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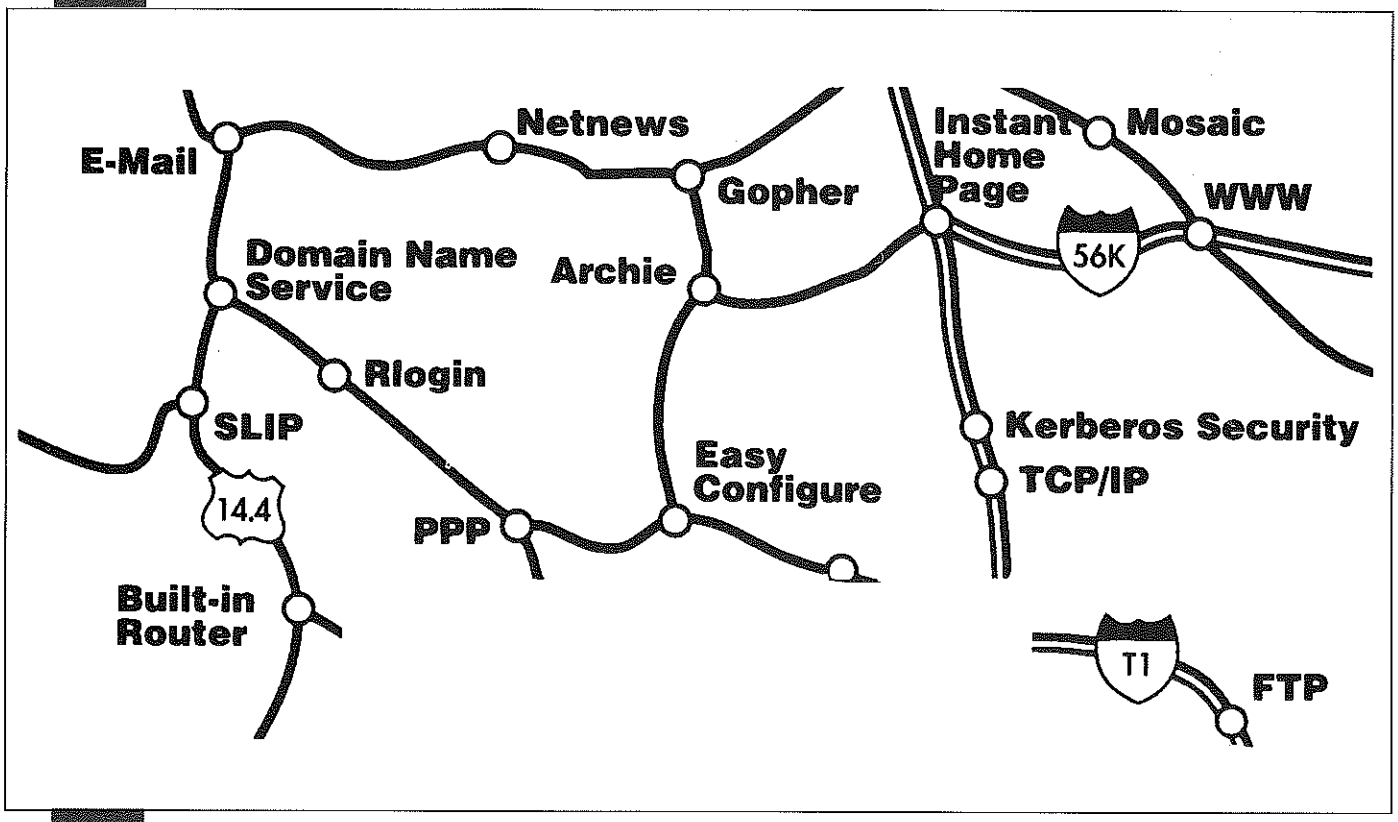

The information highway

Agricultural Education's map to the world and the future!

THE
AGRICULTURAL EDUCATION
MAGAZINE

May, 1995 Volume 67 Number 11

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ARTICLE SUBMISSION

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

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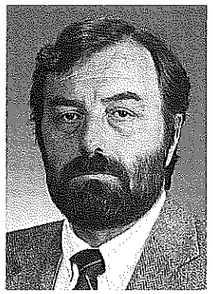
DOS Will Take Care of All Our Needs!



BY LOU E. RIESENBERG

Dr. Riesenberg is professor and head of agricultural and extension education at the University of Idaho, Moscow.

Some years ago, when the Windows environment was first being bundled with some of the new 386 computers, we decided to remove Windows from our newly purchased computer. With hindsight one would surely have to ask why. Because at that time we had 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 that have marched through our offices and lives. In the early 1980's our first computer was an Apple Plus. We remember having the shift key hard-wired so we would not have to double clutch to move between lower and upper case. When compared to the typewriter we had been using, the Apple computer was quite a unique machine. It was almost as impressive as moving from a buzz 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 an XT with a hard drive must have been comparable to one's wildest dreams. However, that was not the pinnacle yet. To move to a 286 with the increase of the hard drive capacity from 20 to 40 mb and DOS 3.1 was like upgrading from threshing 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 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 we did 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 to 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!

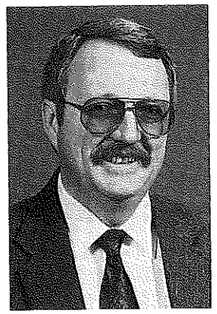
The editor spent quite some time reviewing the articles for this issue, because he would always be side-tracked into taking the authors' suggestions to travel the information highway. He traveled all over the US and even went international to Europe, Australia, Germany and Romania. The directions given by the authors were actually quite clear. However, we have not yet traded 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 conscious, 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* 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 made the mistake and apologizes to all concerned for any anxiety, consternation or embarrassment the mishap may have caused. In addition, a correction will also be noted in the Volume Indices of Authors and Subjects.

The Information SUPERHIGHWAY



BY MICHAEL K. SWAN

Dr. Swan is an assistant professor and head of agricultural and extension education at North Dakota State University, Fargo.

An ambitious distance learning program linking the United States and the world is working 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—INTERNET. When you hit the information superhighway with your network, a world of opportunity is within 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 Schoolhouse allow students around the world to work on collaborative projects that address issues like global warming and human rights. Everyday across the nation, teachers connect to the Internet through university accounts, public school networks, and private carriers and let their school system 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 MecklerWed at http://www.mecklerwed.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 some of the terms used on the highway. It also gives you an idea of how to use the technologies in everyday life. The classroom applications section gives you a number of concepts and, as put by the authors, "the superhighway incorporation will spawn numerous opportunities."

