Agricultural Education and Distance Education: The Time is Now

In a recent national survey, researchers found that the public now expects educational opportunities to be available off-campus (Christenson, Dillman, Warner, & Salant, 1995). In this same report, the researchers noted that "local universities have an enormous advantage when compared to other higher education institutions; they have a long tradition of providing outreach, as well as offering the kind of continuous, lifelong learning that is becoming essential to success in the information age" (p. 39).

The public's expectations are not without reason, and attempts are being made to meet them in a variety of ways. The Public Broadcasting Service (PBS) now covers over 350,000 students in distance learning courses, up from 55,000 ten years ago. Minid Extension University (MEU) was launched in 1987 as the first U.S. institution offering a college education via cable television. In 1992, MEU broadcast courses taught at 21 universities over 600 cable systems with an estimated audience of 18 million homes.

National Technological University (NTU) in Fort Collins, Colorado transmits the courses of 45 universities (the University of Idaho included) to over 400 company sites around the United States. Finally, many land grant universities have established their own distance learning systems. Wisconsin, Texas, and Pennsylvania are examples of states that have spent vast sums of money to establish distance learning networks based on their land grant institutions. Many other states are currently developing systems.

These growing expectations are driving many institutions to make decisions in haste. In order to illustrate what I mean by haste, remember that there were 170 years between the invention of the steam engine and first successful internal combustion gasoline engine. At least another 30 years passed before the adoption of the gasoline tractor. Who could have predicted widespread changes like this technology covered at least 200 years. The application of electronic computing devices to the solution of human problems has occurred in less than 60 years. The networking of these machines to span geographical distance while solving these problems has occurred during only the last 25. Noting a few points of history in the areas of computing and networking helps to demonstrate the rapidity of this adoption process.

Computing

In 1946, the US Government gave Dr. John Mauchly and his graduate assistant, Presper Eckert, both from the Moore School of Electrical Engineering at the University of Pennsylvania, $486,000 to construct the Electronic Numerical Integrator and Computer (ENIAC). Constructed to speed up the calculation of artillery trajectories for the military, the ENIAC weighed 30 tons, contained 18,000 vacuums, used 160,000 watts of electricity, and covered 150 square feet of floor space. Widely recognized as the first computer, this machine was programmed manually, setting 60,000 switches in such a way that a program would execute. Once programmed, ENIAC could execute 5,000 arithmetic operations per second. Because they used vacuum tubes, the ENIAC and machines like it are called first generation computers. Today's fourth generation machines, those relying on photodiode to "etch" circuits into a thin silicon wafer, are startlingly more advanced. A 1989 468 DX2-66 used less than 8 watts of electricity to perform 45 million arithmetic operations per second. In discerning this advancement, John Naishit quotes Randall Tobias, "If we had similar progress in automotive technology, today you could buy a Lexus for about $250,000. It would travel at the speed of sound, and go about 600 miles on a tankful of gasoline" (1994, p. 99). This trend is continuing. The Pentium Pro processor, introduced in 1995, will perform over 300 million arithmetic operations per second while using less than 15 watts of electricity. Personal computers are predicted to achieve billions of instructions per second by 1998. If our cars had kept pace with our computers, it's obvious that our highways would be totally inadequate. But the "highways" computers use have made enormous advances.

Networking

In 1972, the U.S. Defense Advanced
A Technological Solution in Search of an Instructional Problem

Introduction

As we began to work on this issue of The Agricultural Education Magazine, we began reading each of the articles on distance education that had been submitted for publication. I noticed a trend in the reference sections of several of the articles: they quote Barry Willis as an expert in the field of distance education. Since Dr. Willis is the Director of Engineering Outreach at the University of Idaho, we decided to ask his perspective on the roles, current trends, future trends, and technology issues that are involved in distance education.

The Interview

Will you give the readers a general overview of the field of distance education?

Distance education is not a cure-all. It cannot do all things. It is like any other teaching tool; it does some things well, and it does other things quite poorly. Distance education does not have the capability, nor will it in the future, to replace the importance of face-to-face communication between teacher and student. Neither will it replace the importance of student-to-student interaction. It can be used in pieces and chunks to supplement curriculum, and in certain places, it can be used to deliver curriculum. Students have access to a continuing dialogue in every technology. We think it is going to replace everything that came before, and it never does. My personal view is that the more we distance ourselves from distance education, the more we realize how important it is. In distance education, the students are in the field of distance education and are supplements to the Idaho State 4-H Office at the University of Idaho, Moscow.

Can you tell us a little bit about what Engineering Outreach does as far as providing courses to its students?

We have between 400-500 graduate students each semester that are completing their graduate degree program in the eight engineering disciplines, such as Civil Engineering and Electrical Engineering, without ever coming to campus. The way this is done, as courses are being taught on campus, they are being taught in one of our state classrooms. At the same time, they are being video taped, and we then send those tapes out to students and locations around the country and the world. We have about 500 students in 300 locations, about 40% of our students are in Idaho and the rest are spread out all over.

In addition to the video tapes, since one of the things we know about distance education is that interaction is important, we use Internet e-mail to facilitate teacher-student and student-student interaction. Some of this interaction is to be important in the instructional process. Having done that, there is a role distance education can play. One is reaching place bound students, such as high school educators seeking recertification. These people cannot attend a four year institution, and it is especially effective, I think for adult learners, folks like high school teachers in that situation who already know or value learning, know how to learn, and are highly motivated. Those are three pre-requisites to be effective at a distance.

