The Changing Workplace
THE AGRICULTURAL EDUCATION MAGAZINE

July, 1995

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THEME EDITOR’S COMMENTS

The theme of this issue of The Agricultural Education Magazine is “The Changing Workplace.” Because the many contributions to this theme and the limited space available, the Editor has decided to forgo his normal space for comments. Hopefully, this will show more views from the profession to be published. The Editor’s Comments will continue in the next issue.

Pioneers or Settlers?

BY CARL L. REYNOLDS

In thinking of the theme for this issue “The Changing Workplace”, I am reminded that almost everything I’ve heard or read since the 1980’s seems to have the word “change” in it. But change is not anything new. We can all recall in our history, how the Louisiana Purchase in 1803 and the Lewis and Clark Expedition that followed soon after paved the way for a major change in this country. People left their comfortable farms and homes to go westward as pioneers to settle new land in Oregon or to find their fortune in California. Change today requires the pioneer spirit just like it did during the westward movement over a hundred years ago.

In his videotape “Paradigm Pioneers” Joel Barker (1993) spends considerable time explaining how the modern workplace requires people who think like pioneers rather than settlers. Pioneers today, just as our forefathers who traveled the Oregon trail, are quick to give up the familiar, old ways. They look forward to new technologies, practices, and methods.

The settler, on the other hand, basks in the comfort of routine, security, and low risk.

An example is field about the Sony Corporation which, among other products, produces the “Walkman” which is so popular with our students today. The Sony people are examples of pioneers. When the first model of the Walkman was released and sales zoomed, Sony jumped into motion for the next change, a lighter, smaller unit. Not waiting for sales to slow or for competition to catch up, they improved the quality of the headphones as well. To make it even better, digital controls were developed.

Now the product is barely recognizable in comparison with the first model in quality of sound reproduction, compactness, durability, ease of use, and cost.

The Sony Corporation demonstrates the thinking of a pioneer.

Settlers are typical of the old factory work.

In the workplace, stick to the prescribed procedure, and stay out of trouble with the boss. Dutifully follow the rules and never question authority. This description sounds much like what we see in some schools as well.

Modern corporations, business firms, and single owner entrepreneurs cannot afford to have settlers in their organizations. Everyone must change their way of thinking to that of a pioneer. People start a new job excited, energetic, and wanting to make a contribution. But, if the newness wears off, they drift into daily routine and become only interested on Fridays. They lose their commitment to change (Senge, 1990).

Not only in corporations, but also students in school follow a similar pattern. The young first graders face the same way the pioneers turned their backs on St. Joe, Missouri and looked forward to the promise of going west. They excitedly moved home and show their parents what they learned each day. Do they maintain this pioneer spirit and excitement throughout all their years of public school?

Peter Senge (1990) says that we should maintain a healthy learning organization. In a changing workplace requires that we promote continuous learning and adaptability to change. Dealing with change is one ability we must teach our students.

Our students must learn that change causes discomfort and frustration (see Figure 1). It also causes us to constantly be in a learning mode so that we hopefully reach levels of productivity and quality at the end.

At the time change occurs, the human reaction is to feel more discomfort initially, but as time progresses and we begin to respond positively to change, the comfort level rises fairly soon. If the appropriate abilities are not learned, however, the change process cannot occur at the pace of the person or organization to reach the level prior to the change or it may require a long period of time to adapt to the change.

What then, are the abilities we should be teaching our students so that they will remain pioneers in spirit and willing to be lifelong learners? With the rapidly changing technology and amount of information accelerating as well, we must focus much more on the process and less on the subject matter being taught. The old model of analyzing the occupational task and training the respective tasks will no longer work.

In the changing workplace terms like systems approach, teamwork, empowerment, quality circles, holistic thinking, and statistical process control (Byham, 1992, Peters, 1982, 2015)
Walton, 1986) are commonly heard at all levels from the assembly line to the boardroom. These terms should influence the way we teach our students. Take the systems approach, for example. Seque (1950) says that we should learn to solve problems by looking at the long term and in the perspective that other systems overlap and will be affected by some solution to an isolated event. For example, the systems that are involved in a confinement livestock structure are interrelated, and a change in the ventilation control for a swine farrowing house or greenhouse may very well have an impact on the heating system and humidity controls as well.

The Essential Competencies

- The Secretary's Commission on Achieving Necessary Skills (SCANS, 1991) reports five essential competencies required by employees. They are "workplace know-how" abilities that we must teach our students. They are:
  1. Identify, organize, plan and allocate Resources.
  2. Work with others, Interpersonal.
  3. Acquire and use Information.
  4. Understand complex interrelationships, Systems, and
  5. Work with a variety of Technologies.

- Competencies Resources - Employee indicated a variety of competencies connected with resources. Their employees are expected to be able to select work activities based on goals and priorities, rank them in importance. The employee is expected to provide feedback, organize, and share information with other employees. They are expected to communicate the information to others.

- Competencies Time - Employees are expected to be more involved in preparing and using budgets. They keep records of expenditures and make adjustments to achieve goals. They are also expected to allocate, acquire, and organize the materials and equipment to be used within the facility provided and perform the tasks in an efficient manner. They are expected to complete the task, assess the skills of each team member, and allocate work responsibilities that best match abilities. They are expected to continually evaluate performance and provide feedback from the results.

- Competencies Interpersonal - Rather than the old factory assembly line model of performing those required procedures skills and no more, the employee today is expected to have well-refined interpersonal skills. The employee is expected to communicate with other members of the team, and work together to solve problems to improve quality. Team members are expected to help each other learn continuously. They are expected to be thinking with the customer's satisfaction. Leadership is an important trait; to facilitate the communication of the group, to negotiate differences, to work toward consensus. The worker is also expected to be able to work with a broad diversity of people regardless of gender, race, mental or physical ability.