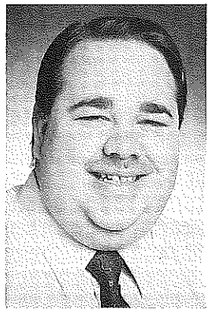
"Getting Information from Webs and Gophers" identifies the potential for using the Internet in educational settings. It also identifies sources of information which are limitless and accessible in a matter of minutes. You will be amazed at the resources available to make you and your programs stronger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

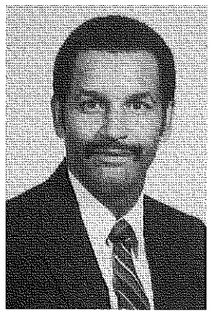
If you are a "Model T on the Superhighway" and want to know what is out on the highway and how to get hooked up, the authors of this momth's articles give you some suggestions on how and why. They have tried to identify what the Superhighway is and why you and your students should be in the main road to the world. The Superhighway is large, and understanding it is somewhat simple 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 those who are willing to give it a try. World Wide 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 to others via the Web. Why not link with students and classes from other countries and exchange information without having to deal with the diatonic and time?

Remember, the next group of students you have in your courses may indeed be from an era called "Cyberbabies." It's time for a technological reality check on the information superhighway. ■

Getting a License to Drive on the Information Superhighway





BY K. DALE LAYFIELD AND BLANNIE E. BOWEN

Mr. Layfield is a graduate assistant and Dr. Bowen is the C. Lee Rumberger & Family professor of agriculture in agricultural and extension education at The Pennsylvania State University, University Park.

The emergence of personal computers in the 1980s led to three predictions about the US becoming immersed in a high tech revolution. First, computer technologies would interact so effectively with students that high quality learning would occur. Second, futurists predicted the birth of classrooms without walls. Third, computers would virtually replace teachers and parents in the educational process. A decade later, some aspects of the first two predictions are bearing fruit but few individuals now predict less teacher and parent interaction. Why?

Within the last two to three years, major computer hardware and software manufacturers have targeted home users and small businesses. Already, increasing numbers of parents are using computers. By 1997, more than half of US homes will have computers and by the year 2000, almost 25 percent will have computer networking capabilities (Maney, 1995). Also, parents are increasingly using the information superhighway for business and education. Not surprising, their curious children are requesting entertainment and instructional applications. This unprecedented demand calls for more educators to begin using the superhighway.

Fortunately, many secondary agricultural education teachers already have computers and the software to access the superhighway. With few additional costs, teachers can use the superhighway to recapture some of the parental involvement that characterized secondary programs prior to the 1970s. Also, by using media associated with the superhighway, teachers can help students drive the superhighway to acquire employability skills. However, creativity is required to teach via the superhighway. For starters, the superhighway has a unique vocabulary and lots of jargon. However, a limited number of terms are required to earn a learner's permit:

- **Compressed Video -** A comparatively low cost digitized system that provides live two-way visual and auditory communication. One example is AT&T's Picturephone.
- **E-mail (Electronic mail) -** Messages composed on one computer can be sent automatically to another computer or several computers simultaneously.
- **Gopher -** Developed at the University of Minnesota (Golden Gophers), this menu-driven program allows users to search through the Internet without passwords and addresses.
- **Internet -** A public access network that allows worldwide communication between users. A computer and modem are the primary items needed to use the Internet.
- **LISTSERV -** Programs that manage mailing lists by sending messages automatically to everyone on a list.

School-to-Work Applications

With increasing interest in School-to-Work programs, agricultural educators should consider the superhighway's computer-conferencing applications. Also, a key feature of most School-to-Work programs is teacher-employer collaborations. Much of the correspondence that results from such collaborations can be handled by e-mail. For example, recommendations about curriculum, program plans, student placement sites, daily logs, and evaluations can be handled with this superhighway feature.

Also, legislation associated with programs such as School-to-Work requires annual updates of policies and procedures. Yet, using surface mail to deliver such updates is expensive and inefficient. An alternative is the Administrative Lines that uses the Internet to communicate information from state and federal departments of education. Many states also use this medium to link public schools and state offices. Also, the Legi-Slate Gopher Service provides access to timely, comprehensive Congressional and regulatory information. Some on-line Legi-Slate services are free but others require a fee (AskERIC: Legi-Slate, 1995). →

Students can collect at their agriscience laboratory to share with students thousands of miles away. Using remote sensors, data can also be retrieved and catalogued for future studies. (Photo courtesy of Penn State Agricultural Information Services.)

Once teachers overcome technophobia, the computer can become an alternative teaching tool, allowing a wealth of information into the agriscience program. Using vehicles such as Gopher and LISTSERVS 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 server found in AskERIC: VocServe. This vocational education 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 (VocServe, 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 agriscience courses can drastically increase enrollment. For example, if universities would permit students to enroll in high school courses such as animal science, food science, 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 informal distance education. However, formal distance education is a reality in many secondary schools and is feasible for numerous others. Increasingly, media such as interactive video, computer-based communications, and audio-graphics conferencing are enabling small schools with limited funding and resources to diversify their course offerings and better use talented instructors. To date, this option is usually limited by non-monetary factors. Swan and Brehmer (1992) identified "technophobia" as one of the primary obstacles to the adoption of interactive video networks in agricultural education.

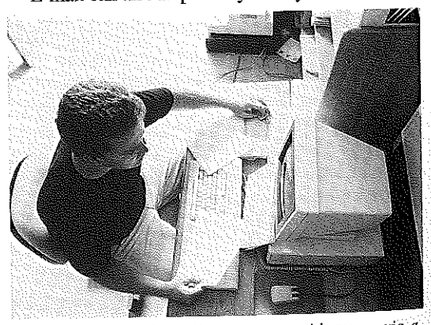
Classroom Applications

Many teachers mistakenly limit information technologies to agriscience. However, opportunities on the superhighway fit all categories of agricultural education, the same as in other vocational fields. For example, employee training programs in the automobile, petroleum, and health industries use many facets of the superhighway. Also, Ford Motor Company uses computers that double as TV monitors when on-site engineer training is provided. This medium is readily available at the employee's desk, providing near duplication of classroom interactivity using real-time voice and data exchanges (Klinck, Nov./Dec., 1993).