For high school students, I think it can be most effective in supplementing curriculum by involving outside speakers, involving levels of expertise from other places that may not be available in schools. For example, a program out of Spokane, Washington offers programs in Japanese and Russian and these courses are distance delivered to places around the country as part of the Ed Star Schools Project. I know in my former position in Alaska, we had a lot of villages that didn’t have a Japanese teacher, and the only way we could expose those students who needed or wanted that type of experience was through the use of technology. So, I think that high school especially, I see it as more of an adjunct as than a way of replacing curriculum.

One of the things we know about distance education is that it tends to make for a more effective traditional teacher. In other words, the placement of the understanding of students as individuals, and the organization required to be effective at a distance translates back to, and improves, the face-to-face classroom.

One of the other key components is that every good teacher in a traditional classroom setting is constantly monitoring the reactions of the audience, and therefore changing their presentation based on what is going on in the classroom. You can subconsciously get a glance at who is with you, who’s not, who’s bored, who’s excited, who needs you to go faster, who needs you to go slower, etc. So, in a traditional classroom setting, you are constantly changing, not the content that is presented but the way that content is presented, and who you target as you present that content. The challenge at a distance is different. Even if you use very interactive technology, such as interactive video conferencing, just by virtue of the fact that the communication is filtered through technology interrupts and changes that dynamic to the point where it takes some getting used to. So, even the best traditional teacher will likely require a little practice to get comfortable at a distance. Although my experience in both administering distance education programs and teaching through the use of technology at a distance for the last 15 years has been that you get used to it relatively quickly. But, the first few times, it is pretty intimidating, and that is why I always recommend hands on training, and hands-on support and practice throughout the teaching process. But, training is especially important before a course begins. This training is helpful for both the teacher and the students, who need to be trained well to get used to the technology before they are expected to learn content.

I guess I would throw in one other thing, we tend to focus too much on the technology. It is important that we focus on developing faculty to use technology effectively, but it is just as important, or even more important, that the students learn how to use technology effectively. Whereas the teacher is expected to teach content they already know well at a distance, the student has added burden of trying to learn content, they don’t have access, they don’t have a chance to get to the support of a teacher, and they don’t have access to the support of others. You have talked a lot about technology, will you give us your opinion on what technologies should or shouldn’t be used better to use in a distance education classroom?

There is no technology silver bullet. Every technology has specific strengths and weaknesses, and the teacher’s role is to be so good that you can seize on one technology that will do everything they want it to do, but realize that to be effective, it will take multiple technologies. For example, if there are visual components, you will obviously need some sort of a visual technology such as video. If activity is critical, you will need some sort of e-mail, telephone, fax, or video conferencing to provide the interactive activity. And, a lot of it depends on what the audience wants. Some students will have access to video conferencing at the desktop or in a conference setting, but others will have access to e-mail. If they don’t have access to e-mail, they will have access to telephones, so if you have an 800 number that’s the way to do it. The key is that there is no one technology.

I would also add that print, although many don’t consider it a “technology,” regardless of how it is distributed whether it is digitized or sent out in the mail, is a critical component of distance education. Just because we are using more sophisticated technology does not negate the need for print. And, it does not negate the need for face-to-face communication. So, again, I would focus on a web of technologies, combining both old and new technologies.

Speaking of new technologies, I think there are some things coming that we will
"Principles" of Distance Education: What's Really New Here? (and Why Should We Care?)

Instructors often comment that the focused preparation required by distance teaching improves their overall teaching ability and empathy for their students (Wiltz, 1992).