- Competencies Information - Workers of all levels will find themselves acquiring and using information at a rapidly accelerating level. They must be able to search for, retrieve, evaluate, and select appropriate information. They must be able to organize and store what they have acquired or created. Interpreting and communicating information is important as well. These tasks call for the ability to use the computer to process the mass of information the worker is expected to master.

**THE CHANGE PROCESS**

**HUMAN RESPONSE TO CHANGE**

**Comfort Level**

![Diagram of the change process](image)

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**About the Cover**

Today's rapidly growing technology base is becoming an increasing integral aspect of today's workplace. Employers and employees alike are recognizing this changing need for computer literacy and competency in a variety of programs. (Photo courtesy of David Goodwill.)
The Changing Workplace: A Manufacturer's Perspective

This is an exciting time for those of us in manufacturing. As we embrace new technology and new methods, we must enable us to design and produce better products to meet the ever-changing needs of our customers; we are realizing increased profitability and success in the marketplace.

New technology mandates that considerable changes take place inside our manufacturing facilities—changes such as revamping assembly lines, adding sophisticated quality-control testing equipment and installing the latest computer-driven production and inventory-control systems. More significantly, however, are the changes in demands of the people we employ. Today's profile of the ideal employee and the profile of employees through the year 2000 differ substantially from that of yesterday.

Employee Triangle

The need to find and retain this new breed of employee is a challenge for the business community. Add to this the fact that six to 10 years from now we expect a significant downturn in the current labor force due entirely to demographics, and our challenge becomes more acute. We will not be able to take advantage of any new developments without the right people to apply them. Your students are our future. Your role in preparing them to become contributing members of the workforce is no less challenging.

I like to view the factors that make up the ideal employee as a triangle. While each side can stand alone as a single line, the triangle forms when they come together. The three sides of my employee triangle are the social, the technological and the scholastic.

Social Side

People skills have long been a trait that employers look for in job candidates. The ability to work well with others and as a team player, is just as important to success in today's world. Leadership is another long-sought quality. That's not new, you say. No, it's not. What is new, however, is that leadership no longer means simply overseeing others. Leadership in today's manufacturing world also means being able to lead yourself; to work independently; to alert others to better ways to do your job; and to stand up for what is right.

We've found that students who have been leaders in high school and college, as well as those who have worked while studying to help pay for their education, are better prepared to be reliable employees.

Companies like Case Corporation are shifting away from a traditional, supervisory oriented approach to work in which employees perform specific tasks and get more experience in those tasks. Instead, they are developing professional employees by giving them the key to growth. By giving employees the key to growth, employees start to make decisions, identify work things better and implement them—to other workers throughout the company.

Strong Communications Side

Another aspect of the social side of the employee of the future is strong communication skills. Candidates must be good listeners and good persuaders. In the past, employees' only exposure to customer was when they saw them touring the facilities. Today, our factory and product people, design engineers, advertisers, engineers and others, meet regularly with groups of customers and dealership personnel to gather information that will help us improve our products.

Employees must be able to understand spreadsheets, data bases as well as word-processing and graphics programs. As products become more technical and the manufacturing processes used to build those products become more automated and computer-driven, computer literacy is a must.

For instance, our Case IH MAGNUM tractors feature computer-controlled monitoring systems. Those systems must be assembled and tested on the line by competent workers who know how to use computers. Our quality control systems are computer-driven. Data is entered as soon as the product moves along the assembly line. Any worker uncomfortable with a keyboard or monitor is unable to perform his or her job.

Adaptability to new technological advances is becoming an important characteristic of the modern employer.

The world of electronic communication is one area of agriculture that offers a great deal of opportunity for students. The teacher can provide the teacher with new opportunities to improve student achievement in the classroom and to enhance learning on this technology.

Explain to your co-workers back at the plant. His factory team and the engineers worked together and routed a hose so it wouldn't be brushed loose by plants in the field. That's initiative, that's leadership, that's communication; and that's what we're looking for.

The technological side of the employee triangle is the most tangible side because it is influenced by constant changes in technology. Without a doubt, the students of today who want the jobs of tomorrow must be technically competent. That means, among other things, being comfortable around a computer.

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Willingness to Change

Willfulness to change. Current manufacturing processes are extremely complex. Manufacturing is a fast-paced environment and workers must be able to adapt. Just-in-time is the philosophy. The days of setting up a tooling machine and making several months' supply of a component are gone. Now, the machine is set to make a one- or two-day supply of that same component; then it's rescheduled to produce a different one.

Development cycles for new products have gone from periods measured in years to a matter of months. Fast, changing market conditions and demands is the most important competitive advantage for any organization. The most significant barrier for companies in achieving success is people who are unwilling to change.

One way for students to get technical experience is through co-op programs and internships with area businesses. Case offers a variety of internship opportunities. Such "real life" training is invaluable and regarded very favorably by employers. Internships and co-op programs offer students a chance to get their feet wet while under the helpful wing of a staff member, as well as apply the principles they learn in the classroom. With experience comes confidence. With confidence, success.

At first glance, the third side of the employee triangle, the scholastic side, appears to be the most tangible as far as identifying what should be included in any agriculture student's curriculum. From an employer's viewpoint, it is not as cut and dry. There's a need for students to grasp the basics of reading, writing and arithmetic before they plunge into the world of electronic communication. I cannot stress that enough.