Classroom uses of the Internet are nearly endless as on-line costs are decreasing. What is available through this medium? LISTSERV enables students to have dialogue through groups such as K12Pals. This medium allows a group of students to discuss a topic of interest and all messages are delivered simultaneously to all subscribers. LISTSERV targets elementary and secondary students who are seeking penpals. It is sponsored by the AskERIC Project and is open to students or teachers involved in K-12 education. Participants can include individual or classroom penpals. To subscribe to **K12Pals**, send the following e-mail message to: **listserv@suvm.syr.edu**; Subject: **LISTSERV** (ignores this); Subscribe **K12Pals (our name; for example: Subscribe K12Pals Tad Martin)** (AskERIC: K-12 Educators, 1995). Groups such as **K12Pals** are found in most interest areas.

A similar medium includes another form of e-mail. Again, the opportunities for learning are endless. For example, a student in Florida might discuss with a student in Colorado the research findings from her school's land lab. The student in Colorado would respond with findings from his school's laboratory. Another e-mail example resulted in higher morale and increased reading and writing skills for fifth graders. At the University of Northern Iowa, college students in Rick Traw's (1994) Teaching of Reading Language Arts course used e-mail to discuss literary themes and additional activities with fifth graders. The college students also gave positive feedback by e-mail. Improved morale and increased skills resulted for the fifth graders.

E-mail can also impact day-to-day classroom →



Earning a superhighway license begins with access via a computer and modem. (Photo courtesy of Penn State Agricultural Information Services.)

In recent years, many progressive agriscience programs have used microcomputers for basic "computing". These programs are now discovering invaluable 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's 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 AgriCola, and other sources including Gopher, a menu-driven application that allows users (free to Internet users) to burrow the globe for information. Gopher is much like LISTSERV in that the user can locate information within any subject area.

Enhancing Linkages with Homes

To modernize the neglected "SOE visit", the superhighway can open teacher-parent communication that has been lost because of societal changes. E-mail can allow busy parents to interact with teachers about their children's activities. What if parents don't have computers? Voice Messaging Services allow interaction with no ownership of extra equipment. Two schools in Brooklyn, NY, use this method to allow teachers and parents to discuss topics ranging from homework to field trips. A simple stutter dial tone 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 Trades 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 "sound employment and international citizenship" (Bowen & Bowen, 1994).

Funding Considerations

Money is often cited as the major obstacle to the implementation of superhighway applications. This may be true in some situations, but teacher reluctance to obtain funds is a perhaps a larger obstacle. In many states, textbook 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 the needed funds. A second step involves the use of charisma and simply being available to spend end-of-the-year dollars. These opportunities usually arise in the summer when agriculture teachers and administrators are often alone at school. Also, several school districts offer foundation grants to purchase innovative educational equipment. Teachers who have this option can involve students in writing a grant application that will increase students' ownership of the superhighway.

Another source of funding includes parents. Most parents take strong interest in their children's learning as evident by the number of school/teacher support groups. Fundraising efforts are normal activities of such groups. Key groups to tap for support might include Parent-Teacher Associations, FFA Alumni chapters, and perhaps individual parents. Also, in many communities, industry and service organizations are major supporters that keep school projects afloat. A detailed plan identifying the major benefits of the superhighway might result in the needed financial support. Finally, during a local Kiwanis or Rotary club meeting, why not have the FFA president explain the impact of the superhighway on the local agricultural industry? Such a presentation might yield the funds that the school needs to access the superhighway.

Concluding Thoughts

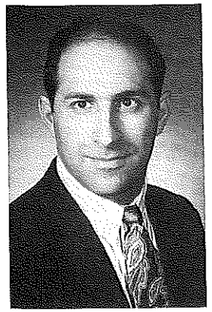
Incorporating the information superhighway into secondary agricultural education programs will spawn numerous opportunities. However, in most schools teachers must decide between purchasing another welder or a desktop computer with communications software. The choice is obvious for teachers who wish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

References

AskERIC service for K-12 educators. (1995, January). Syracuse, NY: Syracuse University, Center for Science & Technology, ERIC Clearinghouse on Information and Technology.

(Continued on page 17)

Adult Education Goes On-Line



BY BARBARA M. KIRBY AND MITCHELL B. OWEN

Dr. Kirby is an associate professor of agricultural and extension education and Dr. Owen is a specialist in extension technology services at North Carolina State University, Raleigh.

Communication among agricultural educators is vital to the success of the profession. It seems that change in agriculture technology, policy, and personnel practically occur 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-ail from Australia? If you have a vague idea as to what they are talking about or limited 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 update. 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 (Miller, 1994). Organized content delivered through educational media by a competent instructor who encourages students 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 (1994) 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 and peers.

Recognizing the need to enhance communications and technological skills among agricultural professions, the Cooperative Extension System in cooperation with AG*SAT offered E-Mail: A Step Beyond the Basics. From individual work stations across the country, participants refine their e-mail skills and position themselves as better communicators in future situations requiring e-mail responses.

An on-line class, *E-Mail: A Step Beyond the Basics*, was pilot-tested 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 the most significant new methods for enhancing organizational communication, both internally and externally. It attempts to build on the participant's basic knowledge of e-mail, 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.

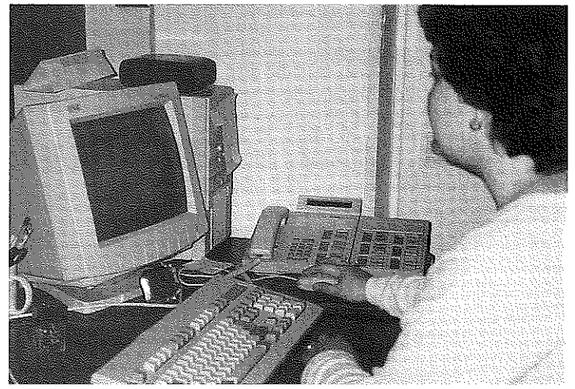
Formation of the Project

The project, conceptually developed at North Carolina State University, required collaboration 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 trainers. Within the next few months, six states and the USDA committed to the project by offering resources and technical expertise. With each state developing a fraction of the course materials, the course became a win-win situation for each of its co-contributors. As the course began to take hold, AG*SAT 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 tools 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.

Goals 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,→



E-mail is an important tool for communicating between professionals. (Photo courtesy of Barbara M. Kirby.)

