The information highway

Agricultural Education’s map to the world and the future!
DOS Will Take Care of All Our Needs!

S

ome years ago, when the Windows envi-

ronment was first being bundled with

some of the new 386 computers, we de-

cided to remove Windows from our newly

purchased computer. With hindsight one would

surely have to ask why. Because at that time we

decided that "DOS will take care of all our needs!")

But today we are not at all sure that

was the real reason for not being as enamored

with Windows as we are now.

The articles in this issue of The Magazine

reminded us of the parade of computers and

software that have marched through our offices

and lives. In the early 1980's our first computer

was an Apple II. We remember having the shift

key hard-wired so we wouldn't have to double

click to move between lower and upper case. When

compared to the typewriter we had been

using, the Apple computer was quite a

machine. It was almost as impressive as mov-

ing from a hobo box of a stick welder to a MIG

welder. I am sure we asked ourselves why

we didn't make the change sooner.

Next we progressed to an Apple 2E on

our way to a double 5.25 disk drive IBM PC and

a word processing program. If only we could

have processed our dissertation on a computer

rather than having it typed about eight times.

Moving on to color and at XT with a hard

drive must have been comparable to one's

wielding a Billabong short-sleeve shirt. But,...

nucleus yet. To move to a 286 with the

increase of the hard drive capacity from 20 to 40

and DOS 3.1 was like upgrading from thresh-

ing grain with a stationary threshing machine to a

combine that actually went to the grain and even

cut the standing grain if one so desired.

We finally had developed a reasonable sense of

what DOS was and what it would do. We

thought that having traveled on Interstate 80

and 90 and instead of good US 30 would hold us in

good stead at least until the 1990's.

But, no, along came the 386's and Windows.

Call it technophobia or what you will, we felt we

could go anywhere on Interstate 90 and 80.

We knew our good old map of DOS. Why

should we trade in our DOS map for a new one?

Well, for whatever reason did we get the new map.

The new map has made our travel

through our computers much better ever since.

Now we are being called once again to buy a

new map of the whole world and travel

places we have never been before; travel on the

Information SUPERHIGHWAY. My gosh,

what's become of this world? It has become

quite small if one uses the new map of the

Internet.

The editor spent quite some time reviewing

the articles for this issue, because he would

always be side-tracked into taking the authors'

suggestions to travel the information highway.

He traveled all over the US and even went

international to Europe, Australia, Germany and

Romania. The directions given by the nation

were actually quite clear. However, we have

not yet tried our Model T for a Corvette;

but we were quite happy cruising in our

1957 Chevrolet.

In conclusion, let's be serious. As teachers,

how can we, in good faith and with a clear con-

scious, not help our students get on the

Information SUPERHIGHWAY? Are we still

going to recommend US Highway #30 for a

trip across the country?

EDITOR'S CORRECTION

In the March 1995 issue of The Agricultural Education magazine the author credit for the Success Story "Agricultural Education/FFA: Extinction or Survival" was mistakenly and inadvertently given to L. DeVere Burton, the Success Story Editor. Instead, the author credit should have been given to Linda A. Rist, the Agriscience Instructor at West Central High School, Hartford, South Dakota. The Editor alone makes the mistake and apologizes to all concerned for any anxiety, consternation or embarrassment the mishap may have caused. In addition, a correction will be noted in the Volume Indices of Authors and Subjects.
The Information SUPERHIGHWAY

A n ambitious distance learning program linking the United States and the world works today and in place today. Many more will be in place tomorrow and the years following. We identify this distance learning program as the Information Superhighway of the future. When you hit the Information Superhighway with your network, a world of opportunity is within your reach. Not only is it a source of up-to-the-minute news and fast inexpensive global communication, it offers innumerable opportunities to exchange and disseminate information of all kinds. All too often, however, we identify roadblocks and let them stand in the way.

The Internet provides wonderful opportunities for the educational community. Through on-line services as AskERIC and Newton, teachers and students can find thousands of journal articles on classroom topics, learning theories and legal issues. Government agencies including the US Department of Education and NASA offer lesson plans and professional support for teachers. KidsLink and the Global SchoolNet allow students around the world to work on collaborative projects that address issues like global warming and human rights. Everyday, teachers connect to the Internet through university accounts, public school networks, and private carriers and let their students pick up the tab. It's one of the perks about teaching!

Legislators realize the benefits the information superhighway offers to educators, and many states provide funds that allow classroom teachers to obtain free Internet access. After all, the Internet is a very cost-effective tool for educators. Once a connection is established, most services are free. In all, more than 40 states provide their public educators with access to the Internet, and more states are beginning to offer this service as its benefits increasingly become apparent. A complete list of educational networks providing Internet access are posted on McklerWed at http://www.mcklerwed.com. A word of caution—most state-sponsored educational systems don't allow full FTP and telnet privileges. After all, the state has to protect itself from hackers who might use their system to access dubious sites and download material of questionable academic value. Some states will allow you to get full privileges by asking for a full Unix account when you register with your state. Such an account gives you free reign on the Internet. You assume the risk if you allow your students to use such an account in the classroom.

"Getting a License to Drive on the Information Superhighway" gives you a taste of the terms used on the highway. It also gives you an idea of how to use the technologies in everyday life. The classroom application section gives you a number of concepts and, as put by the authors, "the superhighway incorporation will spawn numerous opportunities."

"Getting Information from Web and Gophers" identifies the potential for using the Internet in educational settings. It also identifies sources of information which are limitless and accessible in a matter of minutes. You will be amazed at the resources available to make your classroom stronger and help students become more knowledgeable about any topic they choose.

If you are a "Model T on the Superhighway" and want to know what is on the highway and how to get hooked up, the authors of this month's articles give you some suggestions on how and why. They also attempt to identify what the Superhighway is and why you and your students should be in the main road to the world. The Superhighway is large, and understanding it is somewhat difficult if you realize it is really a group of databases linked together via technology, which means that we all have access to more sources of information than ever before.

"Clicking Open a World of Information" identifies what some of the many uses of the system offers to those who are willing to give it a try. Wide World Webs are an excellent process of graphically viewing and obtaining information out on the Superhighway. With a little effort and proper equipment, you and your students can be retrieving information from others and providing information and auditory communication. Why not link with students and classes from other countries and exchange information without having to deal with the diastonic and time?