Good math and science skills at the high school level are minimal requirements. Identifying the need for mathematical and statistical skills would be achieved by college graduation. Few things in business operate with simple arithmetic these days.

Engineering is a very versatile education for a number of careers in manufacturing. The engineering student gains analytical capability and acquires a logical process that can be applied to many different jobs.

We recruit agricultural, mechanical and electrical engineers for our purchasing, marketing, human resources, engineering, manufacturing and technical sales departments. Many of our product managers have engineering degrees or dual majors in engineering and another discipline such as business or marketing. An engineering degree, combined with a background in crops, could lead to a new emphasis in crop production in the field of research and development or product management.

(Continued on page 19)
The Changing Classroom: Software That Helps

By Jerry Paxton
Ms. Paxton is an agricultural education instructor at Exponenter, WI.

A computer lab you can have an entire class working on HyperCard projects. I have found the program to be most useful as an enrichment opportunity for accelerated students or as an independent study project for older students who got scheduled out of their regular classes.

A scanner is a useful item to have when working with HyperCard because it allows the student to incorporate pictures or diagrams into the program with a minimum amount of effort. It is not too difficult to add animation, color and sound to further the presentation.

You can have the student decide on a topic for the instructional unit, they are usually able to proceed with very little supervision. I set a few basic parameters, such as a required multiple choice quiz at the end of the unit, but encourage the students to rely on their own creativity to develop a useful, interesting and educational product that can be used by other students.

The illustrations accompanying this article, represent cards in different HyperCard stacks.

Intake valve open
Exhaust valve closed

Operation of the 4 cycle engine

INTAKE

Go to 2 cycle engine

Speed up

Hypercard software can be animated to show moving parts and functions. It is interactive, requiring the student to click on the buttons to activate the animation. (Figuure courtesy of Jerry Paxton.)

Technology Education for the Changing Workplace

By Joe G. Harper
Dr. Harper is associate professor of agricultural education at Clemson University, Clemson.

Keeping up with technology is no easy task. Being able to provide effective agricultural and environmental technology instructional programs for a changing workforce is not an easy task either. Is technology in the workplace changing the way we teach? Are we experiencing fundamental changes in the way we teach, or are the changes we are experiencing only in the technology we teach? Changes are that if we are experiencing changes in technology, we are also experiencing changes in the way we are doing business.

The changes in the technologies are much more visible than the changes in the way we teach. Many folks would contend that technologies improve our teaching methods and delivery techniques, but we will continue to teach based upon the same principles as we always have. This concept has some merit; however, it does appear that technology, especially in the workplace, is having impacts upon the ways we go about teaching.

Shifting Concepts

Agricultural and environmental technology education are founded upon principles. These principles may come from the hard sciences/hard systems which follow physical laws, or the soft sciences/software systems which follow social and ethical beliefs (humanistic principles). Principles fall along a continuum from a systems view to a hard systems view. They may be well-defined or entirely abstract. Agricultural and environmental programs are discipines by a blending of these principles. Critical thinking and problem solving strategies are key to providing students opportunities to work effectively in the changing technology-based workplace.

So what? What does this mean to you, your school, your program and your students? Basically, it means that you will need to provide more holistic, systematic approaches to teaching and learning which provide students greater opportunities to adapt to changing technologies in the workplace.

Principle Driven Instruction

The principle driven instruction implies that teaching and learning is based upon various principles, from the most basic through the very complex. Conceptually, the principles of innovative agricultural technologies may be classified in four broad areas:

Basic Sciences Principles - The foundations of science for agricultural and environmental technologies. The basic science principles which determine the ways the natural world works. Students learn these principles with the intention of sometimes later applying these principles to solve problems and provide answers. For example, teaching students the math, the logic, the tools, the technology. Battery workers will help the students work more safely around these types of batteries.

Applied Science Principles - The application of basic science principles. Agriculture and engineering are applied sciences. These disciplines use basic science principles to solve problems and provide solutions. Students are taught the applications. When we teach problem solving, often times we are teaching applied science principles. Probably, a significant portion of your instruction fits this area. As an example, teaching students how to properly test and maintain a battery utilizes applied science principles. A more complex example would be teaching students how to maintain the starting circuit of a garden tractor.

Technological Systems Principles - The utilization of a variety of applied sciences to manage and/or evaluate relatively complex technological systems. Management systems are based upon these types of disciplines, e.g., Integrated Pest Management. Students learning these technological systems use models and expert systems to determine what tools are available and viable alternatives. For example, an irrigation system representative can use computer models to help determine which irrigation system is most appropriate for the area. Systems are used based upon a variety of applied science principles and applications. This type of instruction is somewhat advanced and requires knowledge and skills in a variety of areas. In order to be able to install, operate, and maintain irrigation systems, a worker needs to be knowledgeable in several areas, and able to perform a wide range of skills.

Human Activities Principles - A value-based system of principles. Students learn to work both in the workplace. Students learn to do "what is right." Reasoning, critical thinking, and leadership, are skills which are required in this classification. Teaching students to plan and implement a conservation program for a golf course would be an example.
How is the Workplace Changing for Teachers of Agricultural Education?

We spend a great deal of time talking about the changing workplace for our students. We are concerned about the demands of the workplace placing more responsibility on us to teach basic skills, the ability to work with technology, teamwork, and problem solving to name a few. But what about the changing workplace for our profession, the teachers of agricultural education? A recent survey conducted in the state of Nebraska of agricultural education teachers sheds some light on this question.