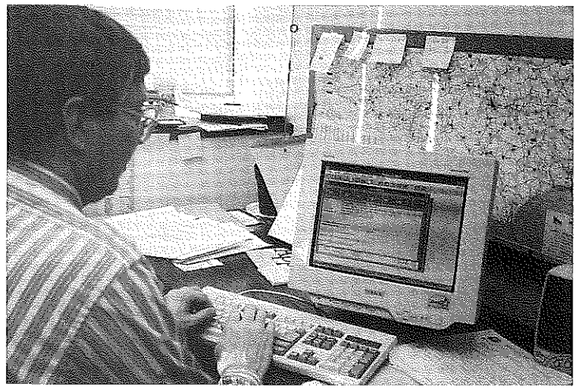
unsubscribe, and participate in forums, discussion groups, and other e-mail lists across Internet.

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 insure 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 teammates. Although rarely seen, this can often result in poorer student participation.



Agricultural and Extension professionals can access the Internet from their office or home as their schedules demand. (Photo courtesy of Barbara M. Kirby.)

• Immediate Feedback - Participation in formal educational methods have 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 instructors are given the choice 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 them to be self-directed, 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 huge challenges faced by the faculty:

• Coordination - Development and review of the course was 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 the size of 425 in a formal setting can be difficult enough, but adding the limitation of distance can result in chaos. Many traditional practices, such as grading homework can be overwhelming to instructors. One 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 see new approaches to solving the same questions. Some individual interaction is necessary, so instructors still have to provide individuals with feedback.

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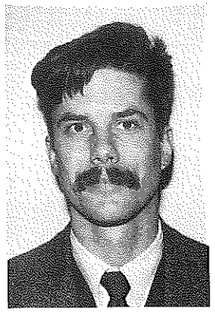
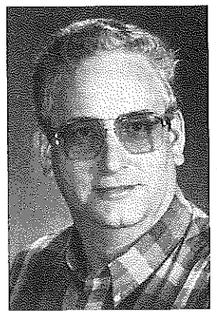
Clicking Open a World of Information





BY MATT R. RAVEN AND ED SETTLE

Dr. Raven is an assistant professor of agricultural education and experimental statistics at Mississippi State University and Mr. Settle is an agriscience instructor at Biggersville High School, Biggersville, MS.

An agriscience teacher gives students an assignment to develop a multimedia presentation on an equine related topic after teaching a unit on equine science. 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 a user friendly 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 the word to search for. Thirty seconds later, the search returns 167 "hits" of research papers dealing with horses. One of the papers is a profile of the horse industry in the United States, including statistics. The group decides that they need some pictures and graphics to accompany their report. Their next stop is a directory maintained by Texas A & M University. From the Texas A & M computer the students 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. Here, they find a large collection of old photos by famous photographers that depict the various uses of horses by society during the past century. The group also finds a sub-directory 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, pictures) 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 NO. This is the classroom of today. The technology described is currently available and being used by public schools across the country. Students ranging from kindergarten 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 tool created by the European Laboratory for Particle Physics also known as CERN. The WWW makes use of hypermedia. Hypermedia is specially coded text or media based documents that are linked to other documents. These links are highlighted and underlined allowing users to point and click to go to that document (Library of Congress, 1995). The WWW provides the first time user of the Internet an intuitive, graphical front-end that can be used without training.

The code of the WWW is an easy-to-use process called HyperText Markup Language (HTML). HTML defines text, graphics, and links that are independent of the computing platform that is being used. In order to access WWW over the Internet users must have a "browser" program on their computer. The browser program interprets the HTML code and formats it in a visually pleasing way.

There are currently over 30 browsers for DOS, Windows, OS/2, Macintosh, and UNIX platforms (Brody, 1994). One of the most well known browsers is Mosaic, developed by the National Center for Supercomputing Applications (NCSA). Mosaic, however, has competition from a new generation of browsers. The most significant competition is Netscape from Mosaic Communications, as it is better, bigger, stronger, and faster than all of the others (Kantrowitz, 1994; Brody, 1994). Netscape has a number of features designed to make it easier to navigate the WWW, most significantly its ability to download several documents or images at the same time, which dramatically reduces waiting time.

Home Pages on the WWW?

With the arrival of these user-friendly browsers and the easy-to-learn HTML language, the information available on the WWW is exploding. Each stop on the WWW opens with a "home page." These home pages are similar to a table of contents in a magazine or textbook with highlighted hyperlinks marking where users can move to other parts of that site or different sites all together. The user clicks on the hyperlinks with the mouse and moves to an image, document, or another site.

The ease of learning HTML has helped fuel the use of the WWW. Numerous sites across the Internet were developed and are maintained by users with basic skills. Universities and schools are responsible for a large number of sites that have been developed. Some excellent sites have been developed by elementary school students. As more and more home pages are developed, the breadth and depth of the topics is continually increasing. Home pages dealing with agricultural topics are becoming very common.

Agricultural Sites?

Cooperative extension systems across the country are taking advantage of the WWW to disseminate information. The USDA Cooperative Extension System as well as state cooperative extension systems from Alabama, Arizona, Florida, New York, Illinois, Iowa, Nebraska, North Carolina, Michigan, Ohio, Oregon, Pennsylvania, Indiana, Tennessee, and Texas have home pages on the WWW. The amounts and type of agricultural information these servers offer is diverse and plentiful. The North Carolina CooperativeExtension System offers full text versions of every bulletin they produce. The Texas Cooperative Extension System offers agricultural bulletins, pictures, clip art, and graphics on their home page.

Colleges of agriculture across the country are also developing home pages. Prospective students are able visit these home pages and obtain information about the majors offered, calendars of activities, scholarships, and deadlines. Students can also use the home pages to identify faculty that can be used as resources immediately or in the future. Additionally, there is an increasing number of hypermedia-based course materials and lessons that are being placed on colleges of agriculture home pages. For example, by August, 1995, the course materials and lessons from the technical writing in agriculture course at Mississippi State University can be accessed from the college of agriculture's home page. Any agriculture student in the world with access to a browser will be able to access this information without ever leaving their classroom.

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 biotechnology. The WWW allows agricultural students to obtain the most up-to-date information available.

The WWW provides teachers with another form of learning activity. Students can use the WWW to develop and disseminate multimedia-media projects rather than just using paper and pencil for assignments. The use of the WWW for student assignments and other applications, such as a home page for a program's FFA chapter provides another forum for public relations.

Requirements?

