presidency. To a large extent, during President William Jefferson Clinton's era, the overall economy prospered. Unfortunately, a number of factors created unprecedented challenges for the first year or so of President George W. Bush's presidency. A prior strong economy, the Supreme Court ruling regarding the 2000 elections, the events of September 11, 2001, and subsequent efforts, the Enron collapse, and various world affairs have all challenged President George W. Bush like no other president during contemporary times.

Career education seems to attract greater attention when societal problems here at home appear to be spiraling out of control. Such factors as unemployment, crime, drug addiction, family values, and limited knowledge about the world of work are reasons for increasing the amount of financial support for career education. Some view career education as a panacea for solving America's problems and correcting what might be wrong with a number of educational systems.

Contemporary Definition

There are many definitions for career education and the debate continues to what the definition should be during contemporary times. With regard to students, we should recognize that for nearly a ten-year period, our youth lived during the most prosperous economic times in the history of our country. Although prices for farm commodities were very weak during this period and prevented rural America from benefiting fully from the prosperity of the overall economy, there are some indications that rural America also prospered during the ten-year period. Moreover, $28 billion were distributed to farmers and ranchers in 2000. This was a record and amounted to almost half of what farmers received for selling their own commodities. Therefore, today we need to be fully aware of the status of our customers if we are going to be effective in responding to their current and future needs.

First and foremost, we should view career education as a means for preparing individuals for a variety of life roles: economic, home, community, avocational, aesthetic, and religious. Early in this process, we should assist students in determining the value of life and where they are in relation to their own Wheel of Life. This provides students with the opportunity to determine how balanced they are and where they may want to establish some personal future goals. Moreover, this analysis helps students to develop a strong foundation with regard to where one may want to work, live, associate with and determine other dimensions that are important in defining a lifestyle.

Traditional Models

Several career education models have been implemented over the years in order to prepare individuals for various life roles. These include school-based, employer-based, home-based, and residential based models. Many school-based models are designed to: (1) assist students in developing an awareness of career options; (2) develop positive attitudes about self, family, school, community, work, and society; (3) enhance personal characteristics such as motivation, initiative, social skills, and self-respect; and (4) prepare students for entering the workforce, advancing, and contributing to society.

The employer-based model is designed to provide students with an alternative education in the workplace by building upon the general, academic, and vocational curricula. A career education home-based education model is not the same as home schooling. This model includes delivery of an educational program in the home primarily for adults. The model provides adults with new career development skills in order to assist them in becoming more competent workers and to enhance the quality of the home as a learning entity. A residential-based career education model may include education, health and health services, family and community services, economic development services, research, evaluation, and other related efforts.

Contemporary Model

In light of a number of challenges, particularly those here at home, the general public is requesting greater reform in education in order to achieve higher levels of educational achievement. The public is not interested in high-flying proposals with all the whistles and bells. They are interested in practical implementation strategies that are likely to achieve meaningful results. It is crucial that we restore public confidence in our result-oriented reform efforts and involve them in the change process. We must not allow the fiscal challenges which lie ahead to color our thinking about educational improvement.

A contemporary model for career education may be summarized in an African proverb: It takes a village to raise a child. This proverb is discussed in more detail in a book by Senator Hillary Clinton titled It Takes a Village and Other Lessons Children Teach Us.

A contemporary career education model for local agricultural education programming includes the integration of school-based, employer-based, home-based, and residential-based models. This contemporary career education model is likely to produce greater results than models that are at times disconnected, overlapping, and costly. Agricultural education is positioned to build upon this model considering our current secondary delivery systems are an integral part of local communities.

The following points should be considered in building a contemporary model for local programs:

- Develop local programs around the lifelong education needs of people (youth and adults);
- View local programs as the planner and manager of educational growth of people and utilize the full range of community resources to meet their respective needs;
- Consider the contemporary model as a pervasive and evolving concept in order to respond effectively and efficiently to unprecedented opportunities which are directly related to our customer needs;
- Implement a visioning process that is contemporary in nature and scope;
- Give strategic planning the highest priority possible as part of the contemporary career education model integration process;
- Search for new and different opportunities that are global in nature;
- Be innovative in programming and remain focused on meeting current and future needs of customers.

Implementing contemporary career education programs at the local level will be an awesome challenge for the profession. Do we who are concerned about implementing contemporary local career education programs have the breadth of vision to plan accordingly? Do we see far enough and comprehend broadly enough what this crucial contemporary educational component should be in the future?

In response to these questions, we should remember that during the height of the career education movement in the U.S., Goldhammer and Taylor (1972) stated:

As educators, as citizens, we must confront it, think through it, consider it, shape it, so that career education can more effectively keep its promise of fully capacitating individuals for their multiple roles.

References

Clinton, H. R. (1996). It Takes a Village and Other Lessons Children Teach Us. New York, N.Y.: Simon and Schuster.

Gray, S.T. (1984). How to Create a Successful School/Community Partnership. Phi Delta Kappan. Volume 65, Number 6, pg. 405-409.

Goldhammer, K. & Taylor, R. (1972). Career Education Perspective and Promise. Columbus, Ohio: Charles E. Merrill Publishing Company.

Hamilton, S.F., and Hamilton, M.A. (1997). When Is Learning Work-Based? Phi Delta Kappan. Volume 78, Number 9, pg. 677-681.

Rhoder, C., and French, J. N. (1999). School-to-Work - Making Specific Connections. Phi Delta Kappan. Volume 80, Number 7, pg. 534-541.

Seeley, D.S. (1984). Educational Partnership and the Dilemmas of School Reform. Phi Delta Kappan. Volume 65, Number 6, pg. 383-388.

Timpane, M. (1984). Business Has Rediscovered the Public Schools. Phi Delta Kappan. Volume 65, Number 6, pg. 389-392.

Walberg, H.J. (1984) Families as Partners in Educational Productivity. Phi Delta Kappan. Volume 65, Number 6, pg. 397-400.

Eddie A. Moore is a Professor in ANR Education and Communication Systems at Michigan State University and Former Senior Executive with the United States Department of Agriculture

Does Agricultural Education Do School-to-Career Education?

By Michael K. Swan

The strategic plan for Agricultural Education identifies our mission as preparing students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber and natural resources system.

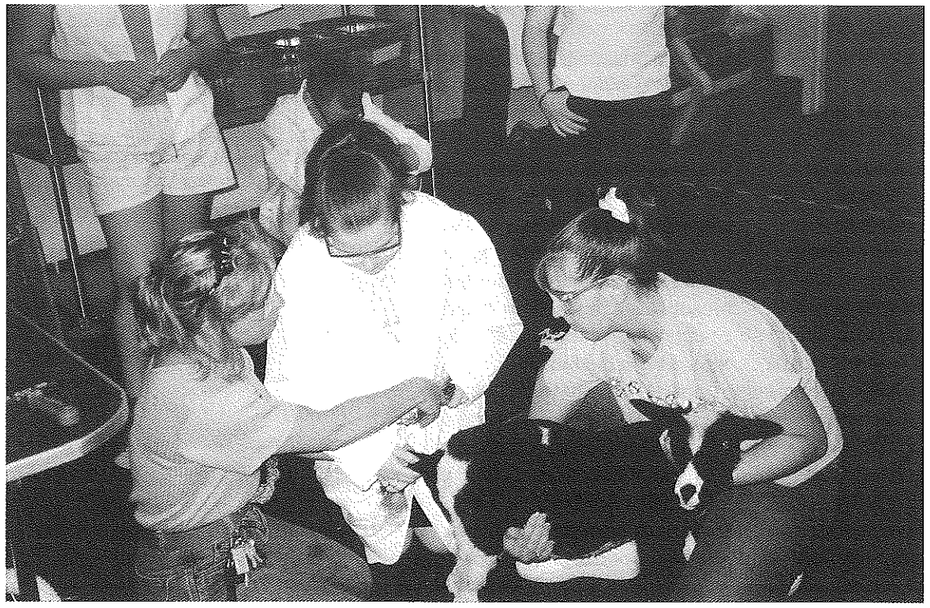
Many of America's young adults leave school unequipped with skills they need to perform in today's modern, competitive world economy. These young adults often flounder in post secondary education and/or the labor market, wasting a decade or more in intermittent, low-paying jobs. Due to the lack of academic, technical, and workplace skills, employers are having difficulty finding employees who are adequately prepared for today's more demanding technical jobs, creating a crisis in the employment market. In answer to this crisis Agricultural Education is placing more emphasis on Supervised Agricultural Experiences (SAE) and classroom - laboratory - employment interactions.