Here's a quiz. In the table below are listed two sets of teaching guidelines. Read these lists. Now, which of the following sets of guidelines do you think apply to designing distance education courses, and which apply to designing instructional experiences in any setting? Each of these lists were compiled by recognized experts in the fields of distance education and agricultural teacher education, respectively.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A Basis for Effective Teaching</strong></td>
<td><strong>A Basis for Effective Planning, Design, and Implementation of Instruction</strong></td>
</tr>
<tr>
<td><em>When the subject matter is to be learned passively, teaching is easy. Explain that it is to close to students, learning proceeds more rapidly and is assumed longer.</em></td>
<td><em>Review existing research on the content.</em></td>
</tr>
<tr>
<td><em>Students must be motivated to learn. Learning activities should be provided that take into account the needs, interests, and aspirations of students.</em></td>
<td><em>Analyze the strengths and weaknesses of possible instructional approaches.</em></td>
</tr>
<tr>
<td><em>Students are motivated through their involvement in setting goals and planning activities.</em></td>
<td><em>At the start of class initiate a frank discussion to set rules, guidelines, and standards.</em></td>
</tr>
<tr>
<td><em>Success is a strong motivating force.</em></td>
<td><em>Make sure classrooms are properly equipped with proper equipment.</em></td>
</tr>
<tr>
<td><em>Students are motivated when they attempt tasks that fall in a range of challenge such that success is perceived to be possible but not certain.</em></td>
<td><em>Learn about students' backgrounds and experiences.</em></td>
</tr>
<tr>
<td><em>When students have knowledge of their learning programs, performance will be superior to what it would have been without the knowledge.</em></td>
<td><em>Discuss the implications of students' background and interests in equally important.</em></td>
</tr>
<tr>
<td><em>Behaviors that are reinforced (rewarded) are more likely to be repeated.</em></td>
<td><em>Be sensitive to students' communication styles and varied cultural backgrounds.</em></td>
</tr>
<tr>
<td><em>Dissatisfaction with the current instructional approach is an effective means for learning.</em></td>
<td><em>Remind students that students must take an active role by independently taking responsibility for their learning.</em></td>
</tr>
<tr>
<td>*Maximize learning, students should involve &quot;listen&quot; rather than be &quot;instructed&quot; in the subject matter.&quot;</td>
<td><em>Integrate a variety of techniques for feedback and feedback.</em></td>
</tr>
<tr>
<td><em>Students learn what they practice. Supervised practice that is most effective occurs in a functional educational experience.</em></td>
<td><em>Make detailed comment on written assignments, referring to additional sources for supplementary information.</em></td>
</tr>
<tr>
<td><em>When students are provided with feedback which is specific and relevant to their work, they are more likely to improve.</em></td>
<td><em>Use pre-class student questions and assignments to encourage critical thinking and informal participation on the part of all learners.</em></td>
</tr>
<tr>
<td><em>Students learn what they practice. Supervised practice that is most effective occurs in a functional educational experience.</em></td>
<td><em>Have students keep a journal of all their thoughts and ideas regarding the course content, as well as their individual progress and other concerns.</em></td>
</tr>
<tr>
<td><em>Call on students to ensure that all students have ample opportunity to interact.</em></td>
<td><em>Establish good learning strategies for student reinforcement, review, repetition, and remediation.</em></td>
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<tr>
<td><em>Most effectively convey the content that can be effectively transmitted through the course.</em></td>
<td><em>Realistically assess the amount of content that can be effectively transmitted through the course.</em></td>
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<tr>
<td><em>Dissatisaction with the current instructional approach is an effective means for learning.</em></td>
<td><em>Different learning styles will be present.</em></td>
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<tr>
<td><em>Plan unique case studies and examples as often as possible to assist students in understanding and applying course content.</em></td>
<td><em>Assure that student participants will have different learning styles.</em></td>
</tr>
<tr>
<td><em>Students must be motivated when they attempt tasks that fall in a range of challenge such that success is perceived to be possible but not certain.</em></td>
<td><em>Encourage the course by focusing on the students.</em></td>
</tr>
<tr>
<td><em>Make sure classrooms are properly equipped with proper equipment.</em></td>
<td><em>Use locally relevant case studies and examples as often as possible to assist students in understanding and applying course content.</em></td>
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<tr>
<td><em>Learn about students' backgrounds and experiences.</em></td>
<td><em>Be concise. Use short, cohesive statements and ask direct questions.</em></td>
</tr>
<tr>
<td><em>Establish good learning strategies for student reinforcement, review, repetition, and remediation.</em></td>
<td><em>Empower and involve students.</em></td>
</tr>
<tr>
<td><em>Encourage the course by focusing on the students.</em></td>
<td><em>Relate.</em></td>
</tr>
</tbody>
</table>

Now, match the letter of the column (A or B) above with the following references:

Wiltz, B. (1992) Strategies for Teaching at a Distance.

If you matched column A with Newcomb, et al., and B with Wiltz—you receive an A! If you had the choices reversed, don't feel bad. Clearly, there is a lot of conceptual overlap between these guidelines. But, what's the point?

Good Teaching is Good Teaching is Good Teaching.

The point I'm trying to make is that Newcomb, McCracken, and Wambroed summarized the list in Column A to help teachers of agricultural education think bothically and systematically about designing their instructional programs. Likewise, Barry Wiltz summarized the list in Column B to help college faculty (from a variety of disciplines) to think the same way about designing their courses or delivery via distance education technologies (Barry Wiltz has a nationally recognized expert on the design and delivery of distance education programs—in particular, he has designed and consulted on a variety of engineering education programs). Irrespective of the context (agricultural education, engineering education, or ANY kind of education), there are certain principles that teachers should consider when designing their curricula and teaching plans.

I'd like to qualify my thesis a bit. The strategies listed above are by no means the "end-all" of effective teaching strategies. Also, there ARE certain technical and communication issues one must resolve in a distance education setting compared to a "traditional" face-to-face instructional setting. These considerations are significant. Barry Wiltz also addresses these issues in detail in the publication I have cited here.

Back to the Future

As I consider the future (and it's clear that agricultural educators need to be cognizant of the development and application of distant education technologies. In our future) of agricultural education, I find the rate of technological change to be somewhat overwhelming. However, I take solace in the fact that I have confidence in my ability to plan the effective instruction in agricultural education. That confidence is based upon a strong sense of the effective principles of teaching and learning. To me, the challenge lies in applying these principles in creative ways as I participate in planning agricultural education programs for the future, using the most appropriate technology available.

We, in agricultural education, have always been in a unique position, operating from a perspective of a respect for our past and a forward outlook to our future. Our collective expertise in planning effective educational programs provide us with an important set of principles and knowledge for building the agricultural education of the future.

References

Cows, Sows, Plows,...and Fiber-Optic Networks?