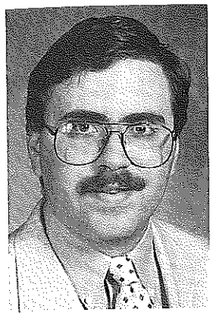
A personal computer, a gateway to the Internet, and a browser program are required to access the WWW. The most important requirement is a gateway to the Internet. There is an increasing number of elementary and secondary schools that are obtaining gateways to the Internet. If your school doesn't currently have one, find out what is being done to obtain an Internet gateway. The speed of your connection is also important. You need at least a 14.4 kbs modem utilizing PPP or SLIP protocols. The ideal connection is some type of hard-wired interface such as 10-Base-T. The computer will need a hard drive and at least 4 megabytes of RAM; however, the more RAM, the better. Macintosh users need system 7.0 or later. Windows users can use a 386 machine with 4 megs of RAM. However, a 486 (33MHz) with at least 8 megs of RAM or better is recommended. Netscape and NCSA Mosaic, the two most popular browsers, are free to educators. They can be obtained by ftp from Netcom (ftp.mcom.com) and the National Center for Supercomputing Applications (ftp.ncsa.uiuc.edu).

Summary

The World Wide Web and its graphical front-end helps make the Internet friendly for the typical user. The average computer user with a good machine, a browser program, and a gateway to the Internet can help students and themselves take advantage of the wealth of information that is currently available on the WWW. With a little effort and proper tools, teachers and students can start contributing to the information available by producing their own home pages. Imagine the advantages for students who can instantly access the largest libraries, universities, and other information sources all over the world. Picture the opportunity for finding and

(Continued on page 17)

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



BY KIRK A. SWORTZEL AND N.L. MCCASLIN

Mr. Swortzel is a graduate administrative associate and Dr. McCaslin is a professor of agricultural education at The Ohio State University, Columbus.

The use of educational technologies such as computers and telecommunications offer great potential for improving the delivery of high quality instructional programs (McCaslin and Torres, 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 are 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, text, sounds, and video images that circle the globe at the speed of light (Dyrli, 1993). This is all possible through merging computers, 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, CompuServe, 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 common standards to connect dissimilar software and hardware (Seguin and Seguin, 1995). The Internet is made up of various federal, regional, campus, and foreign networks full of information for everyone in the world to use (Fleck, 1994).

Some applications of the Internet are already being utilized 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 save time and money by getting information quickly and efficiently.

Although there is a large amount of information and data in other states and in 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 also have a computer address similar to that of your postal address where information can be sent.

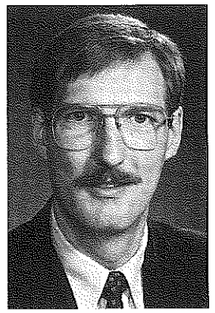
There are two major providers of this kind of information through the Internet. Through the use of Gopher and Word Wide Web (WWW) servers, teachers and students can access a wide variety of information to they can use in educational programming.

Gopher

Gopher is an interface that helps retrieve information on the Internet that also have gopher software (Seguin and Seguin, 1995). The gopher menu will allow you to find infor-

(Continued on page 15)

What To Do If You're a Model T on the Information Superhighway and You Want to be a Corvette



BY B. ALLEN TALBERT

Dr. Talbert is a visiting assistant professor of agricultural education at Purdue University, West Lafayette.

Do you have a Windows-based or Macintosh computer? Do you have a modem and telephone line or some other connection to the outside world? If so, then you should be utilizing the information superhighway in your agriculture classes. How do you get connected? In the August, 1994 issue of *The Agricultural Education Magazine,* Murphy (1994) and Fleck (1994) give methods for connecting to the highway. Why should you get connected? Your students can:

- communicate with students, scientists, agriculturists, and others around the world with little or no cost and within minutes, hours, or days depending on the system;
- discuss topics ranging from agriculture to politics to current events;
- access thousands of information databases and libraries worldwide;
- download and use documents, journals, books, and computer programs; and
- access wire-service news, sports, and weather reports (Gaffin, 1995).

By utilizing the information superhighway, your students can conduct activities that develop their problem-solving and critical thinking skills. They can explore the world without leaving your classroom. Now that you know some of the benefits, let's shift into first gear and start our journey!

What is the Information Superhighway?

The Information Superhighway, also called the Internet, began in the 1960s as a funded project of the US government to link computers together so that data transfer lines could survive a nuclear attack. It has developed over the past three decades into a collection of government, educational, military, and commercial computer networks. These are joined by high-speed fiber optic lines and other communication lines, called backbones, that connect cities across the United States and the world. Regional and local communication lines connect educational institutions, businesses, and even individual computers to a backbone. There is no one single computer controlling the Internet (Gaffin, 1995). The biggest advantage of this system is that if one part goes down, the other parts can continue unaffected. An analogy is to compare the highway system with the airport system. The Internet is like the highway system in that bad weather in one part of the country doesn't affect driveability in the rest of the country. If one part of the Internet goes down, transmissions can still get through by using other parts of the system. If there were one central computer controlling the Internet, it would be like the airport system with its hubs and spokes. If Atlanta, Chicago, or Dallas has bad weather, the rest of the country is affected because most flights go through these or other hubs. One disadvantage of the Internet is that each part of the system has its own sign system, speed limits, and rules of the road. Going from your system into a different one could be like going from a country that drives on the right-hand side of the road to one that drives on the left.

How big is the Internet? Gaffin (1995) estimates that there are now as many as 5,000 networks connecting 2 million computers and more than 15 million people around the world. Whether this is accurate or not, everyone agrees that the number of networks and users is ever increasing. Steady now as we increase speed and change into second gear!

What Can You do on the Internet?

Just as knowing the signs on a highway help you to reach your destination, knowing the terms used on the information superhighway will help you and your students. Gaffin (1995) gives this list:

- **FTP -** File-transfer protocol gives you access to hundreds of file libraries (everything from computer software to historical documents to song lyrics). FTP is the mechanism for transferring these files to your computer. Once on your computer, you can run the software or use the documents in your word processor.
- **Telnet -** This gives you access to databases, computerized library card catalogs, weather reports and other information services, as well as live, on-line games that let you compete with players from around the world. Telnet allows you to view the files and query the databases.
- **Gopher -** A software program that gives you easy access to dozens of on-line databases and services by making selections on a menu. You can use Gopher to Telnet to remote sites and FTP files back to your system. Gopher was developed at the University of Minnesota.
- **World Wide Web -** WWW was devel- →

oped 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 newer than Archie and is supposed to be easier to use.