As a profession, agricultural education professionals are committed to providing all students with the opportunity to acquire knowledge, skills, and abilities that will lead to success in their continued education and careers through:

- Relevant education that allows students to explore different careers and see what academic and technical skills are required for success.
- Essential skills that are obtained from structured classroom, laboratory and work-based learning experiences.

In visiting several schools over the past year, I have observed what agricultural educators are doing to enhance relevant experiences and develop essential skill building experiences for students. Many of these programs have a similar appearance that focuses on the student while enhancing the technical skills needed in agriculture.

These programs provide students the opportunity to explore various new visions of agriculture and the newer occupations related to the industry of agriculture. One example is a program that explores various aquaculture industry occupations from raising salmon, steelhead, and trout to catfish and Koi. Several of these programs have now established school placement and internships for students to get real work-based experience while learning in the classroom. These teachers have fostered a relationship with Fish and Game Departments and Wildlife Commissions who not only assist in work placement but also provide the equipment and feed to reduce costs to the local program and school.



Students at Southington Senior High School, in Southington, Connecticut, investigate animal health by working with animals in situations similar to those of a veterinarian. (Photo courtesy of Monica Kukielka.)

Other programs have developed a working relationship with business and industry to allow students to learn and develop skills while earning wages. Many of these programs are short term placements where students rotate between two to four chosen placements during the semester. At the same time students are required to maintain their other class assignments and projects.

What I have seen from all of the programs that are really doing School-to-Career development is that they have incorporated industry standard benchmarks along with established education and training standards throughout the curriculum. Agricultural educators have altered their curriculum to be more like industry than the traditional school or academic setting. What is common to all of these programs is a strong modern science-based agricultural curriculum that includes:

- Communication Skills
- Networking Skills
- Listening Skills
- Writing Skills
- Public Speaking Skills
- Questioning Skills
- Reading Skills
- Life Skills

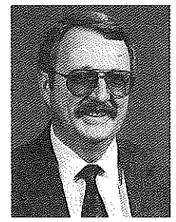
Most of the teachers I observed believe that when students are preparing for the real world of work, and complete interactive projects in the curriculum they will:

- Improve their communication skills.
- Enhance their listening skills.
- Learn and practice the "art" of conversation.
- Improve their public speaking skills.
- Identify the common denominators of successful people.
- Learn and practice networking skills - the process of making and developing contacts.
- Broaden their awareness of career options, both traditional and non-traditional.
- Learn how people skills, communication skills and networking skills can help them succeed in the real world.
- Practice their questioning skills.
- Develop their writing skills.

These programs and teachers believe that the School-to-Career approach to learning is for ALL students. This belief is based on the proven concept that education works best and is most useful for future careers when students apply what they learn in school to real life, real work situations. The ultimate goal of the School-to-Career program is to better prepare our students for the high wage, high skill careers of tomorrow's global agriculture, food, fiber, and natural resources economy.

This concept is the foundation upon which Agricultural Education has been built for decades. So, "Does Agricultural Education Do School-to-Career Education?" I think YES, in most cases. If teachers want to enhance their students' opportunities, they should focus on the above concepts. Include these concepts in your curriculum and your students will benefit!

"There is always one moment in childhood when the door opens and lets the future in."
—Peter Drucker



Michael K. Swan is an Associate Professor in Biological Systems Engineering Department at Washington State University.

September - October 2002, Issue

The Role of Research in the Agricultural Education Curriculum.

Does research in Agricultural Education impact the curriculum? If so, how? What does research tell us about the curriculum? What are some examples of a linkage between research and our curriculum?

Theme Editor: Dr. Greg Miller
Iowa State University
Phone: 515-294-2583
email: gsmiller@iastate.edu

Articles Due to Theme Editor: August 1, 2002
Articles Due to Editor: August 15, 2002

A Model for Youth Leadership Development in Career Education

By John C. Ricketts and Rick D. Rudd

A couple of years ago, when I was teaching in Middle Tennessee, a student that we will call "Johnny" signed up for "ag class." After about a week of lessons and videos pertaining to what he could do when he grew up, Johnny began to let me have it.

"What's all this talk about career education, and why do I have to learn all of this leadership stuff. This is silly, I don't care about working with others and talking in front of people!"

Little Johnny expressed the views many of his classmates had from time to time. However, that "leadership stuff" serves as the core material of any program built to prepare students for a career in agriculture.

Agricultural education is faced with the challenge of providing young people with more opportunities than ever before in leadership and personal development for career and societal success. In 1998, vanLinden and Fertman found that "employers are more interested in adolescents who are leaders". Just ask your local feed store representative or computer salesman or tractor dealer. They will tell you leadership qualities are what they are looking for and that leadership qualities are what new hires are lacking the most. The National Association of Colleges and Employers conducted a study where six of the top seven skills desired by employers of new graduates were leadership related (Table 1).

Table 1: **Employers rating of new hire skills**

Skill	Mean
Interpersonal	4.54
Teamwork	4.51
Verbal Communication	4.51
Analytical	4.24
Computer	4.12
Written Communication	4.11
Leadership	3.94

Note. 5-point scale. 1 = not at all important; 5 = very important

The same study listed the top ten personal qualities that employers seek (Table 2).

Table 2: **Top ten peraonal qualities employers seek**

Rank	Personal Quality
1	Communication Skills
2	Motivation/initiative
3	Teamwork skills
4	Leadership skills
5	Academic achievement/ Grade Point Average
6	Interpersonal skills
7	Flexibility/adaptability
8	Technical skills
9	Honesty/integrity
10	Work ethic
10*	Analytical/problem-solving skills

Note. * Tie

FFA and other youth organizations have done a tremendous job of preparing leaders, but do all students in agricultural education programs take advantage of membership in the FFA? The answer is no. There is another tool to help our students in career education. We propose a comprehensive model for a formal leadership education curriculum that could better prepare our students for their careers. Such a model could supplement existing leadership opportunities and complete the arsenal of leadership knowledge that formal and non-formal agricultural education program can provide young people the skills needed to compete and be successful.

The *Model for Youth Leadership Development* consists of five dimensions of leadership that should be taught or facilitated in three different stages. Each dimension represents the competencies of leadership that should be taught for students to successfully enter the "world of work." If an educator uses the model as a curriculum guide they could teach a unit on each dimension at each stage.

Model of Youth Leadership Development

Each stage of the Model for Youth Leadership Development, *awareness, interaction, and integration* calls on the educator to teach the competencies utilizing higher order thinking and learning procedures. A description of each stage follows:

* Awareness – At this stage leadership is not a part of the student's life, but he/she is becoming aware of it.
* Interaction – At this stage the student is starting to think about leadership and wants to explore.
* Integration – At this stage the individual is focused on improving leadership skills and abilities.

The model can be used to develop a specific curriculum for teaching leadership or it can be used as a guide for demonstrating the those skills that employers want in new employees. The dimensions of the leadership model are listed below:

Leadership Knowledge and Information

The dimension of "leadership knowledge and information" represents what youth need to know about leaders and leadership before they proceed with application of the leadership concepts. The leadership knowledge and information dimension demystifies complicated, abstract concepts and ideas about leadership by helping students understand the phenomena as a personal and attainable undertaking.

Leadership Attitude, Will, and Desire

Leadership attitude, will, and desire is the dimension designed to stress the importance of motivation, self-realization, and health in fulfilling a student's leadership capacity.