Technologies that link multiple sites for participating in educational programs are becoming more common across the country. These technologies include television-based systems that allow for two-way audio and live two-way full-motion video to be used over Internet connections. Iowa began operating a state-wide fiber-optic telecommunications system in 1993, which allows for the level of interaction described above. At least one specially equipped classroom in each county is connected to the Iowa Telecommunications Network (ICN) (Miller, W. W., 1994). How do high school agricultural education teachers feel about using these technologies to deliver educational instruction? Do they face obstacles that might inhibit their use of interactive communications networks? Should the opportunity to use such networks exist, what priorities would the teachers identify for sharing expertise among existing agriculture programs? What agriculture courses might be offered to schools where no agricultural education teacher is employed? A study (Miller, W. W., 1994) involving 102 Iowa agriculture teachers was conducted in the spring of 1994 to answer these questions.

At the time of the study, 23% of the schools represented by the agricultural teachers were connected to the ICN. None of the 102 teachers had ever taught on the ICN, but 9% had taken at least one course by ICN. Data provided by the teachers indicated that they held neutral feelings about the usefulness of ICN for teaching agriculture. The most positive feelings were expressed by teachers who related their belief that ICN would allow for the sharing of expertise, facilitate curriculum improvement, and reduce the need for teacher travel. Teachers identified a number of significant obstacles that could inhibit their use of the ICN for delivering agriculture courses, including: lack of equipment, cost of equipment, lack of skills to use the equipment, lack of interest in using the equipment, and lack of support from administrators. Teachers also noted the lack of teacher training opportunities and the additional prepartion time needed to teach on the network, as significant barriers to delivering interactive video conferencing in group settings, which was one of the obstacles associated with logistical issues and included scheduling problems, distribution of educational materials, and lack of support from administrators. Teachers also noted the lack of teacher training opportunities and the additional preparation time needed to teach on the network, as significant barriers to delivering interactive video conferencing in group settings, which was one of the obstacles associated with logistical issues and included scheduling problems, distribution of educational materials, and lack of support from administrators. 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A Star is Born!

By Michael K. Skram
The journal is associate professor and head of agricultural and extension education at North Dakota State University, Fargo.

A Star is Born!

Enrichment in the Classroom: Using Distance Education to Teach Nutrition

By Alice Blaine and Elizabeth Allen-Talbott
Me. Blaine is the state 4-H youth program coordinator and Dr. Talbott is an assistant professor of agricultural education at Purdue University, West Lafayette, IN.

Enrichment in the Classroom: Using Distance Education to Teach Nutrition

With the introduction of the new Food Guide Pyramid and revision of the United States Department of Agriculture (USDA) Dietary Guidelines in the fall of 1992, a need arose to provide accurate, current, and consistent nutrition information in a timely fashion to school-age children. School textbooks, which still displayed the four basic food groups, in particular, did not have this current information. The Purdue University 4-H Youth Expanded Food and Nutrition Education Program (4-H Y EFNEP) developed curriculum to teach nutrition and basic health principles to youth in grades one through nine. The educational materials called “Exploring the Food Pyramid with Professor Popcorn and Hooked on Health” were pilot tested in the fall of 1993. The curriculum needed to be introduced statewide, so extension educators in the northern part of Indiana suggested that a long distance teacher credit course be established. The course would provide training in how to use the materials and would also help the teachers in meeting on-site requirements for teaching license renewal.

How was the Course Delivered?

The course titled “Enrichment in the Classroom: Foods and Nutrition” was an interdisciplinary effort. It integrated formal and non-formal educational systems, bridged extension field and campus staff, and formed a cooperative effort among 4-H, Foods and Nutrition, Child Development and Family Studies, Agriculture Communication Service, the School of Education, and the School of Agriculture. Other contributors were Purdue Admissions, Continuing Education Media Based Programs, the Indiana Dairy Council, and the Indiana Department of Education. The course was taught as a six day intensive course using a one-way video, two-way audio telecommunications system with further instruction given on-site for two hours each morning, the telecommunications was used to deliver instruction from campus-based experts to the local sites. These experts did not have the time to travel to each site, while the participants in northern Indiana were not able to travel to the Purdue campus either. The two-way audio feature allowed for interaction between the experts and the participants. For the remainder of the day, on-site extension educators provided hands-on instruction, coordinated field trips, facilitated experiments, and demonstrated how the materials could be used in the classroom.

The course was first taught in the summer of 1994 at two sites in northern Indiana. Last summer the course was expanded to a third site and for the summer of 1996 will be offered at 13 sites located throughout the state. The primary audience for the course is elementary teachers, consumer and family sciences teachers, school nurses, food service personnel, health teachers, and others who work with school children and foods. To this date, 49 participants have taken the course and have impacted more than 3,000 youth.

What Did the Teachers Say About the Course?

“Great that we can correspond and get feed→
back immediately." "Great use of technology to make sites more convenient for those taking the class." "Informative and exciting program.

courses in areas such as environmental education. The linkages established in the initial course will make providing future courses in other areas much easier.

From pre and post tests, testimonial letters, food diaries, and teacher evaluations, we know that elementary students are learning about foods, nutrition, and food safety. Because of this and other positive evaluations, the EFNEP materials were recognized by the Indiana Superintendent of Public Instruction as one of two nutrition education curricula for adoption statewide. For information on 'Professor Popcorn and Hooked on Health' contact Alice Blume.