The profession has endured considerable pressures caused by the threat of declining enrollments, sentiment that we don’t need to prepare many agricultural workers, reduced support from federal legislation, rapidly changing technology, and reduced visibility in many state departments of education. The pressures caused also by emphasis on adding new technology to the curriculum and shifting away from a production agriculture focus is a source of high frustration as well. What then have teachers done to change their workplace in response to these pressures? A recent survey of Nebraska agricultural education teachers sheds some light in answering this question.

The survey included teachers having more than three years longevity at their present school and their careers extended from 5 to 27 years. The average longevity of the teachers was found to be 12.8 years, an increase above the average of 11 years found in a 1990 survey (Silseth, 1993). One fourth of the teachers developed new facilities while employed in their present jobs and about a third completed major renovations. The types of renovation included agricultural mechanics laboratories, as well as development of agriculture, agriculture, computer, food science, horticulture and greenhouse, small animal, and soil and water laboratories which were identified as being important in Nebraska (Foster and Silseth, 1991).

Other renovations included adding offices or improving technology of existing facilities. In describing workplace changes made since beginning employment at their present school, the teachers displayed commitment to update programs, and reported several positive results. (The teachers also admit to having increased workloads.)

At the same time teachers reported they were adapting their workplace, they reported a positive change in their student enrollments. They were asked to compare their enrollments currently with the enrollments in their program during their first year of teaching (see Table 1). Enrollments increased in number of classes taught, semester vs. traditional classes, and in enrollment of other than agriculture classes taught.

**Table 1** Comparison of average enrollment for first and present teaching years

<table>
<thead>
<tr>
<th>First Year</th>
<th>Present Year</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of classes taught</td>
<td>5.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Enrollment, traditional classes</td>
<td>44.5</td>
<td>45.2</td>
</tr>
<tr>
<td>Enrollment, semester classes</td>
<td>27.6</td>
<td>46.3</td>
</tr>
<tr>
<td>Enrollment, other than agriculture</td>
<td>27.0</td>
<td>50.9</td>
</tr>
<tr>
<td>Total enrollment</td>
<td>57.9</td>
<td>76.5</td>
</tr>
</tbody>
</table>

**Development of Instructional Areas**

In addition to describing laboratory areas developed, the teachers identified cooperative efforts with other teachers, listed other-than-school resources used and identified linkages developed with business/industry. Summaries for the types of laboratories follow.

- Agricultural education laboratory development led to cooperative efforts with teachers of business and science and use of their laboratories and computers for agricultural education instruction. Other-than-school resources used included products, consumable supplies and loan of equipment and tools. Business and industry linkages were developed with professional agronomists and personnel from cooperatives, fertilizer plants, feed lots of FFA alumni and local merchants.

- Agricultural mechanics laboratory development included cooperative efforts with industrial technology and mathematics teachers. Other-than-school resources used for required and approved projects included tools, equipment and materials provided by agronomy businesses, lumber yards and mechanics' shops. Additional linkages with business/industry personnel led to identification of resource people to assist with instruction, provide use of their facilities and assist with procurement of metal, other project materials, small gasoline engines and considerable instruction and advice. Animal science livestock laboratory development efforts led to cooperative activities with...
Change R Us

A lengthy discourse on coming to grips with "CHANGE," that phenomena that teachers and students feel like Wile E. Coyote after a race with the Road Runner, may do nothing more than provide us with a "Blinding Flash of the Obvious." Tom Peters (1994) in his book, Crazy Times Call for Crazy Organizations, indicates that the word change is no longer a term with enough clout. He suggests the acceptance of the word abandon- ment rather than change as one of the biggest barriers we face going into the next century. In an interview with the former Vice Minister of Fish and Aquaculture in Japan, the question was posed concen- trating on the major factors important in buying and selling. He responded by stating that the factors are short-term, medium, and long-term in nature. When asked to estimate the length of time for a long-term factor, he candidly responded, ten minutes. Some would conclude that an occupa- tional area as steeped in tradition as agriculture would be somewhat exempt from the fast pace of change. In fact, nothing could be fur- ther from the truth. Business, industry and education within the field of agriculture have driven a priority for new technologies that are changing the way in which we work. To illuminate some of the change that is taking place, this discussion focuses on one aspect of the agriculture industry and in fact, one machinery dealership. Let's take a look at some of the changes, abandonment, that is taking place at Fish and Steele.

Fish and Steele Equipment Company is the largest franchisor of John Deere utility tractors in the Dallas district. The Dallas district includes New Mexico, Southern California, Arkansas, Oklahoma, Arizona, Texas, and Louisiana. Mr. Alas Soble, owner and manager of the compa- ny shared some interesting insights into the changes that have occurred.

Question: What have you done to reinvent your way of doing business?

Mr. Soble: In order to stay alive, "I would have to say the way in which we make decisions has changed significantly. When I started the machinery sales business 20 years ago, we operated primarily with the cigar box method of management. At the end of the day, if we had more money in the cigar box than when the day began, we had a suc- cessful day. Today's management consists of instantaneous decision making and extremely short turn-around on transactions. With John Deere's "Farm Plan" we operate on a three day maximum. Funds generated from special orders or equipment sales are channeled back to us within three days allowing much more flexibility and a better cash flow. Operating in a compressed transaction cycle sometimes forces us to make decisions with incomplete information. This type of risk taking, however, is just part of the job. The rest of my job is chang- ing."

Question: How has technology changed your job?

In the entered the business, most of my line methods as they were taught in university or workshop and learned from my dad or grandfather. Now, my salesman and some of my line techni- cians have Bachelor of Science degrees in Agriculture. I encourage my employees to get advanced training or degrees. I realize I may have to purchase the computer in some form or fashion. Technicians use the computer to access schematics and other technical information needed for repairs. They also communicate with field service representatives via computer. I would estimate that cur- rently 20% of our employee's time is actually done at home by computer link. I sus-pect that this trend will increase significantly in the future.