Remember, the next group of students you have in your courses may indeed be from an expanded world. From "Cyberbaboons" (you know them) to "Cyberbanshees," the technological reality check on the information superhighway.
Once teachers overcome technophobia, the computer can become an educational tool that offers a wealth of materials to enhance the agriculture program. Using technology such as Gopher and LISTSERV can increase student knowledge. (Photo courtesy of Penn State Agricultural Information Services.)

Another School-to-Work source is the Institute on Education and the Economy, an information service found in AskERIC/ VoicServe. This educational vocation network is provided by the National Center for Research in Vocational Education at the University of California-Berkeley. The Institute contains information on policies, practices, and programs related to School-to-Work transitions (VoicServe, 1995). This medium provides teachers with information needed to secure and use School-to-Work-related grants.

Advanced Placement Courses

Numerous high school students earn college credits through advanced placement courses. Using this concept for secondary agriculture courses can drastically increase enrollment. For example, if universities would permit students to enroll in high school courses such as animal sciences, food sciences, and environmental resources, students could chart early career paths. This idea can easily be implemented using e-mail, compressed video, and fiber optics.

Distance Education

Most superhighway ideas discussed in this article are classified as distant learning education. However, formal distance education is a reality in many secondary and college level. Several years ago, a student in Pennsylvania was able to discuss his work in Colorado with a student in Crete, Nebraska. This new information is being used in distance learning courses. For example, a student can simultaneously watch a classroom lecture and participate in interactive video conferences. The computer acts as a bridge between schools and communities. It also allows students to participate in national and international activities.

In recent years, many progressive agriculture programs have used microcomputers for basic computing. These programs are now discovering interactive curricula via the superhighway. (Photo courtesy of Penn State Agricultural Information Services.)

Activities. For example, students may wish to "mail" their homework to the instructor after completing it on the home computer. On days when students are ill or miss school for other reasons, assignments can be sent to students by e-mail. When completed, such students can submit their assignments by e-mail. Also, FFA members preparing for a speaking contest might send their speeches by e-mail to English teachers to edit. The needed dialogue would also occur by e-mail. Other FFA members might use e-mail to submit applications, plan chapter activities, and register for conferences. In the near future, FFA supplies can be ordered and the FFA magazine (New Horizons) read on-line. Whatever the application, e-mail allows students time to reflect, interact, and respond.

On-line computers provide access to information on topics ranging from aquaculture to zoology. Students working on agriscience projects can obtain information from university libraries, databases such as ERIC or AgCol, and other sources including Gopher, a menu-driven application that allows users (free to Internet users) to browse the globe for information. Gopher is a prime example of how the superhighway can be used to increase students’ ownership of the superhighway.

Another source of funding includes parents. Most parents take strong interest in their children’s learning as evidenced by the number of school teacher support groups. Fundraising efforts are another method. Key school groups to tap for support might include Parent-Teacher Associations, FFA Alumni chapters, and perhaps students’ clubs in the community. Industry and service organizations are major supporters that keep school projects alive. A detailed plan is needed using the major benefits of the superhighway.

Enhancing Linkages with Homes

To determine the neglected “SOE visit,” the superhighway was open teacher-parent communication that has been lost because of societal changes. E-mail can allow busy parents to interact with children about their children’s activities. What if parents don’t have computers? Voice Messaging Services allow interaction with computers that discuss topics ranging from homework to field trips. A simple stroller diary toll notifies a parent that a message is waiting. Such services cost as little as $1.50 a month (Price, 1995).

International Dimensions

The recent North American Free Trade Agreement and the General Agreement on Trade and Tariffs strongly suggest that the international marketplace and diverse cultures be taught using curricula that span time zones and geography. Dialogue between US and international agricultural students can foster global understanding of food, agricultural, and environmental issues. To achieve this ideal, students and teachers in “global classrooms” must adapt quickly to multiple superhighway media to prepare for "global employment and international citizenship" (Brown & Brown, 1994).

Funding Considerations

Money is often cited as the major obstacle to the implementation of superhighway applications. This is in some situations, but teacher reluctance to obtain funds is a major obstacle. Many states, textbooks and supply funds can be used to purchase software. Also, having a software wish list and discussing needs early with administrators will increase the chances of securing needed funds. A second step involves the use of charisma and simply being available to spend end-of-the-year dollars. These opportunities are often found when agriculture teachers and administrators are often short at school. Also, several district offices sometimes grants to purchase innovative educational equipment. Teachers who have this option can involve students in a writing grant application that will increase students’ ownership of the superhighway.

Conclusion

Incorporating the information superhighway into secondary agriculture education programs will spawn numerous opportunities. However, in most schools teachers must decide between purchasing another piece of equipment or a desktop computer with communications software. The choice is obvious for teachers who wish to drive on the information superhighway.

References

Communication among agricultural educators is vital to the success of the profession. It seems that change in agricultural technology, policy, and personnel practically occurs overnight. Without a systematic communications approach, the profession will soon be buried under the information explosion. Do you hear your colleagues talking about "surfing the net," finding it on the web, or answering e-mail from Australia? If you have a vague idea as to what they are talking about or an experience in using the technology, you are ready to expand your technological horizons.

Learning Strategies of Convenience

University faculty with teaching, extension, and/or research appointments generally seek the most efficient, inexpensive means of technological updates. Distance learning is displacing workshops and courses because time is of the essence. Distance learning is preferred to driving to the main campus. At least 11 universities now offer degree programs through distance education and numerous others are offering courses via the technology (Muller, 1994). Organized content delivered through educational media by a competent instructor who encourages student growth through two-way interactions results in a quality experience known as distance learning (Wilson, 1991). Participants in distance education need to interact with the instructor. Instructors may ask students to respond by phone, FAX, or e-mail. Newcomb (1984) stressed that students will have to be forced to interact, especially if the technology creates psychological barriers for them. Interaction is virtually impossible if the participants lack basic technological skills necessary for communicating from a distance with their instructor.

Recognizing the need to enhance communications and technological skills among agricultural professionals, the Cooperative Extension System worked with AGSAT to offer a new course, A Step Beyond the Basics, online. The course was piloted as a collaborative effort of six sites: North Carolina State University, Mississippi State University, The Pennsylvania State University, West Virginia University, Cornell University, Purdue, and CSREES, USDA in 1994. In early 1995, the course was slightly revised, based on student evaluations, and expanded to accommodate a class size of approximately 425 students.