A Technological Solution

(Continued from page 9)

cost money to keep up technology and infrastructure. But, what it can do is provide instruction and experiences to people who are not located near a campus. It is a way of providing access, but there are costs associated with either the consumer, the state, or the institution have to bear.

"IF YOU COUNT ALL YOUR ASSETS, YOU ALWAYS SHOW A PROFIT."

ROBERT QUILLEN

Challenges posed by distance education are countered by opportunities to reach a wider student audience, meet the needs of students unable to attend on-campus classes, and to link students who have a variety of backgrounds and experiences (Wills, 1992).

In 1994, two program areas, Agricultural Education and Technology Education at Montana State University (MSU), decided to address the needs of individuals who could not attend campus to pursue a master's degree. A needs assessment involving agricultural and technology education teachers was completed to determine if enough individuals would be interested in pursuing a degree through distance delivery technology. Analysis of the data from the needs assessment led to the design of coursework that could be delivered with the use of telecomputing and compressed video technology. This not only meant the creation of new courses, but also adapting existing courses to utilize new distance delivery technology.

After consulting with colleagues who had been involved in distance delivery courses, it was decided that the first course offered should be one based on electronic research technology. This course was taught using instruc-

was located on-campus at MSU, and all of the students had computer equipment of their own or used computers at their schools to participate in the class.

Since the initial course in the fall of 1994, three other graduate courses (History and Philosophy of Applied Subjects, History and Philosophy of Technology Education, and Technology in Curriculum and Instruction) have been offered through the use of distance education technology, and Program Planning in Agricultural and Technology Education will be offered in the Spring of 1997. Course enrollment has averaged 8-9 graduate students per semester.

The primary distance delivery technology utilized in providing these four courses were telecomputing and compressed video. In Montana, there are eight telecommunication centers that students can drive to in order to attend compressed video classes. In order to keep travel at a minimum only one or two compressed video class sessions were conducted every other semester, resulting in minimized student travel.

Distance Delivery Techniques

On a weekly basis, the graduate students responded to assignments utilizing telecomputing technology. Electronic dialogue between students was much like the classroom discussion that takes place in on-campus courses. Students were free to respond to each others answers all the while addressing questions or issues posed by the instructor. Students also provided resource information to each other or the group depending on the need. One other aspect that cannot be overlooked in the use of distance education technology is the fact the high tech does require high touch. Through the use of telecomputing software, students left personalized messages for the instructor, which was very important in addressing the needs of the students and making them more comfortable using the technology.

Distance Technology & The Student/Teacher—Other implications

Another application of distance education technology at teacher education institutions that could benefit students and faculty is the
area of student teacher supervision. Digital audio and video conferencing technology used on the Internet provides a viable alternative to student teacher supervision. When a student teacher is placed at a significant distance from the parent institution, alternative assessment means using distance education technology in order to keep the university supervisor in close contact with the student teacher and his/her supervisor. During spring semester 1996, a technology education student teacher was placed at Hailey, Idaho. Evaluation by traditional methods would have involved two to three days of travel for the university supervisor and would have cost approximately $300.00/trip not to mention the time away from the university. With the cooperation of the student teacher and his supervisor, video conferencing technology was used to conduct one of the two required visitations of the student teacher.

On the day of the scheduled visitation, the student teacher faxed his lesson plan to the university supervisor at Montana State University, who then watched and listened to the presentation of the lesson. After observing the presentation, the university supervisor conducted a follow-up discussion with the student teacher and the student teacher supervisor. This was possible through Internet video conferencing. The video conferencing was an Internet connection and video conferencing software called CuSeSee developed by Cornell University. CuSeSee software incorporates the use of digital audio and video for Internet conferencing. The technology was tested prior to the day of the formal evaluation of the student teacher, and it has been used numerous times since then in order to discuss and answer any questions of the student teacher, his supervisor, and the university coordinator. This has resulted in more dialogue and discussion between the individuals. Other educational specialty areas at MSU (Educational Administration and Extended Studies) have also reviewed the CuSeSee demonstrations and expressed interest in the technology. This form of distance education personalizes distance education, thus making it appealing to more individuals and institutions.

Requirements For Video Conferencing On The Internet

Video conferencing over the Internet is a relatively new medium. Video conferencing uses the same Internet communication channels as many of us now use for e-mail. Video conferencing over the Internet requires adequate access to the Internet and a somewhat powerful desktop computer. Video conferencing is a great medium for experiences and interactivity when you consider the price. However, it is not quite as good as being there in person. There are, at minimum, three potential applications for video conferencing in the agricultural and technology education fields: graduate level courses for students who don't have a campus accessible to their location, student teacher supervision, and teacher-in-service. As we look at these applications, video conferencing is a viable alternative to travel, affordable, but adequate, way to deliver education through electronic media, video conferencing offers a real benefit of the relatively low cost and the accessibility of this medium by most schools now or in the near future. Remember, if you have an Internet connection with an Internet Protocol (IP) address in your school, you can probably set up remote conferencing through some inexpensive or free software. As stated earlier, the free software, called CuSeSee, was developed by Cornell University through a grant from the National Science Foundation and can be downloaded from the World Wide Web at the following World Wide Web address which enables remote users to share documents and graphics, sketch ideas, and markup an electronic whiteboard.

Below are the basic requirements to run either video conferencing software packages using an IBM PC computer.