• **E-mail -** 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 is no "phone tag!"

• **FAQs -** Frequently Asked Questions lists help keep the information network flowing smoothly. Someone has compiled a list of questions and answers 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 any system.

• **Mailing Lists/Listservers/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 daily news clippings related 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 varying 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 assist groups of 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. Usenets and newsgroups allow free-flowing dialogue on specific topics. Dialogue can be open and explicit on these, so make sure to screen them before allowing your students to join one.

How Can I Use This in my Classroom?

As we reach cruising speed and shift into overdrive, let's brainstorm some ways that these resources can be used in an agriculture classroom.

◆ As your students research agricultural topics have them 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 students conduct experiments over the Internet such as checking weather charts, commodities and stocks, agricultural statistics, news reports, and land photos.

I challenge you to reach the point where your students are using the Internet daily. The following three 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 set up to provide access to 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 CYFER-net/ES gopher server, then use your e-mail to contact almanac-admin@esusda.gov.

AskERIC is run by the Educational Resource and Information Center and provides a way for educators, librarians and others interested in K-12 education to get more information about educational topics. The center maintains an e-mail address (askeric@ericir.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 ericir.syr.edu. See Budke (1994) in the August, 1994 issue of The Agricultural Education Magazine for 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.msfc.nasa.gov or 128.158.13.250. When you connect, you'll be given an overview of the system and asked to register. The system maintains a large file library of GIF-format space graphics, but you can only view them through Telnet. If you want to obtain the images, you have to dial the system directly, at (205) 895-0028. However, many of the files can be obtained through FTP from ames.arc.nasa.gov (Drew, 1995).

The uses of the information superhighway are only limited by the imaginations and creativity of the teacher and students. Remember, 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 "Corvette" speed the question is where to go from here. Murphy (1994) gave an overview of 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, media specialist, or computer teacher to see if your school already has Internet access. Some states provide limited access to the Internet through toll-free telephone numbers. For example, Indiana has a system called Ideanet which contains an agricultural education bulletin board and allows teachers to access Gopher. You may also want to go to the newsstand and purchase one or more computer-related magazines. 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; so it is up to you to make sure they are given the learning opportunities to get on the highway!

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WEBS & GOPHERS

(Continued from page 12)

mation such as newspapers, weather, travel information, and library databases across the nation. By using Gopher, you are commanding the system to retrieve information on-file regarding a specific topic without having to request a specific Internet address. Gophers, like the US Department of Education's (USDE) gopher, can provide lesson plans that teachers can print out for their use. Legislation affecting education can also be accessed through the USDE gopher. For example, Goals 2000 and National Skill Standards are available through gopher. Information bulletins from cooperating extension systems are also available through Gopher. Additionally, it is possible to download software from a gopher to use in the classroom.

World Wide Web

World Wide Webs (WWW) are the newest development on the Internet. World Wide Webs bring a graphic user interface to worldwide networking—in other words, it allows full integration of full-color graphics, text of varying typefaces, animation, and even sound (Sequin and Sequin, 1995). You can access anything through WWW like you can through gopher. You can even do e-mail through WWW. To access World Wide Web, you must have web server or web browser software like NETSCAPE, MOSAIC, or DREAMNET.

In addition to printed information, you can also see pictures. For example, the Ohio Agricultural Education Curriculum Materials Service has its entire catalog on the Internet. By knowing the WWW address (URL:http://ad254-5.ag.ohiostate.edu/OCMS/OHIO_aged.html), you can scan the entire catalog right from your office. Pictures of some materials are provided.

While these new computer and telecommunication 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 fullest potential. Second, teachers and students must receive training 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 a matter of 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.

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Dispelling the Myths of Distance Education

BY DAWN DRAKE AND MARK ZIDON

Ms. Drake is an instructional program manager for the extended degree program in business administration and Dr. Zidon is an assistant professor of agricultural education at the University of Wisconsin-Platteville.

Tradition! In "Fiddler on the Roof," tradition explained much of the villagers' way of life. It can explain much of what we do as well. For most of us, it is in our creed to "hold to the best traditions." We even cling to traditions that may not be the best for us.

In education, one of our traditions is the method we use to present information. Most often, a teacher stands in front of seated students and imparts information in a lecture format. Occasionally, the teacher will break the format long enough to engage in a discussion with the students. This usually is a teacher-dominated discussion with short answer responses from the students. Obviously, this tradition is not used at all times by all teachers. A personal inventory, however, may tell you that it is used more than you may think.

Imagine attempting to break the typical classroom tradition of teaching. Suppose some of the students are in a classroom in another city or state. Perhaps you cannot physically shake the hand of the students as they enter the classroom. How would you react to having your students being taught by a professor at a university across the state? Would your reaction include the following? It's too new to expect me to accept right now! My area of instruction cannot be taught in this format! I would love to lecture to students in other locations, but it would have to be limited to a lecture format! My job will be taken away from me eventually if education is delivered this way! If these are your reactions to distance education, perhaps you may need to re-think the issue.

As technology becomes more affordable and available for use in the classroom, instructors may find that they are being expected to incorporate use of this technology into their curriculum design. Many times, this expectation or requirement comes without any type of orientation or training in how best to use new technology in the classroom. Due to this lack of knowledge and exposure; hesitation, anxiety, and animosities begin to form when talking about distance education. To protect oneself from being "thrown to the lions," defensive mechanisms begin to develop, to help build justifications of why a person cannot be involved with distance education. These justifications can be disseminated to a point where people believe them to be fact. Some anxiety can be eliminated if teachers understand the facts related to a few myths of distance education.

Myth 1: Distance education is a new phenomenon; there is no guarantee that students can learn in this format.

Fact: Distance education has been around for many decades in different formats. Countries all over the world are widely using distance education as a mode of delivery. A person's learning style actually has the most impact on how well one can learn in a distance format. Over the years, the rural nature of the high school agriculture program has made distance education a necessity. Agriculture teachers are not foreign to the idea of education being removed from the classroom. Taking the students to on-site locations is a common practice. For years, teachers have ventured to farms, homes, and places of employment to supervise students' educational experiences. The medium available for use today has expanded the capabilities for delivering distance education more rapidly and efficiently. Interactive video can essentially join the teacher to a remote classroom in both sound and sight. While agriculture teachers may be concerned with the level of the technology, they have an advantage of experience in taking education out of the classroom.