Course Description

The course is about electronic mail, one of the most significant new methods for enhancing organizational communication, both internally and externally. It attempts to build on the participant's basic knowledge of using the technology, by addressing topics concerning mailing lists and file retrieval. The course is taught completely on-line across Internet, and requires the students to be completely self-directed. While learning occurs at a distance from the instructor, satellite broadcasts are not used during the course, only on-line intercommunications.

Formation of the Project

The project, conceptually developed at North Carolina State University, received college and state support on the part of technology specialists across the Cooperative Extension System. At the National Extension Technology Conference in Lexington, Kentucky, Mitch Owen of North Carolina State University shared the framework of the project with selected technology specialists across the country and the USDA committed to the project by offering resources and technical expertise. With each state developing a fraction of their own course materials, the course became a win-win situation for each of its co-contributors. As the course began to take hold, AGSAT agreed to endorse the project.

Objectives of the Course

One of the major focuses of this course is to explore the use of e-mail as a teaching tool. Efforts to evaluate whether participants in the on-line class actually gain cognitive and applied knowledge of the tool is a central aim for the creators of this course. Instructors hope to gain knowledge of the unique strengths and challenges of offering a self-directed course via e-mail.

For the participants focus on e-mail skills. It is the objective of the course to teach participants the skills needed to retrieve information from file servers across Internet, using only e-mail. A second participant objective is the acquisition of skills needed to subscribe to unsubscribe, and participate in forums, discussion groups, and other e-mail lists across Internet.

The Learner

The learners in this course are made up of both faculty and support staff from land-grant universities and USDA employees in Washington, DC. The majority of these participants are employed in a role serving with the Cooperative Extension System. All participants are required to have knowledge and the ability to send and receive simple electronic mail messages before being accepted into the class.

Learners experience several challenges in participating in this course:

- **Group Interaction -** Lack of interaction between students is often cited as a limitation of distance education courses. The course's approach is to place students in teams which will be given group assignments to assure interaction between students. Teams have been shown to help create interaction and build a protective environment for students to learn. However, some students, through laziness, ignorance, or self-interest, tend to make poor team-mates. Although rarely seen, this can often result in poor student participation.

- **Immediate Feedback -** Participation in formal educational methods has resulted in most learners expecting immediate feedback from instructors and fellow classmates when suggesting ideas or answers. With e-mail, this is delayed. Students and instructor are given the opportunity of when to do their work. Thus, students are required to demonstrate patience with team members and instructors. Some students take several weeks to feel comfortable with this delay.

- **Self-Directed -** Being self-directed is not always easy. This method of instruction requires the learner to be almost totally self-directed. Unlike courses offered in a traditional classroom, this course enables the student to decide when they do their assignments. They have the freedom of working on the course at a time of day that best fits their schedule. While the course empowers these learners to self-direct, it also requires discipline on the student's part. It is estimated that five to ten percent of the class will not keep up with their work, and thus be dropped after the second lesson.

The Faculty

There are two major challenges faced by the faculty:

- **Coordination -** Development and review of the course were done completely via e-mail with little exception. There were several teleconferences, and one actual meeting of the faculty before the pilot course was held. These helped to build consensus, which at times was difficult to obtain via e-mail. Coordination of the course became a major task.

- **Class Size -** Working with a class size of 425 is a formidable task, especially when considering the time spent on e-mail. But adding the limitation of distance can result in chaos. Many traditional practices, such as grading how hard the students are working, are difficult to employ. The solution implemented by the course was sending summaries of the students submitted homework to the entire class, instead of grading individual homework. This allowed each student to see the answers, as well as new approaches to solving the same questions. Some individual interaction is necessary, so instructors still have to provide individuals with feedback.

References


Clicking Open a World of Information

An agriscience teacher gives students an assignment to develop a multimedia presentation on a specific related topic after teaching a unit on aquaculture. One group of students decides that its presentation will depict the historical importance of the horse in the United States.

The group goes over to their computer and launches their software program that utilizes a graphical user interface. The student "driving" the computer clicks on a button labeled "Net Search" and, in a matter of seconds, the group is logged on to a computer at the University of Geneva in Switzerland. The group decides to start searching for directories that contain references to agriculture. They type "agriculture" into the blank and click on the "Search" button. In less than a minute, the search engine returns numerous agriculture-related directories. One directory is maintained by the United States Department of Agriculture. The students decide that this would be a good place to start and click on the highlighted link.

Ten seconds later, they have left the computer in Switzerland and are logged onto a USDA computer in Washington, DC. The directory can be searched and the students enter "horse" as their search word for thirty seconds later. The return search list contains "horses" of research papers dealing with horses. One of the papers is a profile of a horse in the United States including statistics. The group decides that they need some pictures and graphics to accompany their presentation. Their instructor suggests that they download a number of clipart files to use in their presentation.

Then the students go back to Washington, DC, to use the Library of Congress computer collection and find a collection of old photos by famous photographers that depict various uses of horses by society during the past centuries. They also find a subdirectory of old films that show the societal importance of the horse in America. The students select the best examples of pictures and old film clips and download the files to their own hard drive.

Their collection of information (text, video, graphics, and sounds) has taken less than a class period. The students can then develop their multimedia presentation. After comments from their instructor and careful editing they make their presentation available for other users of the Internet to visit.

Is this the agriscience classroom of the distant future? The answer is a resounding YES! This is the classroom of the future. The technology described is currently available and being used by public school systems across the country. Students ranging from kindergartners to seniors in high school are taking advantage of the information and resources available on the World Wide Web.

What is the World Wide Web?

The World Wide Web (WWW) is an Internet-based on-line information delivery system developed by the European Laboratory for Particle Physics also known as CERN. The WWW makes use of hypermedia, Hypermedia is a collection of text, data, voice, graphics, video and animation, and is an evolving part of the Internet. The WWW allows users to browse through a wide variety of sites.

Links are highlighted and underlined allowing users to point and click to sites on their computer. The browser program interprets the HTML code and formats it in a visually pleasing way. There are currently over 30 browsers available for DOS, Windows, OS/2, Macintosh, and UNIX platforms. Netscape, however, is the most popular browser. It has a window that allows you to see several pages at once. It also allows you to search for sites that contain certain words or phrases. In addition, it has a feature that allows you to go back and see previous pages you have visited.