Question: What do you expect from a new employer?

I am looking for an employer that comes to the job with a good working knowledge of the machinery and equipment business. They need to know the difference between a plow plate and a replacement part for a round baler. I want my employees to know what they are selling and I believe that is 'satisfaction.' Since I perceive that we are selling an intangi- ble product such as a tangible product, I think potential employees need to have good communication skills. My sales representa- tives invest a significant amount of time just visiting farmers. They must know how to speak the language of the man in the tractor. They are instructed to never suggest to

Animal science laboratory activities lead to cooperation with science instructors and community members such as veterinarians. (Photo courtesy of David Barlow.)
Older technologies, used to locate parts for customers, will soon give way to the EPC (Electronic Parts Catalog) making it possible for farmers to access and order parts from the local dealer or main supplier. (Photo courtesy of Mitzi and Dale Perritt.)

the farmer that he purchased a new piece of equipment. That decision must be made by the farmer. We are just there to supply technical support and the ‘tug of war’ that is part of purchasing a new green tractor. If my employer does part of their work, they are not happy. The more they are effective communicators, the better the job will sell itself. Communication skills, including being a good listener, are essential not only for the sales personnel, but also for the service manager and technician. When customers can explain their problems, be heard, and have it fixed the first time, they are much more likely to go away satisfied.

Question: How have customers changed?

"Customers are better educated, expect more for their money, have less time to handle problems and in general must maximize their inputs. In the machinery industry, we are trying to maximize our customers’ time in a number of ways. These efforts have certainly changed the way we do business. John Deere is currently piloting a ‘home shopping’ venture for its customers. When implemented, the Electronic Parts Catalog (EPC) program will allow a faster, more accurate, and more cooperative effort with other dealers and the local dealership’s parts inventory from the home computer, order a part, print the invoice and expect the part to be ready for pickup when they arrive at the dealership. Should the part not be available at the local dealership, it will be delivered automatically from the John Deere parts supply. This concept is a big change from the farmer who brings in the part and simply says, ‘I want one of these.’"

To summarize some concepts about the workplace in agriculture, it would be safe to say there is an apparent pervasive attitude that doing things the way we used to do them — because that strategy once worked — is no longer valid.

Changes in customer wants and needs, a renewal of competitive views in management and an increased desire on the part of industry to produce a superior product have driven abandonment home to the agricultural workplace. Needs like specialization, professionalism and mastery of craft are being driven downward to the lowest levels of the work force. Some companies would suggest that we prepare for change by developing a systematic plan to attract our most successful people through the combination of job and benefits for which they are well suited.

Reference

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areas and increased use of "high tech" and biotechnology equipment. The addition of a school laboratory/industry was important for some teachers. Some teachers reported plans to update agricultural mechanics laboratories, add new welders and ventilation systems and also planned to introduce more module concept use of the existing laboratories. Farmers and teachers will reduce "shop" space by renovation or redesign use of the area to agriscience activities.

Summary

A survey of Nebraska agricultural education teachers was conducted in order to capacity how they organize their current classroom instruction, changes made since beginning their present jobs. The changes for improved instruction were made by expanding laboratory space, adding more cooperative effort with other teachers and using more other-than-school resources. In addition, linkages were established in a means of developing ties with business and industry. A major change to semester courses was contributed to considerable growth in the ranks of students. However, that change also contributed to more challenges in conducting FFA, SAE and record update activities. Positive results of the on-going process of changing the workplace were identified by Nebraska teachers of agricultural education in the form of increased student enrollment, increased program image and considerably greater job satisfaction; but for teachers, the changes also resulted in increased workload.

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Can We Keep Up with Technology?

"Mom, for high school graduation, can I have my own E-mail address and a modem so that I can cruise the information superhighway? I'm certain I'll need those skills when I get a job.

Technology is increasing knowledge faster than most of us can apply it. Technology is defined as "all human activities involving the use of tools." (Martin) The computer, E-mail, internet, telecommunications, satellite linkages for education, research, and the work site, all part of the information superhighway, are readily available to anyone with a modern willing and able to subscribe. Technology is rapidly changing the workplace. We can only guess how the future workplace will evolve.

Just as agriculture is changing all around us, the workplace is changing too. The workplace is constantly evolving to meet the needs of today's women and men and the jobs they do.

The computer is a powerful tool that can help bridge the gap between the traditional farmer and the modern farmer. The computer can help the farmer manage his farm, plan his crops, and track his yields. It can also help the farmer stay up-to-date on the latest research and developments in agriculture. The computer can be used to create and maintain an electronic database of the farm's history, including records of previous crops, yields, and costs. This information can be used to make more informed decisions about future crops and management practices.

However, the computer can also be a double-edged sword. It can provide valuable information, but it can also be a time-consuming and expensive tool. The farmer must weigh the benefits and costs of investing in computer technology before making a decision.

The future workplace will be different. The traditional farmer will be replaced by a modern farmer who uses technology to improve his farm's efficiency and productivity. The modern farmer will be able to make more informed decisions, but he will also need to be skilled in using a variety of technologies to do so. The modern farmer will need to be able to use a computer, as well as more advanced technologies like GPS and GIS.

The future workplace will also be more flexible. The modern farmer will be able to work from anywhere, as long as he has access to the internet. This will allow the farmer to work from his farm, or from a remote location, or even from home. This will give the farmer more freedom and flexibility, but it will also require him to have good communication skills.
Entrepreneurship as a Career Option

As large corporations have been downsized (right-sized, restructured or what ever term you want to use), small businesses have flourished. More than one million new businesses are started in America every year. While many of them fail, enough succeed to add millions of jobs to the economy at the same time that the Fortune 500 companies are losing jobs.