Decision-making, Reasoning, and Critical Thinking Skills

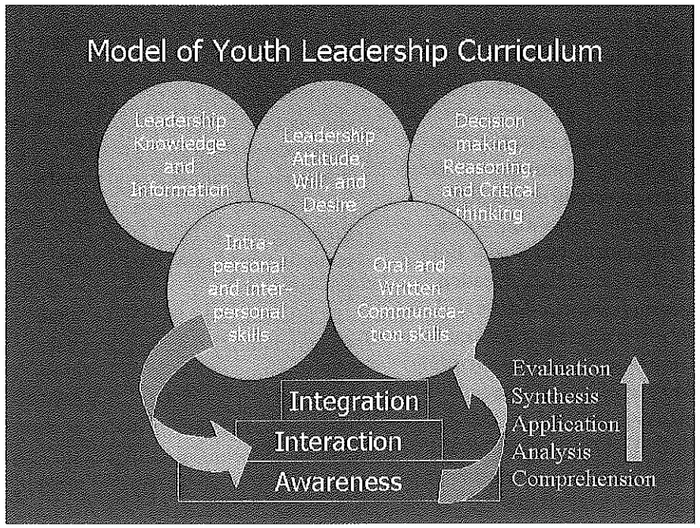
This dimension teaches students how to make decisions, solve problems, and think things through. As times and technology change, it is becoming more important for our students to learn how to think more so than what to think. We can never prepare them for all of the decisions and problems they will face in their careers someday, but we can equip them with the tools that will allow them to move forward in their respective occupations.

Oral and Written Communication Skills

Oral and written communication skills are the media for sharing knowledge, interests, attitudes, opinions, feelings, and ideas in order to influence and ultimately lead others (vanLinden and Fertman, 1998). If employers feel that our students can effectively write and speak on behalf of their business or industry then they will come back for more every time.

Intrapersonal and Interpersonal Relations

The last dimension of the youth leadership curriculum model is intrapersonal and interpersonal skills. Conflict resolution, stress-management, teamwork, and ethics combined with knowledge regarding diversity, personality types, communication styles, leadership styles, and other human relations abilities all fall into the final dimension. The human relation dimension prepares students to look inward and to work with others in the most optimum ways possible.



The next time Johnny starts with all of his "why this" and "why that" you still probably won't be able to satisfy his curiosity. However, maybe now you have a tool that will help you feel more confident about teaching leadership for Little Johnny's career education. For more information about the *Model for Youth Leadership Development* developed at the University of Florida, contact: John C. Ricketts, 310 Rolfs Hall, University of Florida, Gainesville, FL 32608, jcr@ufl.edu.

References

National Association of Colleges and Employers (2000). Job outlook 2000-What employers want (Report) Available:http://www.naceweb.org

vanLinden, J. A., & Fertman, C. I. (1998). Youth leadership: A guide to understanding leadership development in adolescents. SanFrancisco, CA: Jossey-Bass Publishers

John C. Ricketts is a Graduate Student in the Department of Agricultural Education and Communication at the University of Florida.

Rick D. Rudd is an Associate Professor in the Department of Agricultural Education and Communication at the University of Florida.

Career Education Through Service Learning: Creating Strategic Alliances for Student Learning

By Michael Woods

When students sit in a classroom and wonder "When am I ever going to use this information?", the real world can seem a million miles away. To receive a top-notch education, they need to see the relevance of rigorous academic studies to their own lives.

What should students know and be able to do by the time they graduate high school? This basic question is at the heart of most education reforms in recent years. Increasingly, the answer lies not just in strong academic and career skills but also in a sense of self and the individual's role in supporting and building a vibrant community.

As schools seek ways to connect students with the world around them, community service in schools is on the rise. A recent study by the National Center for Education Statistics (NCES) shows that 83% of the high schools in this country offer community service opportunities, up from 27% in 1984. In fact, NCES predicts that more than 13 million students in North America will be engaged in community service by next year.

But service alone is not enough to meet school goals of turning out educated students and thoughtful citizens. When service is integrated into rigorous curriculum and schools give students an opportunity and a framework to reflect on their experience, service-learning becomes a powerful tool for connecting students with their career and their communities.

How Service Learning Fits with Career Education

Service learning represents a point of interface between the classroom and the community and can be used at almost any point in the agricultural education curriculum. Service learning represents an opportunity for agricultural education students to work with employers to provide a meaningful opportunity for community service, combined with the academic and technical skills that employers require.

For agricultural education students, service learning offers exposure to the world of work and community and provides a context for building academic and work-readiness skills (i.e., team and problem-solving skills; communication skills; competencies and foundation skills identified as important for employability; and responsible citizenship) while gaining support of business leaders through community partnerships.

Moreover, service learning offers agricultural education students valuable exploration into and experience with real-world needs that can be addressed through action and initiative, while further solidifying their work-readiness, academic and technical skills. Service learning represents a holistic approach to learner development and the building of multiple competencies.

Because of the commonalities between service learning and career education, agricultural education students can benefit from greater collaboration between them. Both are potent experiential education methodologies, best incorporated into a total agricultural education curriculum. Both involve students in filling real-world roles, in one case as community volunteers, in the other as workers. They also share other elements, including:

- A focus on the strengths and contributions of young people rather than on the problems;
- A need for strong, supportive adult guides as supervisors in service or work settings;
- The importance of structured, thoughtful reflection on service or work experience;
- A focus on immediate outcomes for the community or employer, in addition to outcomes for the learner;
- A need for an active student role in program development, planning, evaluation, and improvement; and
- An ability to engage and motivate students.

However, to attain these elements of career education and service learning requires an agricultural education program to expand the content of subjects beyond exclusive reliance on concepts, facts and procedures. A model of career education through service learning includes: *problem-solving strategies* acquired through experience; *cognitive management strategies*, such as goal setting, strategic planning, monitoring, evaluation, and revision; and *learning strategies*, such as knowing how to learn and reconfiguring knowledge already possessed.

Implementing this model within an agricultural education program also requires a change in teaching methods that give students opportunities to observe, invent, discover, and engage in technical strategies in context. The model requires learning sequences that allow the learner to build multiple skills required for performance at high levels and discover the conditions to which these skills apply. Moreover, the model requires learning environments that reflect the social, technological, time, and motivation characteristics of the real world where the skills and knowledge being learned are ultimately applied.

Outcomes of a Career Education Through Service Learning Model

The career education through service learning model focuses on three aspects of the individual: 1) self-awareness, 2) opportunity awareness and 3) decision and transition learning. These components form the core of an effective career education through service learning model. In order to implement this vision of career education through service learning, agricultural education programs need to have clear and specific outcomes for each component. The following examples illustrate each of the above dimensions.

Self-Awareness

Students will be able to achieve the following:

- Analyze changing personal attitudes, values, interests, and abilities, and explain how they relate to a range of career choices and community needs.
- Describe a personal accomplishment and specify the skills which were used in this achievement.
- Recognize and develop ways of dealing with stereotyping, discrimination and racism.
- Develop and apply skills for studying, organizing, organizing, time management, planning, researching, accessing school and community resources, and goal setting.
- Explain the inter-relation ship of personal responsibility, good work habits, career opportunities, and community needs.

Opportunity Awareness

Students will be able to demonstrate heightened awareness:

- Explain basic concepts about the community and work.
- Identify types and levels of work performed across a broad range of occupations and a variety of settings.
- Describe the present and future role of technology in the workplace and society as a whole.
- Analyze the value of learning as a result of visits to a variety of community settings and work sites.
- Demonstrate the attitudes necessary for success in learning, work and society.
- Describe how stereotyping, bias and discrimination limit career choices, opportunities and achievements as well as civic engagement.

Decision and Transition Learning

Students will also be able to exhibit increased decisiveness:

- Identify knowledge and skills taught in agricultural education which are transferable to work, community, family, and leisure activities.
- Describe a range of opportunities for agricultural education in both the immediate and long term, (also learn how to gain access to these opportunities and where they may lead.)
- Identify ways of making decisions and apply the knowledge to specific life situations.
- Develop an action plan to accomplish occupational, educational, leisure, family, and/or community goals.
- Develop skills for making transitions and for dealing with unexpected situations.

Impact of aligning career education and service learning

Outcomes based on the career education through service learning model posed in this article, linked to a planned and systematic agricultural education program, provides the opportunity to involve schools and the community in a real and reciprocal way. Career development programs in agricultural education must do more than provide information. They must be embedding civic education into the curriculum from the start, taking students out of the classroom and into the community.

A successful agricultural education program that aligns career education and service learning has the potential to help all students experience an enriched education; such students are better prepared for their working lives, and, in the long run, to be truly engaged in society.

References

National Center for Education Statistics (2000). Youth Service-Learning and Community Service among 6th through 12th grade students in the United States: 1996-1999. Retrieved March 20, 2002, from http://nces.ed.gov/pubs2000/qrtlyspring/4elem/q4-2.html

Michael Woods is an Assistant Professor in ANR Education and Communication Systems at Michigan State University.