Keeping Up-to-Date?

Interest and use of the WWW is increasing geometrically. Currently over 20 million people have access to the WWW. The implications for how agricultural education is taught and delivered are profound. Students in the most rural parts of the country will have the same opportunity to access resources as students in more populated areas.

The subject matter taught in agriculture is constantly changing. It is extremely difficult for textbooks to keep up. By the time a textbook is written, adopted, and distributed it may already be out of date. This is especially true with technical subjects such as computers and biotechnolo

Agricultural Education and Information

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**Getting Information From Webs and Gophers: Who Would Have Thought of That**

The use of educational technologies such as computers and telecommunications offer great potential for improving the delivery of high quality instructional programs (McClintock and Terres, 1992). Both teachers and students have used computers for a variety of applications in agricultural education. Computers have been used to keep SAE records, prepare lesson plans and budgets, and do simple correspondence. When computers were first used in agricultural education, there was a limited amount of software available for students to use to practice production agriculture applications. However, today there is a wide variety of software programs from which to choose.

In the future, our information society projects a world linked entirely by telecommunications—a world in which teachers and students can interact daily with vast amounts of information and data. Texts, sounds, and video images that are like the globe at the speed of light (Dyrl, 1993). This is all possible through merging computer, telephone, and cable television technologies to deliver data around the world.

To some extent, we are already seeing this scenario. With upgrades in computer technology and the availability of modems and telecommunications software such as PROCOMM, Computer Network Access or America Online, agricultural education programs can access information from other locations. Information can be obtained from anywhere in the world and be available for use in your classroom within a matter of minutes if you have the right equipment and software.

**Internet**

Many teachers and students are already communicating throughout the world using a giant telecommunications network called the Internet. The Internet is the world's largest computer network—really a network of networks—that uses standard common languages to connect dissimilar software and hardware (Seguin and Seguin, 1995). The Internet is made up of various federal, regional, and campus, and foreign networks simply tied together by a menu to the world to use (Fleck, 1994).

Some applications of the Internet are already being used by educators. For example, electronic mail (e-mail), electronic bulletin boards, and discussion groups have been used by agricultural educators. These applications have allowed individuals to communicate important information, such as meeting dates and lesson plans, with each other. They also have helped educators in other states and countries around the world available for use, obtaining it is a different story. Through the use of the Internet, this information can be accessed and made available to use with students in our classes.

There are thousands of different resources that teachers and students can access through the Internet to help them in planning lessons and reports. They include newspapers, educational software, and major college and university libraries. We can also access information from the US Department of Education, Cooperative Extension System, US Department of Agriculture, and book and publishing companies. Some organizations and agencies will allow you to order information right from the computer. You just indicate what you want and the quantity of each, provide billing and shipping information, and your materials will be sent to you. No more making telephone calls to place an order.

Relatively speaking, a minimum amount of equipment can be used to access the Internet. Hooking up a personal computer to a modem that provides a link to the telephone line can allow you to send and receive mail. Internet searches can be made easier through a Local Area Network (LAN) or by subscribing to a commercial service like America Online or CompuServe (Seguin and Seguin, 1995). You must have a computer address similar to that of your postal address where information can be sent.

There are two major providers of this kind of information through the Internet. Through the use of Gopher and World Wide Web (WWW) servers, teachers and students can access a wide variety of information to then use in educational programming.

**Gopher**

Gopher is an interface that helps retrieve information on the Internet (that also have chat rooms). The gopher menu will allow you to find information (Continued on page 15).
op in Europe and is based on a system called hypertext. Words in one document are “linked” to other documents. By using your mouse to click on a highlighted hypertext word in one document, you can jump to another document dealing with that topic. Mosaic and Netscape are two popular browsers for using WWW.

**Archie and Veronica** - Yes, they are taken from the comic book characters. Several students at a Canadian university created a database system, called Archie, that contains lists of files and their locations on the Internet. To use Archie, access the system through Gopher or Telnet, type in a file name, and see where on the Internet it is available. Archie currently catalogs close to 1,000 file libraries around the world. Veronica is faster than Archie and is supposed to be easier to use.

**Email** - Electronic mail allows you to communicate with individuals and groups worldwide. An advantage of e-mail is that you can send the message any time of day and the recipient can read it at his/her leisure. With e-mail there’s no time lag.

**FAQs** - Frequently Asked Questions lists help keep the information network flowing smoothly. Someone has compiled a list of questions and answers so that a user can read rather than thousands of people a day asking the same questions. FAQs are recommended reading for the first time you access a system.

**Mailing Lists/Listserver/Almanacs** - These allow you to join a special interest group such as one on sustainable agriculture or the Minnesota Vikings football team. Typically, a message sent to a listserver gets sent to all members of the group. Active groups may flood your e-mail box with dozens of messages a day. The USDA has an almanac that sends all members data on how to grow soybeans to agriculture.

**Public Access Sites** - These may be found at universities and colleges, libraries, for-profit agencies, non-profit agencies, state agencies, and others. They allow individuals to connect to the Internet and provide various degrees of services. Some offer free access, while others charge a fee.

**Usenet/Bulletin Boards/Newsgroups** - These are all terms used to describe systems that allow people to communicate. Bulletin boards are just like their namesakes; you can both read notices others have put on the board and post notices yourself. Usenet and newsgroups allow free-flowing dialogue on specific topics. Dialogue can be open and explicit on the Internet or restricted to a closed area before allowing your students to join one.

**How Can I Use This in my Classroom?**

As we reach cruising speed and shift into overdrive, the main message is that some of these resources can be used in an agriculture classroom.

**As your students research agricultural topics they have then use electronic databases to get current information.**

- Have your students join discussion groups on topics such as sustainable agriculture, ecology, animal welfare, or education.
- Find electronic pen pals for your students and have them correspond on a regular basis.
- Assign your students an agricultural scientist and have them interview the person using e-mail.
- Have your students conduct experiments over the Internet such as measuring weather charts, analyzing soil data, or making agricultural statistical news, reports, and land photos.

I challenge you to reach the point where your students recognize the potential of Internet access by following these resources on the Internet that are highly recommended.