Basic Requirements:
Processor (These are recommendations only)
386SX — Video conferencing not possible
386DX — Video conferencing only
486SX — Video conferencing possible
486DX — Video conferencing possible

Windows 3.1 or higher running in Enhanced Mode.
A Windows Socket compliant TCP/IP stack, known as Winsock.
A 256 color (8-bit) video driver at any resolution (640x480, 800x600, 1024x768, or higher).

Besides the basic hardware requirements list, a few other peripherals will need to be added in order to effectively use CuSeSee or White Pine video conferencing software. For the most part, the items described apply to both an IBM PC or Macintosh computer.

In order to obtain video, you need to purchase a QuickCam from Connectix which is a fully digital video camera that connects to your Mac's or PC's parallel port using the 5' cable supplied. Power is taken directly from the port, and the cost of the camera is only $99! It uses a state-of-the-art, black and white technology to accurately capture 6-bit grayscale video and still images. It can capture images that are about a quarter of a standard VGA monitor or up to 320x240 pixels. According to the CuSeSee Project you will need the following to send & receive audio:
A Windows Sound board that conforms to the Windows Multimedia Specification.
(Sound Blaster or better). Full Duplex audio is very desirable. Speakers (or headphones) and a microphone.

An Internet network connection or modem at 56 Kbps minimum. (Note: White Pine's commercial version of CuSeSee will work at 14.4Kv/s.)

The list of resources to learn about this technology is phenomenal. People involved in all aspects of video conferencing are more than willing to help share their experiences to guide others on to the right path.

The demise of education, as we know it, has been predicted since the new communication technologies such as Internet access and video conferencing have arrived on the scene. But, by using the correct teaching approach for the medium at hand, agricultural and technology education can stay on front of changes within their disciplines and enhance services to teachers and the students served by those programs. When used appropriately, a number of forms of distance education that include video conferencing can meet the needs of agricultural and technology education and help us keep pace with all of the new information available to us.

References

THE AGRICULTURAL EDUCATION MAGAZINE
MAY, 1996

THE AGRICULTURAL EDUCATION MAGAZINE
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FFA, Agricultural Education, and the World Wide WWW—New Ways to do New Things

By: B. David Holton and Michael E. Newman

Mr. Holton is an agriculture instructor at Sharps High School, Sharps, MS, and Mr. Newman is an assistant professor of agricultural and extension education at Mississippi State University, Mississippi State.

The World Wide WWW (WWW) is the newest information service to arrive on the Internet. As a distance education tool, the WWW is at the top in terms of widespread access and potential for future growth. The WWW is a universal database of knowledge and information that is accessible to people around the world and links easily to other pieces of information that any user can quickly obtain. At present, over 24 million people use the WWW, with over 18 million of these in the US (Nielsen, 1995).

A little Background

Hypertext or hypermedia, which is specially coded text- or media-based documents, is the technology upon which the WWW is based. The code used by the WWW is a process called HyperText Markup Language (HTML), which defines text, graphics, and links that are independent of the computing platform being used.

Individuals wanting to access the WWW must have a "browser" program on their computer to interpret the HTML code and format it in an understandable fashion. Three of the most popular browser programs are Netscape Corporation’s Netscape Navigator®, Microsoft’s Internet Explorer®, and the National Center for Supercomputing Applications’ Mosaic®. Information on the WWW can be accessed in many different ways, but the two most common ones are: (1) entering the URL (Uniform Resource Locator), if known, in the go-to box, or (2) by using one of the "search engines" from the net search menu to locate the information by title or topic. For example, the URL of the Mississippi FFA Home Page is: http://www.mstate.edu/Dept/AgrEdExpc/FFA/index.html.

Every stop on the WWW unfolds with a “home page,” which is similar to a table of contents in a textbook or journal.

Home pages contain highlighted hyperlinks that mark where the users can move to other related topics on that particular site or to an entirely different site, by clicking on the highlighted hyperlink with the mouse (Raven and Settle, 1995).

Distance Education Classroom Design: Some “Rules of Thumb”

By: Erik T. Anderson

Mr. Anderson is an assistant professor and telecommunication specialist at the University of Idaho, Moscow, and is currently on leave of absence to pursue a Ph.D. in Adult Education.

Distance education has become a hot topic during the past several years. One reason for its prominence is related to the tremendous advances that have been made in telecommunications technology. These developments not only have provided increased access to educational programs, but have also opened the door for many institutions to originate and distribute their own distance education programming. This technology will continue to evolve, and we will see more opportunities to use it to deliver education in the future.

There are numerous examples of effective distance education programs in post-secondary and secondary environments. For example, small K-12 schools in rural areas can receive specialized classes in disciplines such as science, math, and foreign languages that would otherwise be unavailable to their students. In some communities, high schools have established two-way, interactive video links with nearby colleges to receive college level courses for advanced placement students. At schools across the country, K-12 teachers are taking advantage of distance education programs for in-service training and recertification purposes.

Distance education can serve a variety of institutional needs. If your school does not yet have a distance education classroom or dedicated distance education facility, it may have one in the near future. If you are proficient with technical systems such as computers, you may be recruited to help with the design and installation of a distance education classroom at your campus. This article will provide you with a few general "rules of thumb" that can help guide the design and development of a distance education classroom.