Planning for Success: Role of IGP's and Assessment in Kentucky's Agricultural Education Curriculum

By Jay Morgan and Mike Stone

Education that does not incorporate career planning is a hollow promise. In the past, too often students were counseled and led to take courses that fit a learning or study model that had little relevance to their next step in life, especially if that step was toward employment. As Kentucky embarked on its comprehensive educational reform measures in the early 1990s, two key elements directed all students to focus on career choices and future plans. These two elements are planning and assessment.

In the first step of planning, each student, with parental involvement, must develop (1) an individual graduation plan (IGP). This resembles an academic roadmap that each student will use to reach graduation. The second element is assessment. To complete this element each student must participate in an assessment test that contains job-readiness questions. These two actions are particularly important for students who concentrate in Career and Technical Education programs like agriculture, where applied learning techniques can lead to skill certifications and job placement after graduation.

Nationally, Career and Technical Education programs are paying more attention to career preparation, which is required by the 1998 revisions to the Carl D. Perkins Vocational and Technical Education Act. This 1998 Perkins revision sets the guidelines states and local districts must follow in implementing their Career and Technical Education programs. Therefore, it required more attention to career guidance and academic counseling so students were better able to choose a career path, understand the course of study and requirements to achieve that career, and develop a plan to meet their goal. In Washington State, Career and Technical Education was defined as "a planned program of courses and learning experiences that begins with exploration of career options; supports basic, academic and life skills; and enables achievement of high academic standards, leadership, preparation for industry-defined work, and advanced and continuing education." Much like the state of Washington, the emphasis of "planned program courses and learning experiences" is what Kentucky has as its goal.

This student is working on an independent project using high tunnel and raised bed technology for strawberries. Independent projects include learning about careers in production and research. (Photo courtesy of Warren Hitz, Jr.)

Where the Jobs Are

Jobs are important to emphasize in the classroom setting. While the majority of all new jobs will require some level of postsecondary education, most will require a skill specialization rather than a baccalaureate degree. Career and Technical Education programs prepare students for those skill specializations, not only in Agriculture, but also in Business, Health Occupations, Industrial Education (now called Trade and Industry), Marketing, Technology and Technical Fields, and more.

Career and Technical Education programs also recognize that students learn in different ways. Many students learn best by applying what they are taught in hands-on environments. In the 21st Century, this is increasingly important as students can test theory on the technologically complex equipment that dominates the workplace. Career and Technical Education embodies hands-on, applied learning.

The IGP

In Kentucky, beginning in middle school, students and their parents are provided materials and workbooks that detail 14 career clusters that individuals may pursue. They are encouraged to think about interests, what they like to do, and what they believe they are good at doing, all of which are applied to identify a particular cluster of work. Each cluster includes lists of possible jobs and the steps needed to achieve that career. Agriculture is one of the clusters. Furthermore, counselors work with students to complete their IGPs and then help them track progress through school.

A successful Career and Technical Education curriculum incorporates skills needed in the workplace as well as at postsecondary institutions. Curriculum includes integration of academics with the technical knowledge and skills that will be encountered in the workplace. For students to be able to meet that need, they must be taught how to solve problems, process information, communicate, work in teams, relate to customers, accept responsibility, and learn independently. Other essential ingredients include: exploring a variety of occupations, examining skills needed, participating in work-based learning experiences, successfully articulating to a postsecondary institution, completing a successful job search, and maintaining their skills through lifelong learning.

Assessment

In their sophomore year of high school, all Kentucky students take a practical living/vocational studies assessment test, which is part of the Commonwealth Accountability Testing System (CATS). This assessment measures whether students grasp important elements of health and personal welfare, as well as their understanding of career planning and job development. Among the elements measured are the students' abilities to establish short- and long-term career goals, to plan for transition to postsecondary opportunities, to understand employer expectations for work habits, to use team skills in the workplace, to create a career portfolio, and to demonstrate interviewing and job-seeking skills.

The assessment is important in ensuring that all students are presented with these critical pieces of information of getting and keeping a job. The point of the score is to determine whether Kentucky's high school graduates have received adequate instruction so they may become productive employees.

By utilizing the graduation plans (IGP's) and Continuous Assessment (CATS), Kentucky is beginning to strongly emphasize the importance of Career and Technical Education in the high school curriculum, therefore benefiting Agriculture Education and other areas. Getting students excited about a career is a key to keeping them focused on attaining their educational requirements and their goals for a job.

Conclusively, these processes merge to make Career and Technical Education programs work for everyone and makes Agricultural Education not only a model for the rest of the academic curriculum, but further strengthens its validity in the overall school curriculum.

Jay Morgan is an Assistant Professor of Agriculture at Murray State University School of Agriculture.

Mike Stone is the Executive Director for the Kentucky Association for Career and Technical Education.

Integrating Science into Agriculture Through an Assessment Assignment

By Monica Kukielka and Neil Knobloch

The integration of scientific subjects into the agricultural education curriculum is vital to the learning process. The importance of integrating science into career, technical and vocational subject areas helps students retain knowledge and utilize complex problem-solving skills learned through analysis, synthesis and application (Conroy & Walker, 2000).

Today's educational system demonstrates that students lack the necessary skills such as problem-solving and other applications (U.S. Department of Education, 1999). Students in many classrooms are simply being asked to memorize and repeat the material back to the instructor. They are not taught to examine the relationship between scientific concepts and agricultural concepts.

Failing to incorporate science into the agricultural education curriculum can be a downward spiral. This cycle perpetuates from the high school, into the university, and then many times into the workplace. An opportunity to break this cycle is by helping pre-service teachers to understand and properly integrate subject matter because they are the next generation who will prepare students for the future.

The goal of the authentic task is to prepare a quiz to assess the understanding of scientific concepts in agriculture and engage pre-service teachers in higher-level thinking that will help them solve problems related to integration.

In preparing teachers in agriculture, students are expected to perform tasks related to planning, teaching, and assessing. Typically, pre-service teachers create unit and lesson plans on topics that they are interested in or with which they feel comfortable. Then, they implement snippets from their lesson plans in micro-teaching labs. To complete the process of learning how to teach, pre-service teachers may also create an assessment related to what they taught.

As a part of this article we present the authentic task of creating a quiz using an example that demonstrates how to integrate science and agriculture, and also illustrates all levels of thinking (Bloom et al., 1956). The sample quiz relates to a lesson on the circulatory system in an animal science class. Within this particular agricultural education lesson plan, basic clinical chemistry applications are incorporated, along with microbiology, and physics.

The sample quiz contains instructions for pre-service teachers to create the quiz. The five example items are provided to illustrate how scientific knowledge in agriculture can be assessed at five different levels of thinking.

A successful approach toward an integrated curriculum may begin with the pre-service teachers being prepared in writing assessments that integrate science in agriculture because they can connect, solve problems, and engage in higher-level thinking. Pre-service teachers will benefit from creating an academic assessment because they will take what they learned in science classes such as microbiology, physics, genetics, and chemistry and integrate that knowledge into their agricultural education program. As the world changes and innovations are discovered, it is important to teach the students to weave together subject areas fluidly. The classroom is an excellent environment to foster innovations. Although it is crucial for all educators to understand and cultivate the importance of theory, it is just as important to nurture the ability to combine, synthesize and apply all of the sciences in the agricultural education curriculum.

References

Bloom, B. S., Engelhart, M. D., Frost, E. J., Hill, W. H., & Krathwohl, D. R. (1956). Taxonomy of educational objectives. Handbook I: Cognitive domain.. New York: David McKay.

Conroy, C. A., & Walker, N. J. (2000). An examination of integration of academic and vocational subject matter in the aquaculture classroom. Journal of Agricultural Education, 41(2), 54-64.

U. S. Department of Education. (1999). Key high school reform strategies: An overview of research findings. Washington, D. C.: Office of Vocational and Adult Education. Retrieved from http://www.ed.gov/offices/OVAE/nahs/research.html

Monica Kukielka is a senior in Animal Science/Pre-Veterinary Medicine at The Ohio State University with a minor in Agricultural Education.

Neil Knobloch is a Lecturer in the Department of Human and Community Resource Development at The Ohio State University.