**CYFER-net (Children Youth Family Education Research Network) and USDA ES Gopher (the Cooperative Extension System Gopher Server) are up to date with the information from the USDA Cooperative Extension System and the National Agriculture Library. They are still under construction and will be changing as they become more defined.** If you are interested in accessing or submitting information to the USDA/ES Gopher server, then use your e-mail to contact almanacs-admin@usda.gov.

**ASKERIC is run by the Educational Resource and Information Center for teachers, librarians, and educators and other interested in K-12 education to build more information on educational topics. The center maintains an e-mail address (askeric@eric.syr.edu) for questions and will return answers within 48 hours. It also maintains a gopher site that contains digests of questions and answers, lesson plans in a variety of fields, and other educationally related information. The gopher address is: /pub/askeric/askeric.**

Badger (1994) in the August, 1994 issue of The Agricultural Education Magazine has more information about ERIC.

**NASA Spacelink** is run by NASA and provides reports and data about NASA, its history, and present missions. To access Spacelink, Telnet to spacelink.msc.nasa.gov or 128.158.13.250. When you connect, you’ll be given a login and a password. If you enter a valid user name and password, the system maintains a large file library of GIF-format space graphics, but you can only view them through Electronic Mail. You can use the program to obtain the images, you have to dial the system directly, at (205) 895-0028. However, many of the graphics can be obtained through FTP from archive.arc.nasa.gov (Drew, 1995).

The uses of the information superhighway are only limited by the imaginations and interests of the teachers. Remember, once you get on the Internet you are never lost; you are just exploring roads you have never been on before.

**Conclusions**

Now that you are up to "Cortez" speed the question is where to go from here. Murphy (1994) in an overview of 113 commercial vendors who provide relatively easy-to-use access to the Internet for varying levels of cost. He also suggests that you check with your librarian, a local specialist, or computer teacher to see if your school already has Internet access. Some states provide free access to the Internet through toll-free telephone numbers. For example, Indiana has a system called Idemnet which contains farm, forests, weather, education, and other educational links. Typically, these contain numerous advertisements for companies that sell services to access the Internet. Once you are on the Internet, let your students’ natural curiosity take over and allow them to explore what is available. Remember, the information superhighway can take your students across the country or around the world; it is up to you to make sure they are given the learning opportunities to get on the highway.

**References**


**WEBs & GOPHERs**

(Continued from page 12)

**World Wide Web**

World Wide Web (WWW) are the newest development on the Internet. World Wide Web brings a graphic user interface to Internet working—in other words, it allows full integration of full-color graphics, text of varying typefaces, animation, images, sound (W3C and Sequin, 1995). You can access anything through WWW like you can through gopher. You can even do e-mail through the World Wide Web. In addition to being printed, you can also see pictures. For example, the Ohio AgriLife Curriculum Materials Service has its entire catalog on the Internet. By knowing the WWW address (URL, http://ftp254-5-ag.ohio-state.edu/UCMS/Ohio_agedu.html), you can scan the entire catalog right from your office. Pictures of some materials are provided. While these new computer and telecommunications technologies are great and everyone is being encouraged to use them, there are two major challenges that must be overcome if teachers and students are to utilize the vast amount of information available through the Internet. First, agricultural education programs must have adequate hardware and software capabilities to use Internet applications to their full potential. Second, teachers and students must receive relevant information on how to access and retrieve information on the Internet. It does no good to use the Internet if we don’t know what we’re looking for.

**Summary**

The potential for using the Internet in agricultural education is tremendous. There is much information that can be accessed in minutes, if you know what you are doing and know where to look. In a time when information is needed immediately, the Internet provides an easier and faster way to search, access, and retrieve it for use in the classroom. Once you have connected with the Internet, start experimenting with Gopher and WWW. See what types of information are out there. You will be amazed at the resources available to make your programs stronger and help you and your students become more knowledgeable about agriculture.

**References**


Dispelling the Myths of Distance Education

By Dawn Drake and Mark Zabor

Mr. Drake is an instructional program manager for an extended degree program in agricultural administration and Dr. Zabor is an assistant professor of agricultural education at the University of Wisconsin-Piatttelev.
Predicting the future is always a challenge; it also means that one's exercise. When we take time to ponder the future, we begin to plan what needs to be done today. By altering the present we dictate what we do today, we will be in a better position to "invent" the future we want rather than accepting things as they are.

Interaction of economics, technology, social and environmental issues must be considered in predicting the future. This interaction is very complex. In general, it must be recognized that technology is the engine driving the changes in agriculture and, therefore, in economics, education, and society. We live in a technological society and we value what technology can do for us and the new opportunities created by it. Technology changes economic, personal, and social rates. What will work today may not work tomorrow. These changes often make it difficult for individuals, organizations, and society to adjust. In short, technology provides new tools while changing the tools change the role.

**Educational Trends/Reform**

Educational trends/reform influence the school environment in which agricultural education programs must operate. Perhaps the national, educational reforms are moving through legislative actions. The federal government has been interested in preparing people for the future. Much of the federal legislation on education is motivated by the need to keep the nation economically competitive. In a recent presentation, Dr. Winifred Warnat, Director of Vocational and Technical Education, U.S. Department of Education, spoke about the federal interest in workforce preparedness. She explained how the expanding global economy that is challenging U.S. competitiveness and the shortage of adequately trained and flexible work force responsible for advancing technology, work force preparedness is a national priority. It is important for agricultural educators to understand federal actions and how they will affect educational reform programs and the school environment. The federal interest in workforce preparedness has driven many of the educational-reform agendas. Following is a brief overview of federal activities.

**Educational Programs**

Educational programs are the major national attention to the release of the 1983 report entitled, A Nation at Risk, which focused on the need to change education and training. Many national reports have been written since 1983 which have helped to shape the agenda for educational reform activities. For example, the report entitled, America's Choice, High Skills or Low Wages, Another report which has helped define educational expectations is the 1991 report, What Work Requires of Schools. It is known as the Secretary's Commission on Achieving Necessary Skills (SCANS) report.

The listing of competencies and skills of the SCANS report indicates what is needed in a fast-changing work environment. Notice the focus is more of a "flexible worker" rather than one that has a set of specialized manipulative skills which can be replaced by technology. This thinking is one plank in the shifting educational philosophy discussed later in this article.