From fresh produce operations to turf and landscape services, the new business of entrepreneurship is ripe for entrepreneurial enterprise development. Your students should consider becoming an employer rather than an employee as a viable career option.

Creating Entrepreneurs

In a recent survey released by The Gallup Organization, seven out of ten high school students said they wanted to start a business of their own. The survey indicated the primary reason for wanting to start a business was "to be their own boss," not to earn a lot of money.

But while students are interested in becoming entrepreneurs, most do not have the knowledge to take that step. The students' responses to situational questions on entrepreneurial issues indicated they are not ready to pursue their dreams. Students attributed their lack of understanding about starting a business to being taught little about how business works.

While some young people traditionally learn about entrepreneurship from parents and other family members who own their own businesses, others have no access to such knowledge or role models. Many simply do not perceive creating a job or a business as a valid career choice because all of their role models were employees, not employers.

As an agriculture teacher, you can help your students understand that one of their career options is creating their own job. In fact, they can create employment not only for themselves, but for others in their community. The rewards can be substantial, not only financially but in terms of job satisfaction and personal development.

In his book Growing a Business, Paul Hawken writes, "A business shouldn't be something you do to live, but something you live to do." Many entrepreneurs agree. Often the most successful businesses develop from an avocation, hobby or other interest. Just ask Ben Cohen or Jerry Greenfield.

Running the company. Flexibility at the workplace will allow the employee's schedules to better meet the needs of the other important things in their lives. Employee benefits packages will have the traditional fringe benefits of life insurance, paid vacations, and health care but also such amenities as health maintenance, recreational, and educational opportunities provided on site by the employer. In September of 1990, Money magazine asked the Gallup Organization to survey a sample of their subscribers to find out how they defined the American dream. Responses of subscribers identified the following as primary attributes of the American dream: 1) Rewarding work; 2) First rate education for children; 3) Comfortable, affordable health care; 4) A house of one's own; 5) A nest egg; 6) Occasional indulgence; and 7) A comfortable retirement. (Germer, p.5)

This list consists of realistic whole life concerns. Wealth, fame and career advancement are not included. Did the financially astute readership of Money magazine realize that money and power doesn't buy happiness? Surveys by other polling groups reveal that up to two-thirds of the people surveyed said they would like to lead a more relaxed lifestyle. Everyone would like to spend more time with family, pursuing hobbies and personal interests will encourage companies to humanize the workplace.

Due to these anticipated changes, flexible workplaces and schedules will become a common feature. The future will see 40 hour work weeks performed in four days, allowing for worker training or retaining one or two days per week. There will be more time for leisure activities. Working for a distant agribusiness employer in one's home in a rural area will become a more pleasant experience than commuting into cities.

In Carl Danels' 1989 book, The Changing Workplace, the major changes soon to be affected by the future workplace:

1. The minimum wage will be raised.
2. Schools at which children will be lower.
3. The earnings gap for social security recipients will be removed.

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Raising exotic wildlife is sweeping the country. What will be the hot species in the 21st century? (Photo courtesy of Gale L. Hogan.)

By JAMES SPOERLE AND MARKY FREEMAN, Ms. Sporle is director of sales for the Roxy Mountain Marketing & Communications public relations agency which specializes in agricultural education.

Center for economic development in rural areas continue to have an impact on traditional agriculture. Alternatives such as aquaculture allow for diversification and additional income. (Photo courtesy of Gale L. Hogan.)
What's Not Changing at the Agricultural Services Workplace

The Bureau of Labor and Statistics, U.S. Department of Labor, rates the projected growth in the number of jobs in a particular occupation on a scale from one to five: more than average; above as fast as average; faster than average; or much faster than average. So, for example, the American College of Veterinary Surgeons estimates that there will be an additional 25,000 jobs in this area by 2025. This represents a growth trend of 13%, or faster than average with changes in educational opportunities in the agricultural workplace. Much of this anticipated growth will result from the increased use of new technology and automated equipment in all areas of agricultural production, processing, and distribution. What entry-level knowledge and skills in the area of agricultural mechanization will students really need for immediate occupational placement and further education and advancement into positions?

Regular attempts are made by various public and private agencies and organizations to quantify the lists of specific entry-level skills needed in each occupational cluster area. Instructional materials and job sheets are developed to cover each area. Vocational counselors review the information and tell students, “If you want to go to work in this area at an hourly salary of $7.77 per hour, you need to take this course.” You should know this information and should be able to do these things on the first day of the job.” Vocational counselors (including me as a former instructor) take the materials, introduce students to the concept and skill, and try to create the need-to-know attitude. Next, we demonstrate a specific how-to skill several times. We then require students to practice until they become proficient as time and available training equipment in the laboratory or classroom will allow. We then check the items on their competency profiles and introduce another skill because the list is long and the semester is limited.

As many of you, I began my professional career as a vocational instructor teaching agricultural mechanics courses in a high school. During the 1980s, I had an opportunity to work as a service manager for a farm machinery dealership before returning to education. Part of my responsibility was to supervise employees of the service department. I recall that during that period digital displays, electronic sensors, circuit boards rather than bulky wiring harnesses, point-of-sale transactions, on-board computers, etc., were being introduced on many models of agricultural equipment. At the same time, major technical improvements and changes were made in hydraulics, power trains, and other systems as well. The workplace had changed. The load of new machinery arriving at the dealership caused revised technical manuals, special tools, and high-tech diagnostic equipment. Fellow mechanics and I were perplexed, to say the least. How could we ever change? How could we understand and keep up with all this new technical jargon? Would we have to adjust to ourselves, the boss, and to our customers? And we did not know how to work on this “modern equipment?” Had technology run away from us? What was lacking in our knowledge and skills to be successful? Each of us had successfully completed our vocational training with the prescribed curriculum and had from two to 40 years of practical experience servicing and repairing agricultural equipment.