Sample Quiz: Integrating Science into Agriculture

- ❖ Using any notes or references create and type a 25-point quiz.
- ❖ At least 1/2 of the points should be earned through multiple choice and 1/2 through essay questions.
- ❖ At least 1/2 of the questions may be low-level thinking (Knowledge, Comprehension, and Application).
- ❖ One-half of the questions must be high-level thinking (Analysis, Synthesis and Evaluation).
- ❖ All items must include science concepts in agriculture.
- ❖ Identify each level of thinking for each item.
- ❖ Using the format of the examples provided, identify the type of item, level of thinking and number of points.
- ❖ Do your own work!

Student's Name: _____
Animal Science: Circulatory Quiz (25 points)

(Multiple Choice: Knowledge/Comprehension: 3 points)
1. You are looking at a pig's heart in lab, and you come across the structure in the heart that is responsible for transporting blood into the lungs which is known as:

   a. Pulmonary vein
   b. Pulmonary artery
   c. Aorta

(Essay: Application: 6 points)
2. One day on a farm call with a veterinary assistant, the veterinarian suspects that the cow may be anemic, but needs to run blood tests to be certain. Dr. Brown examined the blood for reticulocytes, and determined that indeed an increased level is present. Explain the importance of examining the blood, particularly in the case of anemia for livestock producers and how other science courses may help you prevent the problem.

(Essay: Analysis: 6 points)
3. While working at a veterinary clinic as an SAE project, you overhear Dr. Baker tell the client that the two-year-old dog has developed endocarditis (inflammation of the membrane that lines the heart cavity). This dog lived in a highly populated mosquito area. From this you suspect the dog has a severe infestation of heartworm. Explain the importance of white blood cells. Name the white blood cell that would be high during a parasitic infection like heartworm.

(Essay: Synthesis: 6 points)
4. Mrs. Jones is a physics teacher. She would like to relate another scientific subject to allow students to grasp concepts of physics, and appreciate how sciences can be integrated intp agriculture. Mrs. Jones, however, was not taught how to integrate scientific subjects and has asked you to help her think of a physiological concept that can be applied to illustrate the laws of physics. The topic is fluid dynamics and Poiseuille's Law. She gives you an example of this as water moving through a pipe. This movement causes pressure to build and moves the fluid through the given area at a given rate. Each area is different in size so the forces, pressures, and rates also change. Although you may have little experience in physics, you visualize the pipe and water as the circulatory system. Write how you would relate this physics topic to the circulatory system if you were Mrs. Jones.

(Multiple Choice: Evaluation: 4 points)
5. While on your break at the local animal clinic, you read an article about E. coli; you find that you can use this article for your report on mastitis, which is an inflammation of the mammary gland. If a dairy producer does not treat the infection and lets it progress, what may occur to the cow in extreme cases?

   a. The mastitis will go away on its own.
   b. The bacteria will reproduce and enter the circulatory system infecting new body regions leading to a condition called septicemia (blood poisoning).
   c. The bacteria will reproduce, enter the circulatory system and platelets will clot the microbes and destroy the E. coli.

A Capstone Learning Experience for Students in the Management of Natural Resources

By Sidney Bell, Roger Lowe, and M. Craig Edwards

Harper (1993) stated that, "We cannot expect students to learn the latest technologies without having active involvement" (p. 10). Surely, this is a *mantra* that all professional agricultural educators support, yet is it one that we all "embrace"? In the case of the Oconee County High School (OCHS) Agricultural and Environmental Science Department, Watkinsville, Georgia, the answer is a resounding YES!!!

Oconee County High School agriculture students, who are enrolled for the Forestry and Wildlife Management course, are acquiring "cutting-edge" skills involving the use of Global Positioning Systems (GPS), Geographic Information Systems (GIS), and supporting data management and presentation software: Trimble's Pathfinder Office (GPS software), ESRI's ArcView GIS 3.2, MS EXCEL, and MS PowerPoint. This skill acquisition is occurring while students are learning and working in the context of environmental and natural resources.

These learning experiences involve the sustained collaboration of personnel from the University of Georgia (UGA), Daniel B. Warnell School of Forest Resources (WSFR), Spatial Information in Forest Resources (SIFR) GIS Lab. This collaboration creates a dynamic learning partnership that continues to grow while forming additional learning opportunities for students, teachers, and university collaborators.

The purpose of this article is to describe one example of using technology in agricultural education.

The Thompson Mills Memorial Garden Mapping Project

Students mapped the trees planted in the Thompson Mills Memorial Garden (Georgia State Arboretum) by measuring the bearing and distance from tree to tree. Each student mapped a portion of the Memorial Garden. For every 5th tree, a global position coordinate was recorded. Before recording any information, students measured the number of paces (steps) required to walk 100 feet. This was repeated 4 times, and the average distance per pace was calculated.

> ***It remains to be seen, therefore, whether traditional approaches will carry the American people successfully into the twenty-first century—or whether they will pay a high price in assuming that things can stay the same at home while the world outside changes more swiftly than ever before. (Kennedy, 1993, p. 325)***

A student's task was to measure the distance (by pacing) and bearing (using a hand-held compass) to each tree from the previous tree for their section of the garden. At each tree, a tree species code, pre-assigned by the garden's managers, was recorded as well as distance and bearing to the next tree.

An example scenario follows: If tree # 1 had a species code of AmSyc (American Sycamore), a GPS point was taken at this tree and the bearing to tree # 2 was recorded. The student then paced to the next tree; recorded the distance information, tree code information, and bearing to the next tree. At tree # 5 and every fifth tree thereafter, a GPS point was recorded.

Following field data collection, students used Pathfinder Office software to differentially correct the GPS data and then export it as an ArcView shapefile. As much as possible, the differential correction process eliminated any inherent error in the GPS data. Using ArcView GIS 3.2 software the data were compiled and the final products, paper and digital, were produced. Then, using a coordinate geometry (COGO) extension, the trees were mapped using the students' recorded GPS points as a reference.

Visualize the following procedure: One has a tabular dataset that has tree number, tree species code, distance, and bearing for all trees in a forest. Starting at GPS point # 1, COGO (draw) a line the specified distance to a specified bearing. The point at the end of the line represents tree # 2. From this point, COGO another line at the specified distance and bearing. The point at the end of this line represents tree # 3. Repeat this for trees # 4 and # 5. Tree # 6 is a GPS'd tree or an "every fifth tree." So, starting from the tree # 6 GPS point, draw a line at the specified distance and bearing. The point at the end of this line represents tree # 7, and so forth. The COGO points were combined to create the Thompson Mills Memorial Garden tree dataset. That is, a dataset containing various points, each representing an individual tree.

Also, while in the field, tree identification codes were recorded. So, tree identification was added to the point dataset's attribute table and a tree management information table was attached—Latin name, common name, date when the tree was planted, etc. Now, not only is the physical location of each tree (i.e., the COGO points) recorded and accessible electronically, but each point represents a specific "thing" (tree) on the ground, and each "thing" has 4 or 5 attributes that provides useful information for the garden's managers when making decisions about tree management and care. Further, a digital image was taken of each tree species. The images were later "hotlinked" to the points, e.g., the willow tree point was hotlinked to a digital image of a willow tree. So, one can click on a particular point (tree location), and an image of that tree type appears, thus creating a visually appealing, interactive map of the garden.

"Crowning" a Capstone Learning Experience: GIS Day Presentations

GIS Day (url: http://www.gisday.com) is a day for users of geographic information systems (GIS) to showcase real-world applications of this important technology. In November 2001, the OCHS Agricultural and Environmental Sciences Department in conjunction with the Daniel B. Warnell School of Forest Resources (WSFR) hosted a GIS Day 2001 event for citizens of Oconee County and surrounding communities.

Focal points of the event were student presentations of their final multimedia GIS projects, complete with maps, historical information, spatially-hotlinked photographs, and streaming video. The demonstrations included GIS maps prepared by OCHS and WSFR students. The event was interactive and participatory. Attendees had the opportunity to take a virtual tour of Georgia's official state arboretum (Thompson Mills Memorial Garden), make their own GIS maps, use a global positioning system device, and interact with student presenters as well as professionals in the forest industry. So, not only did students display their technical skill and expertise, they also honed and practiced valuable communication and presentation skills.