In general, agricultural educators find little to disagree with in the SCANS report. They believe agricultural education programs are meeting most of the competencies and reinforce the basic skills listed. However, many employers express concerns about students lacking many of the basic skills needed today in work places. Costs also has the same concern and has made provisions in recent legislation for addressing the work place competency and basic skills deficiencies.

**Federal Laws**

Three pieces of federal legislation are major forces in shaping the U.S. educational reform: Carl D. Perkins Vocational and Applied Technology Education Act (Perkins), School-to-Work Opportunities Act (STWO), and Goals 2000: The National Education Goals (Goals 2000). The following is a very quick and short overview of these federal laws.

Perkins promotes the integration of academic and vocational curricula and instruction, tech-prep, performance standards and measures, serving special populations, and teaching all students the skills they need. The STWO legislation focused on all students breaking down the tracking system with education not being the sole domain of schools. The STWO also requires integration of academic and vocational curricula, linkage between employer and schools, and a linkage between secondary and postsecondary schools.

Goals 2000 codified eight national goals for education that focus on elementary and secondary education. The intent of the law is to provide a framework for meeting national goals. It also provides a framework for future federal legislation on education.

In addition, the reauthorization of the Perkins law is currently being considered. It is expected that the reauthorization will be vastly different. It is still difficult to predict what the final version will be. Dr. Winifred Warnat, Director of Vocational-Technical Education, U.S. Department of Education suggests, "That it (Perkins reauthorization) will build on the foundations provided by Goals 2000 and STWO is already evident."

**The Future of Agricultural Education**

What do the shifts of job preparation to career preparation mean for all students? Do agricultural educators? I believe the following modifications in the educational system will occur.

There will be three kinds of educational integration. They will be integrated academic and vocational education, the integration of school work not as we know it today. It will evolve to become a system of educational experiences around career cluster/pathways for all students.

Agricultural educators will need to respond and be a part of these basic shifts in educational approaches if agriculture (defined broadly) is to become a career cluster/pathway.

**Integration of Academic and Vocational Education**

This is an important shift in educational philosophy. It means that all students are expected to pursue a career sometime in their lives and that educational systems should respond accordingly. It also means that all students will have a basic foundation skills highlighted in the SCANS report mentioned earlier in this article.

Current school programs and often isolated courses/subjects assume that students will be able to transfer their learning to real situations. For many students, this is an invalid assumption. By the same token, the educational system should not allow students to avoid achieving high academic standards. By working together with other educational disciplines, using contextual teaching/learning techniques, basic skills can be achieved. Research has shown learning to be more meaningful and relevant. In additional, all students and teachers tend to perform at a higher level.

Agricultural educators have experiences which will help them to be a viable partner in this evolutionary process. Agricultural education programs offer a variety of teaching practices that lend themselves to a variety of student learning experiences. If the world is a well-known characteristic of agricultural education programs. Agricultural educators can help other teachers understand these techniques in an integrated instructional environment. Traditional/solated teaching roles will change. Teachers have to learn how to effectively share time and resources with other teachers in the school system while maintaining an identity in technological agriculture or related fields. Teacher educators will need to learn methods of sharing time and expertise across educational discipline in preparing and servicing not only agricultural teachers but all teachers. State supervisors will need to work across discipline to establish meaningful state educational standards.

**Integration of School and Work**

Agricultural Educators have experience integrating school-based learning with workplace learning and know that it is an effective educational strategy. The interaction between the teacher, student, parents, and the students' work experiences on the job with the classroom instruction. This interaction provides the context for relevant educational opportunities. Problem solving, communications, data analysis, and thinking skills are examples of skills that are developed in the work environment. A vision of all teachers sharing in this context is a powerful educational strat-
egy and again will add to higher student achievement and motivated teaching.

Another strength of the traditional agricultural education program is the involvement of employers and business representatives in instructional program design and evaluation. Traditionally, they have also been partners in the education and training of students. These are required components of a STWO system. With the STWO concepts traditionally being a part of agricultural education programs, educational programs must be involved in the design of STWO programs. Little modification to supervised occupational programs could represent the essential part of school-to-work philosophy and methodology.

Traditional roles for agricultural educators will be helpful in making the STWO system a reality. Teachers need to be working with local planners while state supervisors and teacher educators need to be working at the state level to see that agricultural education will be included in state plans. If agricultural educators are not involved at the local and state levels in the STWO system design, agriculture may be left out entirely.

School-to-School Integration

A postsecondary educational experience is a must for an advancing technological society. Technological changes demand life-long educational experiences. Effective tech prep programs have developed across the country. Real linkages between secondary schools, community colleges, and four-year universities are being developed and are part of the vision for the career cluster/pathways concept.

Again, agricultural educators can make a positive contribution. Technical agriculture such as biotechnicians, machinery technicians, animal technologists, and many others are needed by the industry. The educators need to work with school-to-school integration and should be a part of the career cluster/pathway system. State and local agricultural education educators need to give recognition to this trend and exploit it for the benefit of students.

Agricultural Education Student Organizations

Traditional programs for organizations for agricultural education have included the National FFA Organization (FFA), National Postsecondary Agricultural Student Organization (PAS), and the National Young Farmer Educational Association (NYFEA). Students organizations are integral to the instructional program. As the instructional programs change, so will the student organizations. For example, as these integration programs are implemented, student organizations will need to integrate their programs for a "seamless" system of recognition and certification. More specifically, why not use the competitive events as a part of certification of student competencies needed in the agricultural career cluster/pathway? This would help the students in their job seeking/career building activities.

Conclusions

It is safe to say that basic educational shifts are occurring and adjustments in educational programming are inevitable. It appears that integration of school-based and work-based learning and integration of academic and vocational instruction are happening now.

Connecting secondary and postsecondary schools for easier and quicker transition of students into the work force is also part of educational reform. These changes will help students understand basic skills and acquire work competencies which will enable the students to accept the application hurdle that exists between knowing and doing.

Rapid technological changes require our nation to have a seamless educational system so that all persons can have access to postsecondary educational experiences as a part of their initial educational experience as well as any time during their lifetime of career pursuits. Agricultural educators believe in this philosophy. Agricultural education programming has been pragmatic and realistic since its inception. The programs are community based and provide the opportunity for students to apply their learning in real enterprises and/or on the job.