There are far too many types of distance education facilities to allow us to provide specific design guidelines here. For example, a two-way, interactive video classroom involves a completely different design than a computer lab. However, based on our experience in designing and installing a state-of-the-art distance education classroom at the University of Idaho, we can offer several suggestions that will apply to most situations. Once your institution has made a commitment to install a distance education classroom, consider the following recommendations:

1. Conduct an internal needs assessment related to the potential uses of the classroom. Discuss all possible uses of the classroom with all interested users. It is all right to do some brainstorming or "blue sky" thinking during this stage because you will inevitably need to narrow the classroom’s capabilities later in the design stage.

2. Develop a vision statement about the facility. The findings from your needs assessment will guide this process. The vision statement should create a sense about how the classroom will be used and describe the specific purposes it will serve. This document will provide guidance for the design phase.

3. If possible, hire an expert consultant to assist you with the design process. Even a "low budget" distance education classroom can be a very complex technical system. Although there is a cost involved in working with consultants, professional designers and engineers who specialize in the construction of distance education classrooms can save you time and money in the long run. If you cannot afford to hire a consultant, try to recruit some outside "volunteers" to help you design. You can find useful technical expertise in a variety of places, and some examples include:

   a. Technical support people in your school district or at your state Department of Education.

   b. Personnel at other educational institutions that have installed distance education classrooms. Visit the other campuses and tour their facilities. During the "show and tell," ask the managers to describe what works well in their system and to identify the parts of their original design that didn’t work so well. Take a lot of notes with the intention to literally "borrow" all the good ideas that apply to your project.

   c. Pay attention to the "mistakes" that were made so you can avoid recreating them.

   d. Hardware vendors are an excellent source of information and assistance, some vendors can even offer a "thumbs up" package.
where they can provide the equipment and the design and installation services. However, be wary of vendors who claim to have the perfect solution to all of your needs. Remember the adage: "If it sounds too good to be true then it probably is!"

4. Design your classroom to be as flexible as possible. Your facility will likely need to serve multiple purposes—it is possible that some of these uses will not even be realized until after the room is completed! Avoid the tendency to "nail things down" such as the use of fixed seating, where tables are attached to the floor. Also, consider installing additional controls for the room lighting so the lights in the front and the back of the room can be put on different circuits. A more flexible room can more easily serve diverse needs.

5. Use multiple technologies and delivery systems. In other words, be flexible in your choices of technology and avoid locking your classroom into just one system. For example, a live video signal can be transmitted in a variety of ways including via satellite, microwave, broadcast TV, cable TV, special high-capacity telephone lines, and even over the Internet. The key point is to keep your technical options open. The telecommunications industry is a very dynamic field—it is extremely difficult to predict which distribution medium will be the most cost-effective in the future.

6. If possible, hire a full-time technician to operate and maintain the distance education classroom. If that is not possible, designate one person to be responsible for the room. The classroom should not require constant technical attention, but you will need someone to be available to solve problems when they arise.

During the actual design phase, decisions will be influenced by several factors, particularly the limited availability of funds and local technical options. The goal is to design a facility within those constraints that can effectively meet the current and future needs of your institution. A well-designed distance education classroom will be flexible, cost-effective, and able to serve multiple instruction purposes.

Be aware that Murphy’s Law prevails in the design and installation of a complex technological style like a distance education classroom! You should expect that some mistakes will occur (these typically tend to be minor errors of omission). However, careful attention to the design process will help you avoid making really costly mistakes!

The design and development of a distance education classroom will require a significant commitment of time, energy, and resources from several people at your institution. In addition to being challenging, it can be a very rewarding project. The greatest reward is to see the facility in full operation, successfully delivering instruction to students at a distance.

Telecommunications technologies are wonderful inventions that offer a great deal of promise to the field of education. It is important to remember, however, that these technologies are only a means to an end. The real purpose of any distance education project is education.

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"Go to the head of the class if you ..."

Dr. Moore has agreed to author a new feature for The Magazine. He will prepare ten questions about some aspect of the history of agricultural education. Each set of questions will have some type of common denominator or theme (i.e., FFA officers, NVATA, federal legislation, etc.). His answers will be included in the next issue of The Magazine. Go to the head of the class if you know the answers.