A Model for Future Collaborative Endeavors

The futurist, Lester R. Brown (2002), board chairman of the Worldwatch Institute and president of the Earth Policy Institute, predicted that, "If we want economic progress to continue, we must systematically restructure the global economy to make it environmentally sustainable" (p. 23). Further, Brown foresaw eleven "Expanding Professions in an Eco-Economy" (p. 31) of which nine are related to, or are allied with, agricultural, food, environmental, and natural resource systems, including careers such as foresters, environmental architects, and aquacultural veterinarians.

Inherent to Brown's thesis is the need for an educational system that fosters the preparation of future workers who are technologically literate about, and adept with, the tools and support mechanisms that these "expanded" and related careers will demand. So, secondary school agricultural educators and their partners, environmental and natural resources educators, can and should position themselves as the leading pre-college education providers for meeting this challenge. Providers need to be committed to preparing students to enter and, ultimately, ascend these career pathways. To this end, the OCHS Agricultural and Environmental Science Department in partnership with the UGA, Daniel B. Warnell School of Forest Resources is working to better meet the learning needs of today's students and tomorrow's world by intersecting emerging technologies with student learning experiences in agricultural and environmental sciences education.

References

Brown, L.R. (2002, March-April). The eco-economic revolution: Getting the market in sync with nature. The Futurist, *36*(2), 23-32.

Freedom's Nest Quotes! (2002). Eric Hoffer on learning. Retrieved February 15, 2002, from http://www.freedomsnest.com/cgi-bin/qaq.cgi?subject=learning&ref=hoferi

Harper, J.G. (1993). Laboratory facilities improvement for technology transfer. The Agricultural Education Magazine, *65*(11), 10-11, 19.

Kennedy, P. (1993). Preparing for the twenty-first century. New York: Random House.

Sidney Bell is an Agricultural and Environmental Sciences Teacher at Oconee County High School in Watkinsville, Georgia.

Roger Lowe is a SIFR GIS Lab Manager at the Daniel B. Warnell School of Forest Resources at The University of Georgia.

M. Craig Edwards is an Assistant Professor in the Department of Agricultural Leadership, Education and Communication at The University of Georgia.

"Physician, Heal Thyself"

By Billye Foster

I have always been under the assumption that it was hard to fix a problem if you did not recognize it existed. The most common example of this type of situation could be found in an alcoholic. If a person continually denies they have a drinking problem, it becomes a challenge to involve them in a rehabilitation program.

I believe the agricultural education profession suffers from a serious disease. As with alcoholism, this disease affects not only the alcoholic (teacher) but everyone they come in contact with (students). It works in an insidious manner and often the people most heavily affected by it, will not admit that it is a serious condition. Usually this disease first infects people during their teacher preparation program, although there are known cases of preliminary infection dating back to the high school agricultural education experience having viewed their own teacher who had this disease. The disease is highly contagious and can have life-debilitating effects on large numbers of people. If this disease is not acknowledged and controlled it may decimate the profession!

For the past few years much time and money has been spent researching the solution to the teacher shortage. Unfortunately, as a profession we have chosen to focus on the symptoms, not the root of the problem—a dangerous approach. We have noted that fewer quality young people are entering the profession and once there, they do not stay. The question is ***Why***?

We have doubled our efforts at recruitment to battle this symptom. We have also noted that lower pay scales have attributed to the loss of our best teachers. Why become an Agricultural Educator for $30,000 a year when, for the same approximate time load (say 60 hours per week) you can work in industry for $40,000, have a company pick-up and expense account? To address this symptom we have lobbied for better teacher salaries. In addition we have noted that on-the-job stress and frustration has increased because of poor funding and inadequate facilities. To alleviate this symptom we have held seminars on grant writing for our teachers. Which in turn creates more work and monitoring on the part of the educator.

I would submit to you now that all these "symptoms" are but a part of the complex disease known as "GOODAGTEACHERSDOITALL DISEASE." Realizing many of you reading this article are still somewhat confused, allow me to clarify how GATDIAD infects our teachers and prevents young people from entering and staying in the field.

Over the years agricultural education has grown and expanded to become a comprehensive program that offers students quality technical instruction, life-long learning skills and participation in the premier student organization in the world. As the program has evolved, additional responsibilities have been added to the role of the teacher/advisor. This has been a gradual process taking over 75 years to reach its current state. We, as agricultural education professionals, have simply added more and more weight to the load of the teacher, assuming each individual increase could easily be absorbed. Consider the list of hats we expect our teachers to wear: classroom teacher, agricultural experience (for outside employment or student entrepreneurial activities) supervisor, Career Development Events coach, officer trainer, livestock show coordinator, greenhouse manager, camp coordinator, advisory committee organizer, school wide involvement publicity agent, grant writer, community liaison, student mentor, occasionally pseudo-parent, and in some cases baseball/football coach or game announcer! I probably left out a few possibilities, but the concept still holds—***how much can one person do?***

When viewed individually, each component that makes up the role of a quality agriculture teacher would seem reasonable. It is the collective expectation that causes the most internal damage to the infected individual. We preach the necessity to run a complete program, addressing every facet that is of benefit. We advise beginning teachers to take things slow, gradually ease into the various roles. Unfortunately, many young teachers lack the patience to "grow" into these expectations. They want it all—all the glory, all the notoriety, and they want it now!

An example in point might be the young teacher that is enthusiastic and dynamic and the single teacher in a program. At district and state level Career Development Events, this youngster arrives with 16 teams for 18 possible events. Often you will hear them "bragging" about training all their own teams—no outside help for them. They are working 8 hours during normal school days and 4-5 hours afternoons and evenings just to cover all the bases. How long can they keep that kind of pace? Eventually, they will want their own life. Perhaps they will start a family of their own and decide there is merit to spending time with them.

So the question becomes, "How do we change the definition of an agriculture teacher?" Getting the teachers to consider a more reasonable division of responsibilities, perhaps the use of an aide or even a second teacher would be necessary. Additionally, getting school administrators to buy into the concept will be mandatory. After all, why would they want to hire two teachers to do the work that one has done for all these years? Obviously, this disease will require much more thought than just the treatment of the symptoms. However, I believe that if our profession does not step up and seriously address some of these issues, we will see a teacher shortage that has only just begun.

Alcoholics Anonymous states that the relative success of it's program revolves around the alcoholic that no longer drinks helping the uncontrolled drinker. Perhaps agricultural education could learn from the simplicity of this program. Consider the following steps in addressing this issue:

1. *We must admit we have the disease, and that we are powerless as individuals to make a change.*

2. *We must recognize that the power of the collective is greater than the power of just one.*

3. *Make a searching and fearless inventory of what we expect from agricultural education teachers.*

4. *Make a list of all the potential dangers of GATDIAD disease and become willing to eradicate them.*

5. *As individual educators, continue to take personal inventories of where our time is spent and admit when we have "overdone."*

6. *We must continually seek solutions and be open to unconventional alternatives—such as utilizing part-time teachers to lighten the load of the full time teachers.*

7. *Seek help within our own communities. Utilize alumni and community supporters to help with additional responsibilities, i.e, training teams, helping with fundraisers, even with classroom demonstrations.*

8. *Learn to say NO. Become selective in the external activities we agree to help with. Do you really need to coach the girls' softball team? Could someone else serve as game announcer and thereby provide you with the opportunity to watch the game with your own family?*

9. *Every level of educator within the profession must commit to seeking solutions. Teachers, teacher educators, state supervisors, FFA staff and support groups, NAAE officers and leaders—we all must be dedicated to improving the lives of the teachers in the field.*

10. *Acknowledge that as teachers become more contented with the balance between their work and their personal lives, their performance will improve.*

11. *Acknowledge that as teachers become more contented with the balance between their work and their personal lives, their longevity in the profession will increase.*

12. *As we come to the spiritual "awakening" of the potential results of these steps, we must carry the message to teachers and administrators everywhere.*

Obviously, these steps will prove alien and even subversive to many professionals in the field. We can only ask that they keep an open mind, join in discussions with younger teachers about the balance in their personal lives. Share their own experiences and reflect on ways their careers could have been enhanced by greater balance of personal and professional life.

GATDIAD not only affects external issues such as funding, recruitment and salary levels, it also eats into the more individual needs of the teachers it attacks. Personal and family time often are hit hardest, divorce rates rise and problems with the children of infected teachers often increase. When viewed by potential candidates for the teaching profession, GATDIAD often drives these people away from the profession before they ever become involved. After all, they only need to look to industry to realize they can work the same amount of long hours and receive more frequent and higher monetary rewards for their efforts.