The biggest fear for many agricultural educators is loss of identity and the assumed—traditional identities are at risk. Remember the new tools—new roles phrase used earlier in this article. Agriculture and food systems are changing. Agricultural educators must assess and find the new niches that have value for students and society or agricultural education will not survive.

Our future depends on us. If we choose to stand by and watch our students play to their conclusions, we will have not done our job. We must network with others to magnify our efforts. Agricultural education programs have worked well for many years and have helped many students. However, this is a new day for both agricultural education and agriculture. Armed with proven educational practices, we must be part of the team that strives to develop the new context for local and national development. If successful, the students will benefit, the industry of agriculture will benefit, and the education in and about agriculture will improve.

References


FEATURE ARTICLE

A Past Look at the Future

Forty years ago a young couple packed their car and headed off to the golden state of California. He became an engineer in the aerospace industry. They worked hard to build the "American Dream." They purchased a home, started a family and eventually had a girl and a boy. And they wanted the very best for their children.

The little girl was given lessons - piano, ballet, art, ballet, dancing, organ, clarinet and more. She was told to study hard, get good grades so that she could graduate from high school and then go on to the college of her parents' choice. And she did. The college she chose was the farthest University of California campus from her parents. And her parents were pleased knowing that her daughter would graduate from college with her Mrs. and all would be well in the world.

However, the little girl, now a young woman, began to question the relevancy of her college curriculum. All her professors disagreed. She was given a bachelor's degree in order to go on to graduate school; no mention was made of prepare her for a career. Luckily, she met a professor that had promised his program would make her curriculum relevant, meaningful and employable. And he did and she was.

Meanwhile the little boy was taught wood-working, metal working, electronics, plumbing, welding and more. He was also told to study hard and get good grades so that he could graduate from high school and then go on to the college of his parent's choice. But the little boy began to question the relevance of school to his interests and rebelled. He didn't graduate from high school and for the next 10 years worked successfully jobs.

Eventually, the little boy, now a young man, enrolled in a community college at age 30, earned an associate degree, and became successfully self-employed in the electronics industry.

This is a true story that began in the 1960's, but it is still being played out in cities throughout the United States today. Our country, our economy, our children can no longer depend on luck in selecting a college curriculum or take 12 years to graduate from a post-secondary institution.

The recommendations for a successful transition between school and work have been a part of agricultural education for decades—school-based instruction, work-based instruction and leadership development. It is the increasing technological demands of the workplace which require employees to have a higher degree of education. Approximately 85% of all jobs require a postsecondary diploma, certificate or degree. This is agricultural education's challenge as the year 2000 approaches—successfully transitioning students between secondary and postsecondary institutions.

In 1993-94 approximately 34,000 students were enrolled in agriculture classes in California's community college system. Following are facts about this system:

• The average age of community college students is 29.
• Only 10% of community college agriculture students took institutional courses.
• Many community college agriculture courses do not transfer to four-year institutions and those that do transfer are articulated independently by each of the 60 community colleges with each of the 8 universities offering agriculture programs.
• In 1990, the net transfer rate was from the four-year institutions to the community college.

There are several federally-funded initiatives designed to assist local and state educational agencies in developing articulated programs: Perkins VETA (especially related to the development of a co-ordinated, coherent sequencing of courses), Tech-Prep Education and, just recently, the School-to-Work Opportunities Act and Goals 2000. In general, it appears that since agricultural education is a small instructional program, these funds are being channeled to other technical instructional programs. Agricultural education will need to work together, without extra funding, so our students can transition between secondary and postsecondary education.

The objective of the School-to-Work Opportunities Act is to create real connections between schooling and work that empower young people and give them choices for their future. The key components of the act are the integration of work within the traditional school-based learning, integration of academic and occupational learning, building of effective linkages between secondary and postsecondary education, and providing all students with equal access.

(Continued on page 24)
Agricultural Education in the United States: National Trends in Number of Positions and Openings

Since 1965, researchers from the National 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. For members who are interested in obtaining a copy of the full study, contact Dr. Camp at 288 Litton-Reaves Hall, Virginia Tech, Blacksburg, VA 24061.0343.

This article will be the first in a regular series of reports to the profession about the supply and demand for teachers on Agricultural Education programs in the US. This article will provide (1) a brief overview of the annual study, and (2) national data on the long-term trends for most of the teacher-related programs, newly qualified teachers, and their placement rates. Future articles will not include the introductory materials and references included here.

Why a Supply and Demand Study?

A very real problem faced the profession of agricultural education in the mid-1960s — i.e., how to recruit enough people into teaching to fill the need of the profession for replacement teachers. There was an on-going "agriculture teacher shortage" that had become a constant problem for agricultural education. Then, between 1976 and 1988, student enrollment in public school agricultural education declined from 697,000 to 222,000 (Scanolan, Yoder, Hoover, & Johnson, 1989). That student decline produced a small decline in the number of teachers in the profession, from 12,844 in 1978 to 11,204 in 1987 (Camp & Hively, 1988). During the same general time frame, the number of newly qualified potential teachers of agriculture fell from 1,749 in 1977 to 636 in 1988.

During the 1980s, with the recession came budget cuts in most state legislatures. The result of widespread budget problems was that many of the Agricultural Education teacher vacancies that did occur were not being filled. That meant a decreasing number of teaching positions. Thus, even with fewer new potential teachers available, not only did the placement rate for new teachers in the early years of the decade decline, but the shortage of the 1960s and 1970s became a small surplus of potential agriculture teachers in the mid-1980s. Regardless of whether there is a surplus or shortage of teachers, it is important that data be available regarding the numbers and preparation of teachers in agricultural education.

Today another potential major problem may loom on the horizon. Dykman (1993), writing heavily from earlier work by Lynch (1981), asked the question, "who will teach the teachers" for vocational education. The Lynch study pointed out that the numbers of vocational teacher education programs has been steadily declining in recent years. At the same time, federal policies have begun to place greater emphasis on vocational education as a critical component of the public educational system. If the future holds more vocational education (Dykman, 1993), including a revitalized Agricultural Education (National Research Council, 1998), more teachers will be needed, not fewer. Yet teacher education programs seem to be on the decline in vocational education in general. Does the same contradiction hold true in Agricultural Education?