Myth 2: I have a type of course content that cannot be taught in a distance education format.

Fact: Given the appropriate attention to the particular delivery mode to use, every class can be done at a distance. The medical community is one of the largest users of distance education. The type of attention to detail that is necessary in that profession can be an example of how to make the best use of the technology. It is most important to not make one type of technology fit all situations. Compare it to how a person communicates. Sometimes it is best to talk face-to-face, other times memos or letters can suffice, phone messages, fax, and e-mail also have their place. Finding the best way to communicate brings several aspects, both positive and negative.

Can a laboratory skill such as adjusting a lawn mower carburetor be taught through a video camera to students in another location? What about grafting a bud to a branch, or artificially inseminating a cow? An obvious initial reaction might be, "You must be standing next to the teacher to learn such skills." On the other hand, teachers can be credited with being creative. Close-up lenses, selective camera angles, simulations, well-coordinated student activities and other creative methods may actually improve the quality of instruction. A technician at the remote location may also be adjusting →

a similar carburetor, grafting a bud, or simulating artificial insemination while instructor demonstrates the process. Small group discussion, under the guidance of a local supervisor, can also be useful and provide a variety of useful teaching methods. The creativity and careful planning needed to adapt content to a distance education format will likely result in improved lessons.

Myth 3: To teach in a distance education format, all I have to do is lecture; I don't need to worry about changing my delivery from a face-to-face situation.

Fact: It is imperative that a person be extremely organized in a distance learning format. Planning for technology and being aware of mannerisms which may be very distracting at a distance need to be diligently considered. Even in a contained classroom, "talking heads" do little more than replace textbooks. Good agriculture teachers have long recognized the need for demonstrations and hands-on activities. Creatively packaging demonstrations in a visual medium, whether live or recorded, may be required. Supervision may be required at the remote location.

Attention to details that might normally be handled spontaneously need to be considered. The end result of a carefully planned lesson might have a university professor at one location demonstrating the use of ultrasound to pregnancy check cows, while a technician or local agriculture teacher assists students in a simulation activity at another location. The entire activity would need considerable preparation.

Myth 4: Distance education opportunities will eliminate my job as an in-class instructor.

Fact: The type of access that distance education allows actually encourages growth in the field of teaching. Rather than having small classes at a number of locations, one person can teach many people this course. This will allow other teachers time to develop more classes. This not only gives instructors opportunities to pursue their specific areas of interest but opens up more possibilities for students to be involved within their given situations. On the other hand, it is important that student/teacher ratios not become out of hand. Thorough evaluation and opportunity for interaction must still remain high priorities to the profession. The need for this interaction will prevent one professional from teaching multitudes of students.

The variety of topics in agriculture generally requires that teachers have a little knowledge in a many areas. The result is that there are areas of which the teacher has only minimal knowledge. Distance education would allow the mechanics gurus to extend their expertise to other schools. The agriculture teacher who is nearly a veterinarian could teach animal health beyond the local classroom. The trade-off is that the mechanic would teach agricultural mechanics to the veterinarian's students while receiving animal health lessons from the other teacher. Neither suffers from job insecurity. The result would be more interaction between educational institutions, improved teacher knowledge through specialization, and improved lessons. It is not likely to result in good teachers losing their jobs.

Tradition has kept many teachers lecturing in front of seated students. Perhaps technology can break tradition. The old dirt roads from "Fiddler on the Roof" have evolved to the modern day information super highway. Fiber optics have replaced the cobblestone. Technology continues to provide more means to reach out beyond the classroom. Electronic mail, fax, and interactive video are improving distance education possibilities. We ought not cling to myths that keep us confined to one location. Instead, we need to think creatively and consider possibilities that can improve the quality of education for our students. ■

LICENSE TO DRIVE

(Continued from page 7)

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CLICKING OPEN

(Continued from page 11)

developing links between agricultural education programs in other states without worrying about time and distance. Isn't it time you and your students joined the other 20 million people using the World Wide Web?

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The Future of Agricultural Education (from a Federal Perspective)

BY LARRY CASE

Dr.Case is coordinator of agricultural and rural education at the U.S. Department of Education in Washington, D.C.

Predicting the future is always a challenge; however, it is also good exercise. When we take time to ponder the future, we begin to plan what needs to be done today. By allowing the future to dictate what we do today, we will be in a better position to "invent" the future we want rather than accepting things as they happen.

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 we are experiencing in agriculture, 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 rules. 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 and these new tools change the rules.

Agricultural Issues and Trends

A short list of agricultural issues includes international trade, adoption of technology (especially biotechnology), identity/image, animal welfare, environmental, declining subsidies, consumer concern for food safety, etc. A few agricultural trends include the following: vertical integration of production with processing and distribution, shrinking number of farms producing larger portions of the total production, increased farm size, decline in the number of midsize farm operations, increased rural population, increased number of small farms, precision farming, declining economic base for rural communities, and many more.

This kind of information should be considered in developing modern Agricultural Education curriculum. I predict that we will continue this practice so that the teaching materials will reflect modern agriculture. In the future, however, agricultural educators will use new technological tools which will change the rules for the instructional process. For example, it is now technologically possible to use more live data and information for classroom instruction or individual exercises. The potential for using live video, two-way interaction with people on the job any place in the world for class instruction, computer simulations of virtual reality for learning, and more is all currently technologically possible. In the future, only the imagination can fathom what will be possible. We might even have a "Star Trek, Star Ship Enterprise Holodeck" in our schools where computer simulations would be truly lifelike. The possibilities are endless!

Educational Trends/Reform

Educational trends/reform influence the school environment in which agricultural education programs must operate. From the national level, educational reforms are coming through legislative actions. The federal government has long been interested in workforce preparedness. Much of the federal legislation on education is motivated by the need to keep the a 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 this way, "Driven by an expanding global economy that is challenging U.S. competitiveness and the shortages of an adequately-skilled and flexible work force responsive to advancing technology, work force preparedness is a national priority . . . ."

It is important for agricultural educators to understand federal actions and directions in order to decide future adjustments. Many nationally-recognized reports have helped to shape national thinking on education and federal laws have been passed to form the educational-reform agenda. Following is a brief overview of federal activities.

Educational Reports

Educational reform received national attention with the release of the 1983 report entitled, *A Nation at Risk*, which focused on the need to change elementary and secondary education. Many national reports have been written since 1983 which have helped to shape the agenda for educational reform activities. An example is the report entitled, *America's Choice, High Skills or Low Wages.* Another report which has helped define educational expectations is the 1991 report entitled, *What Work Requires of Schools.* It is known as the Secretary's Commission on Achieving Necessary Skill (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 thought 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 in today's work place. Congress 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: Educate America Act (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 aspects of the industry.