We all believe that agricultural education has a bright and promising future. Are we willing to try the "Twelve Steps?" Do we want the best and brightest teachers to lead the industry? Do we expect those teachers to sacrifice their personal lives in order to sustain the future of agricultural education? In a world that typically rewards those that achieve the highest levels of success and quality, sacrifice of personal time to maintain that success seems almost ludicrous. Agricultural education abounds with creative and intellectual minds. Surely by utilizing all our assets and working together we can find a way to deal effectively with GATDIAD.

Billye Foster is an Associate Professor in the Department of Agricultural Education at the University of Arizona.

Taking Care of the Home Front

By Edward A. Franklin

Scene: Local high school Ag program. It is the first week of the fall semester; a new school year. The agriculture teacher is instructing his new students on the procedures of how to complete the "Student Data Sheets".

Student One: "Hey, Mr. F. why do we have to fill out these forms?"

Teacher: "Well, it helps the agriculture teachers track your progress through your four years here in the agriculture program." We want to help you plan your future, plus the state requires the information."

Student Two: "Hey, Mr. F., this question asks what type of agriculture career I want to go into. What if I want to be a jet pilot?"

Teacher: "Jet pilot… Hmm. Why don't you put down crop duster?"

Student Three: "I want to be a police officer, is that ag-related?"

Teacher: "Depends. Why don't you write down game and fish warden?'

Student Four: "Hey Mr. F., what does it mean by "*Selected SAE*"?"

Teacher: "That is the Supervised Agricultural Experience" or "projects" we talked about yesterday. Everyone needs to write down the SAE they want to conduct over the next four years."

Student One: "What do I put down for '*Career Development Events*'?"

Teacher: "What did you write down for your chosen ag career?"

Student One: "Ummm, I wrote that I want to be a lab researcher."

Teacher: "You might want to try the Agriscience Fair."

Student Four: "Well, what should I write down in this space, *Proficiency Award*."

Teacher: "What is it you want to do after you graduate from high school?"

Student Four: " I want to be an agriculture teacher."

Teacher: "Hmmm… good choice". Let's see. [Contemplating]. There is no CDE for Ag Teaching… and, well, there really isn't a proficiency award area for agriculture teaching…well, I'm not sure how we can put you down for a SAE for Ag Teacher…. unless you wanted to follow me around all day and see what I do…I guess we could keep track of your hours and use the FFA formula for dollars…"

Student Four: "What teams can I be on?"

Teacher: "Well, I guess you should try all of them, since you might be coaching them someday."

Student Four: "What "*Proficiency Award Area*" should I write down?

Teacher: "Good question. Not sure, there really isn't one listed for Ag Teacher. Guess you should pick one from the list in the FFA Manual."

Student Five: "Hey, Mr. F., You talked about a shortage of Ag Teachers in this state, and elsewhere….I can see where the CDE's and Proficiency Awards, and SAE's are tied to some agriculture jobs, but why isn't Ag Teaching included in those areas? How can I earn my State and American degrees if I can't show I earned enough money? Should I put down "*Forestry*" for CDE, and "*Market Swine*" for SAE, and "*Turf Management*" for Ag Proficiency Area?" At least that's what I would be teaching. Isn't that what you teach to the other classes?"

Teacher: [Still contemplating]. "That's one way to look at it. Guess I could call the State Supervisor and see what she says."

Student Four: "I still can't figure it out. Dave wants to be a dairyman like his dad and uncles, so he raises and shows cattle for his SAE, judges dairy for his CDE, and has his Proficiency Award Area application already set up for him."

Student Five: "Carrie plans to work for the Forest Service as a Hot Shot, so she is judging on the Forestry Team, has a job working for the USDA nursery, and her Proficiency Award application is partly filled out."

Later that day during lunch…..

Student Four: "I can't figure it out. If I want to be an Ag Teacher, there aren't any activities in FFA, or classes in high school that teach you how to be a teacher. All the classes are related to skills and careers in agriculture but not agriculture teaching…"

Student Five: "Maybe, we are supposed to watch how the Ag teacher does it everyday and learn from that…"

Student Four: " I don't know. Sometimes Mr. F. seems really stressed out. I hear him say that after 3:00 p.m. is when the work really begins. He deals with questions and complaints from parents, meets with boosters, answers questions from the school administration, and then there is the paperwork he asks us to make copies and help file for the state, or fixes a broken waterline at the land lab. On top of that he asks us if we want to go weigh hogs 'til it's dark."

Student Five: "Hey, is Mr. F. married?"

Student Four: "To somebody besides the Ag Department? Yeah, I think he has a couple of children."

Student Five: "Wonder when he spends time with his kids? He is here on Saturdays taking us to field days and judging contests, and here almost every night 'til 6:00 p.m. or later when we have a banquet, chapter meeting, or sectional meeting."

Student Four: "Do you think Ag teachers make a lot of money?"

Student Five: "I think so. My dad gets extra pay for overtime when he works more than 40 hours a week, and I'm sure the Ag teachers work more than that. I see Mr. F. more than I see my dad during the week."

Student Four: "I wonder why there isn't a CDE or Ag Teaching Proficiency award, or an SAE for Ag Teaching."

Student Five: "I think you just have to do it all so you can coach it and fill out the forms."

Student Four: "Hmm. That must be why the high school across town is hiring their third Ag teacher in five years. Do you think Ag teachers get a vacation?"

Student Five: "Only when they take their telephones off the hook or say "No".

Edward A. Franklin is an Assistant Professor in the Department of Agricultural Education at the University of Arizona.

Between agricultural education classes, FFA activities, FFA Alumni groups and other responsibilities, instructors can easily become overwhelmed. Franklin encourages instructors to remember to say "no" before they become overwhelmed! (Photo courtesy of Warren Hitz, Jr.)

Assessment of the 4-H Shooting Sports in Oklahoma

By Charles Cox and Tomas Joe Manske

Youth and guns. A scary combination in the public mind, and for good reason. Every day, 14 children die in the US from gunshot wounds, according to the National Center of Health Statistics. Although the numbers are alarming, this rate is the lowest since 1990, a direct result of increased safety awareness and proper training. Accidents, while hunting or participating in other outdoor-related firearm activities, have declined more than one-third over the past two decades. Firearm accidents in the home have declined 50 percent over the same period (Ruth,1999).

Studies show that a youngster who has had firearm safety instruction is less likely to have an accident than those who have not. Children under the age of 15 in the US are still 12 times more likely to die of gunshot wounds than their peers in 25 other industrialized nations (Oklahoma 4-H Impact Statement, 1999). The need for firearm safety education remains a high priority.

Safety entails more than just placing an extra safety device on a gun, removing a firearm from the home, or never acquiring a gun. Guns are plentiful in the US and easy to acquire. Fundamental gun safety education is the best way to curtail gun-related deaths.

Groups such as the Boy Scouts of America, Jaycees, the National Rifle Association, and 4-H have promoted and taught gun and shooting sports safety for many years, using a variety of teaching methods. Shooting sports is an active program, attractive to youth and adult audiences. The curriculum is designed to assist young people in personal development, establishing a personal environmental ethic and exploring life-long vocational and avocational activities. The program uses experiential learning and positive interactions with youth and adult role models to help young people develop self-concept, self-assurance, and a positive self-image (Howard, 1993).

The Shooting Sports project is one of the fastest growing programs in 4-H today. Currently, 33 states have active shooting sports programs which involve approximately 100,000 youth (Kling, 1990,p.3).

While the 4-H Shooting Sports program teaches youth firearm and shooting safety, it also helps them develop other important life skills such as citizenship, leadership, and sportsmanship. Moreover, youth have the chance to develop critical thinking, ethical practices, and an appreciation for nature. 4-H Shooting Sports is a community-based, volunteer-directed, family-oriented activity that emphasizes hands-on learning (National 4-H Shooting Sports Committee,1998).

During the 2000 programming year, a study was undertaken to determine the effectiveness of the Shooting Sports leader certification program in Oklahoma and the demographic characteristics of program participants. The purpose of the study was to help the 4-H staff evaluate volunteer recruitment needs. The findings would also help leaders and instructors make necessary adjustments to more effectively equip volunteers already working with youth and other adults in the program.