The problem addressed by this ongoing study is twofold. Leaders in the profession need current, accurate estimates of the numbers of and demand for teachers of Agricultural Education to provide for meaningful policy decisions at all levels. Teachers organizations and teacher educators need current, accurate supply and demand information to use in recruitment activities and in counseling potential teachers of Agricultural Education.

Data Collection

This study is an annual population census. The data come from two sources:

- Supply Data — e.g., teacher education programs, graduates, and placements. The head teacher educator is surveyed at each institution of higher education in the United States with a program for the specific preparation of teachers of agriculture.

- Demand Data — e.g., numbers of teachers, numbers of replacements hired, sources of replacements hired, types of schools, kinds of

programs. The person in charge of Agricultural Education at each state department of education is surveyed. In several states, the state department official does not have access to the data needed or for some other reason does not respond to the survey. In those states the survey is mailed to the head teacher educator at a teacher education institution.

Numbers of Agricultural Education Teachers

There is good news to report, as you will see when you examine the table included with this article. Nationwide, the number of teachers of Agricultural Education (including junior high, middle, and high schools) rose to 10,119, an increase of 9 teachers from school year 1991-92.

Trends in the supply of secondary teachers of Agricultural Education in 1964-65 and since 1978

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of teachers</th>
<th>Teachers needed but not available</th>
<th>Number newly qualified</th>
<th>Percent of newly qualified entering teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>10,378</td>
<td>120</td>
<td>1,038</td>
<td>64.6</td>
</tr>
<tr>
<td>1977</td>
<td>12,694</td>
<td>221</td>
<td>1,749</td>
<td>60.8</td>
</tr>
<tr>
<td>1978</td>
<td>12,844</td>
<td>189</td>
<td>1,791</td>
<td>56.7</td>
</tr>
<tr>
<td>1979</td>
<td>12,772</td>
<td>144</td>
<td>1,656</td>
<td>54.9</td>
</tr>
<tr>
<td>1980</td>
<td>12,510</td>
<td>117</td>
<td>1,564</td>
<td>50.6</td>
</tr>
<tr>
<td>1981</td>
<td>12,450</td>
<td>98</td>
<td>1,468</td>
<td>52.2</td>
</tr>
<tr>
<td>1982</td>
<td>12,474</td>
<td>35</td>
<td>1,368</td>
<td>51.3</td>
</tr>
<tr>
<td>1983</td>
<td>12,099</td>
<td>42</td>
<td>1,277</td>
<td>45.6</td>
</tr>
<tr>
<td>1984</td>
<td>11,960</td>
<td>19</td>
<td>1,249</td>
<td>43.2</td>
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<tr>
<td>1985</td>
<td>11,687</td>
<td>8</td>
<td>1,207</td>
<td>40.8</td>
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<td>1986</td>
<td>11,582</td>
<td>20</td>
<td>964</td>
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<tr>
<td>1987</td>
<td>11,204</td>
<td>14</td>
<td>952</td>
<td>41.6</td>
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<td>1988</td>
<td>11,072</td>
<td>39</td>
<td>838</td>
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<td>25</td>
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<td>9</td>
<td>638</td>
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<tr>
<td>1993</td>
<td>10,119</td>
<td>20</td>
<td>656</td>
<td>54.2</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.

b The number actually reported in the 1992 study was 9,981. That total did not include 129 Florida teachers who were incorrectly reported as post-secondary. The total would have been 10,110 if that error in reporting had not occurred.

Although the increase in the number of teachers is very small, it represents the first increase in the total since 1978, when the number reached its historical high of 12,844. The increase in 1993 reversed an unbroken pattern of decline from 1978 to 1992 and indicates that the national decline in numbers of teachers may have "bottomed out." The 1994 data will be available soon and will be reported as soon as possible.

(Continued on page 24)
Barry, P. J., Ellinger, P. N., Hopkins, J. A. and Baker, C. B.

Reviewed by David Daniel
Mr. Daniel is a former agriculture instructor at Melba high school and is now in private business in Melba, ID.

Business management is the most important subject in the secondary agricultural education curriculum. I have never known a farmer to go out of business because he couldn't weld, was a poor irrigator, or an inferior cattle judge. The majority of farmers who have been forced out of agriculture ended up in that position because of poor financial decisions.

Financial Management in Agriculture is one of the most comprehensive texts that I have used or reviewed. It appears to contain all of the essential concepts that are necessary to develop a working knowledge of agricultural business management. The text is arranged in a very logical sequential manner.

I applaud the authors for integrating information from the Farm Financial Standards Task Force and emphasizing the use of generally accepted accounting principles (GAAP). The information in the text seems to be very current.

Important terms are found easily because they are in bold type with the definition following in italics. There are several helpful examples and some sample problems. Each chapter has a good summary and a list of topics for discussion that would be very useful for class deliberation.

As a former teacher, I would like to see more sample problems to allow for more student practice. Also, there could have been more information on how to integrate computer usage into successful management. Financial Management in Agriculture is a very complete text and would probably be extremely useful in an advanced high school agricultural management class and post-secondary or adult classes. I definitely would recommend it as a resource text for anyone teaching agricultural business management.

A PAST LOOK

(Continued from page 21)

Goals 2000: The Educate America Act created national education goals, a National Education Goals Panel, a National Education and Standards and Improvement Council, and a National Skill Standards Board. Of these, the concept of national skill standards could have the most direct impact on agricultural education. The National Skill Standards Project in Agricultural Biotechnology identified technical, related academic and employability skills necessary to be successfully employed in the field of biotechnology. Doesn't this sound as familiar as the classroom, work experience and leadership agricultural education triangle?

The solid education foundation found in the above-mentioned federal legislation can be effectively implemented only with a three-way partnership between high schools, community colleges and industry. An instructional program which integrates skill-based curriculum, work-based experience and leadership development in a coordinated, articulated system of secondary and postsecondary education is our future. The elements of successful implementation are already present—state and national curriculum frameworks; local industry advisory committees; national student organizations; and, most importantly, dedicated, caring instructors.

Do we let our nation's children continue to walk in and out of our classroom with minimal thought for their career future or do we work together as a secondary and postsecondary educational system to ensure their success? We have the tools, let's use them.

SUPPLY & DEMAND

(Continued from page 23)

Look for This
The next article in this series will provide details by state and by region on the numbers of teachers and demand for new teachers for school year 1993-94.

References