We soon realized a need for additional knowledge in what we could call “hands-on knowledge and skills.” How do we relate back to the fundamental principles of how come and why each system operates as it does; how different systems are interfaced; and the ability to be able to apply this knowledge to changing situations and applications.

The formula for the higher-level cognitive knowledge was reserved for those students in the last three years of college and become engineers, scientists, etc.

How can we prepare students for this ever-changing workplace? Ask yourself this question. Are we utilizing new technology in agricultural production, processing and distribution, or are we just reapplying the same simple mechanical concepts and fundamental principles of science, physics, math, etc., to new and improved components and applications?

It is not suggested that we disregard the competency lists that have been generated in each occupational cluster area. It is not suggested that, as vocational educators, we take over the curriculum and roles of academic teachers and try to teach science, math, and physics, etc., to the point that our vocational students become "rocket scientists." Rather, I would like to suggest that we teach students and skills as they are listed on the competency profiles, we relate them back to fundamental principles of science, math, and physics, etc., and link them to actual plant problems. It will then become much easier for students to apply these principles to current and future applications in the workplace. This will be consistent with the concept of linking learning theory, abstract principles such as these are best learned when they are related to real-world applications of these concepts and experiences. Let's try it!!

The Changing Workplace

(Continued from page 7)

Career Examples

Each of the product lines has technical support people available to address potential problems. After-sales service is extremely critical when you are dealing with a product like seed corn, where its performance can directly affect the farmer's financial success. It can cost a farmer thousands of dollars if he can't get his corn crop off the field because his combine is down for repairs. When a customer calls in with a problem, our job is to help. Our customers may have at their disposal a technical background, a mechanical background, communication skills, problem-solving and reasoning skills, flexibility to change, and the ability to be able to apply this knowledge to changing situations and applications.
Agricultural Education: Responding to the Changing Workplace

After the turn of the century, the United States was in World War I. Agriculture was the largest industry and this country was dependent on agricultural production to supply its needs. The Smith-Hughes Act of 1917 was passed providing the funds to establish vocational agriculture education in all public schools. However, before the passage of this act, some schools were already providing education in agriculture. The emphasis in agriculture at that time was production. Approximately 70 percent of the population was directly involved in agriculture and the easiest and quickest way to increase production in agriculture was to educate the public. The Smith-Hughes Act provided for education in the public schools for young people and for the education of adults.

Traditional programs in agricultural education continued in the public schools until 1963, when legislation was introduced to broaden the offerings. These included programs in agriculture, home management, clerical occupations, home economics, and a few other "off-farm occupations." (Vocational Acts of 1963). Agricultural mechanics became an important part of almost all educational programs. For example, the standard power and machinery supported the crop production portion of the curriculum. Agricultural business strengthened by teaching the business and management aspects. These types of programs continued until the late 1970s when the Committee on Agricultural Education in Secondary Schools (1988) recommended changes in agricultural education programs. Some of the changes included an addition of agricultural literacy to public school curriculum and broadening course offerings to include agricultural mechanics.

Agricultural Literacy

In the United States today, a vast majority of the population, especially young people, are two or three generations removed from real farm experiences. Their knowledge base concerning agriculture has greatly diminished. This problem has been identified as a lack of "agricultural literacy" or more explicitly, the lack of basic knowledge about agriculture by the general population (Committee on Agricultural Education in Secondary Schools, 1988). According to Williams and White (1991), many Americans have little or no knowledge of agriculture or the importance of agriculture to the life of the individual.

Agriculture is not simply farming. It is in the supermarket, the equipment factory, the trucking systems, the overseas shipping, the scientists' laboratory, the home we live in, and much more. It has an effect on the air we breathe, the ground we walk on, the water we drink, and the food we eat." (Phillips, 1990)

Fricke, Katter and Johnson state that "The failure of our secondary schools and liberal arts colleges to teach even rudimentary concepts on agriculture is enormous. A recent survey of the high school majority, even strong-willed Americans, are totally ignorant of an area of knowledge basic to their daily style of life, to their economy, and indeed to their survival." Reported in Idaho Farm Bureau News (1988), "We have people here who think that milk comes from a cow, not the local supermarket. In places like New York or Los Angeles or Chicago you would expect that, but even in a state like Idaho, where it is fairly rural, we still have people who don't know where their food and fiber comes from." The two principle conclusions and recommendations of The Committee on Agricultural Education of the National Research Council's three year study (1985 to 1987) released in 1989, are that the focus of agricultural education must be changed and beginning with kindergarten and continuing through the twelfth grade, all students should receive a systematic instruction in agriculture.

Two similar programs that have been initiated are FFA's Food for America and USDA's Ag-in-the-Churchroom. Food for America is one of the first national efforts to teach younger students about the business of food and fiber (Stagg, 1991).

With all the needs and opportunities before us to teach about agricultural literacy, it is time for agricultural literacy in the United States to take the lead in providing materials and expertise to teachers in the public schools. Schools need more than just a central source that could supply materials and information. A community resource specialist, for example, could find ways to provide the instructional material and activities needed by the school district to implement and expand curriculum (Endresen, 1990). Most important to agricultural education departments, all elementary teachers should be taught how to incorporate agricultural literacy into their curriculum.