The data revealed that of the 103 respondents, the majority of them, 79 (76.70%), were male, while 24 (23.30%) were female. This finding showed a gender ratio for this program that was nearly opposite the overall gender ratio of volunteers in the 4-H program as a whole. The age range of those who responded was 20-69, with a mean age of 41. Eighty-eight (85.44%) listed White/Caucasian as their ethnic group, while 14 (13.59%) listed Native American affiliation, and 1 (.97%) listed Hispanic.

Fifty-seven (55.34%) of the respondents indicated their own children had been involved in the 4-H Shooting Sports program, and a majority, 83 (80.58%), had been involved in 4-H as either a member or volunteer. The average tenure of 4-H affiliation was 9.11 years, with an average of 4.23 years as a shooting sports volunteer.

Respondents of the study reported they volunteered with youth in activities other than 4-H Shooting Sports. The largest group, 25 (17.87%), reported working with Church Youth groups. Twenty-one (15%) reported working with other 4-H Clubs and projects, 18 (12.86%) worked with youth in Natural Resources programs, and 15 (10.79%) worked with FFA.

One objective of the study was to find why participants volunteered to work with the Oklahoma 4-H Shooting Sports program. The largest number of respondents, 34 (32.04%), reported they joined because "An agent asked me." Fifteen (13.6%) volunteered because "Another adult asked me" and 13 (11.65%) joined because "A child asked me."

Respondents indicated they had an average of 23.33 years of shooting experience. In addition, well over half of the total respondents listed affiliations with other shooting sports organizations.

A final set of objectives for the study was to determine the benefits of the shooting sports program and of the training program itself. Safety ranked highest among perceived benefits, with 65 responses. Another perceived benefit was "discipline," with 17 responses. Allows for self-improvement (10), promotes self-esteem (10), develops responsibility (9) and develops respect for firearms (9) were also perceived as major benefits.

Of the 103 respondents, 30 indicated their knowledge improved greatly, and 39 indicated their knowledge improved significantly due to the training program. Respondents also indicated they acquired new skills or teaching techniques. High among newly acquired skills or techniques were safety (21), coaching/team shooting (10), sighting/aiming (9) and other teaching techniques (9).

When asked how they would improve the training process, 18 suggested more training sessions in more locations. Others asked for more time at training (7), and better program promotion (7). Nine respondents suggested condensing the program into a two-day format, while six would like to see more emphasis on competition shooting.

Finally, the study sought to determine if the Shooting Sports program in whole should be recommended to all youth. Although eleven (10.68%) respondents indicated they would not offer it to all youth, an overwhelming 91 (88.35%) respondents indicated, without reservations, that it should be recommended to all youth.

Based on the demographic data collected, volunteers who had participated in the Oklahoma 4-H Shooting Sports Training program were typically Caucasian (85.44%) male (76.7%) with an average age of 41 years. A slight majority of the respondents (55.34 %) had children in the program; yet, a notable group of volunteers were working with the program even though their own children were not involved. Over 80% of the respondents indicated having previous involvement in 4-H as either a member or volunteer in some other capacity. Of those, 15% indicated current involvement in other 4-H programs. Of the respondents, 32.04 % said they were volunteering because their Extension Educator had asked them.

The current training seems to be highly effective in expanding the knowledge of the participants, although, many of those who attended had not established clubs upon returning home. However, the respondents have expanded their individual effectiveness by involving other adults in the program. Most respondents reported two or more other adults were assisting with the disciplines offered. The respondents perceive the program could be more effective if more trainings were conducted each year and in more geographic locations.

The 4-H Shooting Sports Project demonstrates that persons in the community who have skills and interests in a topic can be recruited as leaders. They respond to Extension Educators when simply asked. Furthermore, the current teaching model—using a team of certified instructors to do a weekend of peer teaching—seems to be well received by the participants.

Regardless of the teaching setting, as teachers of teachers, we must all evaluate the effectiveness of our teaching methods and how transferable the knowledge is to others in the community. Extension Educators, both professional and volunteer, are using the Shooting Sports program to develop responsible youth while making an impact on a serious social issue, the responsible use of firearms. This study only sought to evaluate the program being conducted in one state. More opportunities for the assessment of program impact exist.

References

Ruth, D. (1999) A Parents Guide to Recreational Shooting for Youngsters (1999). (pamphlet) "How Safeare Shooting Sports?".

Howard, R.A. Jr. (1993). 4-H Shooting Sports Guide. Manhattan: Kansas State University Cooperative Extension Service.

Kling, E. (1990). Observations on the National 4-H Shooting Sports – Skills and Concepts for Life. p.3.

National 4-H Shooting Sports Committee. (1998). National 4-H Shooting Sports Program –National Donor Report. p.3-5.

Oklahoma 4-H Impact Statement, (1999). Oklahoma Cooperative Extension Service, Oklahoma State University.

Charles B. Cox is an Associate Professor and 4-H Program Leader in the Department of Agricultural Education, Communications, and 4-H Youth Development at Oklahoma State University.

Tomas Joe Manske is a Canadian County Extension Educator with 4-H Youth Development.

An Interdisciplinary Approach to Agriculture

By Paul Heasley

Integration of agricultural science into other subject areas plays a vital role in student perceptions of, accessibility to, and development in agriscience and agribusiness education. Educational programs that develop collaborative partnerships with higher education institutions as well as business and industry will provide seamless transitions into the vast career opportunities found in today's agricultural industry.

The Agricultural Science Program improvement strategies undertaken over the past three years at the State College Area School District include: (1) broadening subject areas in plant and animal science, agricultural mechanics, environmental sciences and urban agriculture; (2) implementing post-secondary articulation with associate degree programs; (3) conducting agricultural career summer camps for middle school students; and (4) piloting agricultural literacy at elementary levels utilizing integrated lessons. Each strategy was developed and reviewed by business and industry and faculty members from post-secondary institutions. These improvements have led to a 500% increase in enrollment in the secondary agricultural science program.

Even with these improvement efforts, there still exists a stigma or lack of understanding of the importance and vast array of careers in the agricultural industry. Many students and community members do not realize the scope of agribusiness nor do they recognize the technical base needed by potential employees of agriculture.

Traditionally, at the State College High School, agricultural science and electromechanical students do not take physics or deem it as relevant as other science courses. Similarly, physics students do not take technical or applied courses to gain necessary practical or job skills associated with technical or mechanical careers.

As a part of a USDA Secondary Education Challenge Grant, collaborative efforts between the secondary agricultural science program, other educational programs within the school have been established to improve our total educational program.

More specifically, the focus of the grant activities connects physics, agricultural mechanics, and electromechanical technology instruction for high school students. The interface with agricultural mechanics, electromechanical technology and physics was developed because of the common curricular content as well as the opportunities for both scientific and hands-on technical applications. This effort built a team teaching approach in these three program areas to improve skills in and enable more high school students to receive agricultural science instruction. Since this area of instruction has been identified as a critical skill area by local industry, it enhances students' connection to the workplace.

This project addressed the school district's mission statement which is: to prepare students for lifelong success through excellence in education. In order to achieve this mission several of our goals include: design and implement a future-oriented curriculum; encourage innovation; build strong partnerships; and establish effective systems for creative planning and allocating human and financial resources.

The team of teachers reviewed and developed several lessons in hydraulics/pneumatics that stressed both technical and hands-on learning activities. These lessons were presented utilizing the team-teaching approach with students from all three curriculum areas. Students participated in all three instructional classroom/mechanic facilities to meet the educational outcomes of the lessons. Instruction included: concepts of physics and the applications to agricultural and electromechanical technology areas; career options and workplace skills necessary in industry; activities on both hydraulics and pneumatic trainers. Group activities promoted additional integrated outcomes and students were utilized to lead instructional activities.

This integrated project produced many positive outcomes that included: increased utilization of all three instructional areas; better use of instructional staff; increased student skill development, both technical and practical; more positive views towards technical and academic programs and the need for better career planning. Although the initial planning time of the three teachers increased, it was seen to actually decrease over the lessons' duration because the strengths and experiences of each teacher aided in more effective activity preparation and evaluation. Also, responses to students' questions concerning technical and workplace standards improved.

We are now well along our way to fulfilling the challenge to improve our program. Agriculture science students and many other students in our school have not yet seen the potential and viable career opportunities found in the number one industry in the nation and world. Hopefully, our program will help.

Paul Heasley is a secondary Ag Science Instructor at State College Area School District in Pennsylvania.