The STWO legislation focused on all students breaking down the tracking system with education not being the sole domain of schools. STWO also requires integration of academic and vocational curricula, linkage between employer and school, and 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 reauthorized Perkins will be vastly different. It is always 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 framework provided by Goals 2000 and STWO is already evident."

The Future of Agricultural Education

What do the shifts of job preparation to career preparation for all students mean for agricultural educators? I believe the following modifications in the educational system will occur. There will be three kinds of educational integration. They will include integrated academic and vocational education, the integration of school will not exist 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* need to have the basic foundation skills highlighted in the SCANS report mentioned earlier in this article.

Current school operations of individual 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/applied learning techniques, basic skills can be taught more effectively. 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 styles. Problem solving in a real world application is a well-known characteristic of agricultural education programs. Agricultural educators can help other teachers understand these techniques in an integrated instructional environment.

Traditional/isolated teaching roles will change. Teachers will have to learn how to effectively share time and resources with other teachers in the school system while maintaining an identity in technical agriculture or related fields. Teacher educators will need to learn methods of sharing time and expertise across educational disciplines in preparing and inservicing not only agricultural teachers but all teachers. State supervisors will need to work across disciplines to establish meaningful state educational standards.

Integration of School and Work

Agricultural Educators have experience integrating school-based learning with work-based learning and know that it is an effective educational strategy. The interaction between the teacher, student, parent, and the work site link experiences on the job with the classroom instruction. This interaction provides the context for relevant group and individual instructional opportunities. Problem solving, communications, data analysis, and thinking skills are examples of skills that are addressed in this of 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, agricultural educators must be involved in the design of STWO programs. Little modification to supervised occupational programs could represent the essence of the 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 so 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 in an advancing technological society. Technological changes demand life-long educational experiences. Effective tech prep programs are being 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 technicians, and many others are needed by the industry. These areas lend themselves well to school-to-school- integration and should be a part of the career cluster/pathway system. State and local agricultural education leaders need to give recognition to this trend and exploit it for the benefit of students.

Agricultural Education Student Organizations

Traditional student 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 strategies are implemented, student organizations will need to integrate their programs for a "seamless" system of recognition and awards. 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 a part of educational reform. These changes will help students understand basic skills and acquire work competencies which will enable the student to "leap 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 holistic 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 you can rest assured—traditional identities are at risk. Remember the new tools-new rules 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 as these issues are being played 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 agriculture and education. Armed with proven educational practices, we must be part of the team that strives to develop the new context for total-school investment. If successful, the students will benefit, the industry of agriculture will benefit, and the education in and about agriculture will prosper.

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A Past Look at the Future

BY KIMBERLY PERRY

Ms. Perry is the executive director of postsecondary agricultural education for California Community Colleges, Sacramento.

Forty years ago a young couple packed their bags and moved 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, tap, art, ballroom 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 choose was the furthest 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 discussed was getting a bachelor's in order to go on to graduate school; no mention was made of preparing for a career. Luckily, she met a professor who promised that his program would make her curriculum relevant, meaningful and employable. And he did and she was.

Meanwhile the little boy was taught woodworking, metal working, electronics, plumbing, welding and more. He was also told to study hard, get good grades so that he could graduate from high school and then go on to the college of his parents' choice. But the little boy began to question the relevancy of school to his interests and rebelled. He didn't graduate from high school and for the next 10 years worked a succession of 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 stilled 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 postsecondary institution.

The elements 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. What has changed 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 high school agriculture,
- 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, and
- 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 VATEA (especially relating to the development of an integrated, 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-based and 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

BY WILLIAM G. CAMP

Dr. Camp is a professor of agricultural and extension education at Virginia Tech, Blacksburg.

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. For readers 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 short article will be the first in a regular series of reports to the profession about the supply and demand for teachers on Agricultural Education in the US. This article will provide (1) a brief background of the annual study, and (2) national data on the long-term trends for numbers of teachers, 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 became a constant problem for agricultural education. Then, between 1976 and 1988, student enrollment in public school agricultural education declined from 697,000 to 522,000 (Scanlon, 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 1993.

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 teacher education graduates 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), drawing heavily from earlier work by Lynch (1991), 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, 1988), 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 of 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.

The number of teachers still needed (n = 20) as of the beginning of the next school year has declined fairly steadily for the past 30 years. That number remained small in 1993. The trend in the number of newly qualified teachers being produced by teacher education programs throughout the US is a serious cause for concern. In 1978, almost 1,800 new Agricultural Education graduates were available to fill teaching positions in the nation's schools. By 1993, that number had fallen to 636, just over 35% of the 1977 total.

There has been a relatively minor shortfall for several years in the number of newly qualified potential teachers of agriculture actively seeking teaching positions, as evidenced by the number of teachers still needed on September 1 each year. Still, the teacher shortage continues to be relatively small. The effective teacher shortage has been partially remedied by former agriculture teachers returning to the profession and by former Agricultural Education graduates who had been unable to secure initial employment in teaching in previous years.

Trends in the supply of secondary teachers of Agricultural Education in 1964-65 and since 1977[a]

Year	Total number of teachers on September 1	Teachers needed but not available September 1	Number newly qualified to teach	Percent of newly qualified entering teaching
1965	10,378	120	1,038	64.6
1977	12,694	221	1,749	60.8
1978	12,844	189	1,791	56.7
1979	12,772	144	1,656	54.9
1980	12,510	117	1,584	52.0
1981	12,450	98	1,468	52.2
1982	12,474	35	1,368	51.3
1983	12,099	42	1,277	45.6
1984	11,960	19	1,249	45.2
1985	11,687	8	1,207	40.8
1986	11,582	20	964	41.2
1987	11,204	14	952	41.6
1988	11,072	39	838	42.5
1989	10,840	25	588	52.9
1990	10,356	23	625	53.0
1991	10,177	9	638	50.9
1992	10,110[b]	11	686	53.4
1993	10,119	20	636	54.2

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)

Financial Management in Agriculture. Fifth Edition.

Barry, P. J., Ellinger, P. N., Hopkins, J. A. and Baker, C. B. (1995). Danville, Ill: Interstate Publishers, Inc.

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 a 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.

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