A three hour course on agricultural literacy in the elementary schools, where the education core in colleges offering a degree in elementary education (Clayton, 1992). Teachers who have attended workshops on these principles and their agricultural applications. Hands-on learning experiences are an essential of an agriscience

Agriscience

The decade of the 1990's has seen many calls for new agricultural education in the United States. Parents, teachers, business leaders, and educators professionals have all called for new and innovative approaches to teaching science and mathematics. Agricultural education programs are important to this need by placing more emphasis on teaching scientific principles and concepts using agriculture education and natural resources. The Committee on Agricultural Education in Secondary Schools (1988) in its report, "Understanding Agriculture: New Directions in Education," states: "Teaching science through agriculture would incorporate more agriculture into the curriculum, while more effectively reaching students.

Most states have revised the course offerings for the agricultural education program. The "two" words today include "science" and "technology." These words are included in almost every course title offered such as, "Agricultural Science and Technology.

The National FFA Organization (1993) stated that "Perhaps we are behind in agricultural science and technology. A basic understanding of science is required for all secondary agricultural education students.

Nationwide, agricultural educators are giving priority to infusing science into the secondary agriculture curriculum. However, the emphasis has been on biological and life sciences. One can find many activities, lessons, etc., relating biological and life science concepts to agriculture. Many activities have laboratory situations so students can actually see these concepts. One must not forget the physical sciences. According to Lorton (1993), "The current literature gives relatively little attention to agricultural mechanics instruction... Some believe that agricultural mechanics is an important part of agriculture science curriculum revisions will help improve and enrich science-based curriculum revitalization efforts occurring nationwide.

Johnson and Braker (1994) presented sample science and mathematics learning activities for teaching agricultural mechanics. These activities were designed to enable the teacher to implement hands-on science and mathematics principles and concepts. These activities have been successfully used by teachers in Mississippi, Arkansas, Texas, and many other states.

Staff members are working with a few science and mathematics principles and concepts must be incorporated into the current agriculture education program. Teaching only agriculture education is not enough. The need to teach agriculture is as important as previously presented. There must be a balance — not exclusively science and mathematics, but it must be more than present agriculture education — but a blend of specific agricultural literacy will be achieved and science principles can be taught.

Summary

Agricultural education is a changing workplace. Agricultural education is firmly grounded in the science principles and concepts. Teachers should have a basic working knowledge on these principles and their agricultural applications. Hands-on learning experiences are an essential of an agriscience

Can We Keep Up?

Continued from page 16

rural areas continue to depend on traditional agriculture. Technology in the driving force in the way business and agriculture is performed. Therefore, all agriculture teachers and policy makers must become technologically literate with a business savvy in order to compete in the global workforce.

4:35 PM, Wednesday, May 3, 1995 (getting home from school)

"Yes, child, hold the food and say that modern thing if you think that what you need to yourself for the workplace of tomorrow."


Agricultural Education in the United States: Teacher Gender and Ethnicity by Region and State

Since 1965, researchers from the Agricultural Education Division of the American Vocational Association have conducted an annual National Survey of the Supply and Demand for Teachers of Agricultural Education in the United States. The annual studies were conducted from 1965 until 1973 by Dr. Ralph Woodin, initially of the Ohio State University and later from the University of Tennessee, Knoxville. The study was continued by Dr. David Craig of the University of Tennessee from 1974 until 1984. Since 1985, Dr. William G. Camp from Virginia Tech has conducted the study except for 2 years when Dr. J. Dale Oliver, also of Virginia Tech, was responsible for the research. This is the third in a series of reports to the profession on the results of the annual supply and demand study. For more details about the background of this ongoing study, and on the sources of the data, see the first article in this series, in the May, 1995 issue of The Agricultural Education Magazine.

Race/Ethnicity and Gender of Teachers

The following table presents data on the gender and race/ethnicity of teachers by region and state. The stereotypical view of the Agricultural Education teacher as a white male is certainly confirmed by these numbers. Gender was reported on 9,626 teachers. Of these, 8,640 (89.8%) were reported as males. Males made up 91.9% of the teachers reported for the Central Region, 84.5 for the Eastern Region, 93.9% for the Southern Region, and 69.9% for the Western Region.

Race/ethnicity was reported on 9,512 teachers. Of those, 9,015 (94.8%) were reported as white non-Hispanic and 335 (3.5%) were indicated at African-American. Each of the remaining racial and ethnic groups accounted for less than 1% of the total. The Central Region reported 99.2% white teachers, Eastern Region reported 98.7%, Southern Region 91.3%, and Western Region 97.8%.

This is just the second year that gender and race/ethnicity data have been collected in this national survey. We found that teachers of agriculture at the secondary level are primarily white males. Only a minuscule number of our teachers are of native American, Asian, or Pacific Island decent. Both racial and gender percentages are very regional. The general population patterns of the regions probably explain the racial/ethnic differences among Agricultural Education teachers. One might speculate that the larger percentages of males in the Eastern and Western regions reflect less conservative attitudes toward gender stereotyping than is prevalent in the Southern and Central regions.

Table 1 continued

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<tr>
<td>Region Total</td>
<td>1,295</td>
<td>1,132</td>
<td>372</td>
<td>307</td>
<td>1,192</td>
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<td>US TOTAL</td>
<td>10,119</td>
<td>8,680</td>
<td>986</td>
<td>335</td>
<td>9,016</td>
<td>37</td>
</tr>
</tbody>
</table>

a Actual reported numbers included fractions since some teachers are employed part time. The data reported here are rounded off to whole numbers for ease in interpretation.

Look for This

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