What do you know about early FFA conventions?
1. The first FFA convention was held in Kansas City in 1929.
   a. YMCA
   b. Biltmore Hotel
   c. Muehlebach Hotel
   d. Municipal Auditorium
2. During the 1930s it was customary for FFA chapters to submit an ear of corn for judging at the National FFA convention. The champion ear of corn was then:
   a. Fed to the grand champion steer at the American Royal
   b. Used in the Star Farmer of America ceremony
   c. Displayed at the entrance to the exhibit hall
   d. Hung above the secretary's desk
3. In the early years of the convention, a large banquet was held for the attendees. The food for the banquet was provided by:
   a. Each state bringing some type of food item from their state
   b. The American Royal Livestock Show
   c. Kansas City Star Newspaper
   d. Hallmark Cards
4. During the 1930s and 40s it was a common practice for the national FFA president to recognize a delegate from Georgia immediately after the convention was called to order. The delegate from Georgia then did something. What did the Georgia delegate do?
   a. Pass out packages of peanuts to all the delegates
   b. Say a prayer to open the convention
   c. Present the president with a gavel made of wood from the farm of Dudley Hughes
   d. Lead the convention delegates in singing "Hail to the FFA"
5. At the 1934 convention the delegates voted to buy something and send it to President Roosevelt (provided that it didn't cost more than $50). What was the item?
   a. A prize winning lamb from the farm of Dudley Hughes
   b. A set of specially designed FFA dishes
   c. An experimental motorized wheel chair
   d. A rocking chair made with wood from the farm of Dudley Hughes
6. At the 1936 FFA convention, Maddox of Tennessee moved "that the national organization furnish copies of the ... and distributed to all FFA chapters." You can see framed copies of this document hanging on walls in agricultural education departments that have been around for a long while but you won't see this document in new chapters. What was the document?
   a. General Order on Proximity Issued by George Washington in 1776
   b. The aims and purposes of the FFA
   c. The FFA Creed
   d. The Country Boy's Creed
7. At the national FFA convention in 1941 "Lynn of Illinois moved that there be no conferences during the convention next year, motion seconded and carried." The item that was prohibited was:
   a. The use of foul language
   b. The wearing of cowboy hats on the convention floor
   c. Placed waging
   d. Smoking
8. During the 1942 national convention "Delegate Fike of West Virginia moved to go into committee of the whole for fifteen minutes to discuss the possibilities of the national organization buying a bond ... motion seconded and carried." After discussing the issue for 15 minutes a committee of five were appointed to "look into the matter thoroughly and report back to the convention as soon as possible." What was the national FFA considering purchasing?
   a. A herd of Angus cattle
   b. A bomber
   c. A hotel in Kansas City
   d. A plot of land that was part of George Washington's estate
9. The 1966 FFA convention was called the Victory Convention to celebrate the end of World War II. The national FFA Board considered buying 11,000 items for this convention. What was the item they considered buying?
   a. United States Flags
   b. Sleeping Bags
   c. Victory T-shirts
   d. Commemorative coffee mugs
10. The New Farmers of America held most of their conventions in:
    a. Charlotte, North Carolina
    b. Orlando, Louisiana
    c. Birmingham, Alabama
    d. Atlanta, Georgia

   The correct answers to the above question will be in the June, 1996 issue of The Agricultural Education Magazine.

World Wide WWW
(Continued from page 16)
http://www.agriculture.com/contenu/faf/fig/tais.html
5). The Ultimate FFA Chapter List:
http://esludlov/517k12to18andtais.html

Student Research
Another reason to use the WWW is that students get motivated when they find something on the WWW using the computer. They can look up information using textbooks in anyone's class.

To find information, students can go to one of the pages listed above, or they can www:ww:ww with search engines and directories. If students are using Netscape8, they can click on the "Net Search" button to gain instant access to several search engines. From there, they just type the term they are looking for and let the search engine find links that are related.

For students who aren't sure about the exact term they want, several computers offer directories with well designed category-based search capabilities. Using Netscape8, all students have to do is click on the "Net Directory" button.

Public Relations
On August 15, 1995, the home page of the Mississippi FFA Association was placed on the World Wide Web. Since then, the home page has provided information about Mississippi and the FFA to over 3500 individuals from 45 states, Australia, the Virgin Islands, Northern Ireland, the United Kingdom, Canada, Belgium, and Japan. The WWW will prove to be an even more valuable service as more individuals and schools gain access to the Internet.

A local agricutural education program can use a home page for several purposes. Publishing activities of the FFA chapter, publishing a newsletter for alumni, and promoting agricultural awareness are just a few of the possibilities. Teachers can place media from their classes on the WWW to show the public what they are teaching their students. (Wouldn't a school board member be impressed?) Sharing Information About The Program

One way to ensure that students are motivated to get involved in important projects is to provide a means of reward that has meaning to them. Imagine a student who published a report on the WWW having people from all over the world reading it and sending them e-mail about the report. The benefits in terms of self-concept to the student would be tremendous! The WWW is an excellent way for teachers to remind students that what they think and do is important and that they are valuable members of their families and communities.

Teachers can also use the WWW to provide instruction, giving students information to help them solve problems. This approach has improved achievement for college students and should work for high school students as well (Newman, Raven, & Day, 1996).

Get On The Train

Because creating HTML documents is fairly easy, many people are starting to take advantage of the WWW as a way to get out the word about products and programs. In August, 1995, Mississippi became the first state to place an FFA home page on the WWW. Since that time, 12 other states have placed pages on the WWW that relate to the FFA. New agricultural information is being added to the WWW regularly. Technology for agricultural educators is changing rapidly. Now is the time to take advantage of these advancements for the sale of the students. There is much WWW'ed, for students and educators, by increasing use of one of the greatest information sources available, The World Wide Web.

References
Education: The Time is Now

(Continued from page 3)

Research Projects Agency initiated research into computer-aided teaching. The result was the ARPAnet. This precursor to the Internet was made up of 37 users, each paying $32,000 per year for the service. In 1983, Transmission Control Protocol/Internet Protocol (TCP/IP) became the standard, and the Internet was born. With 560 hosts, or machines, connected directly to it, it was still very much an exclusive club. Growth then became exponential. In 1988, Internet Relay Chat (IRC) was developed and released. The year ended with 56,000 hosts connected. In 1994, with 6,170,000 hosts connected to the Internet, The World Wide Web (WWW) was developed by Tim Berners-Lee and released by the Conseil Européen pour la Recherche Nucléaire (CERN) of Switzerland. The National Science Foundation released control of the Internet in 1995 with 9,472,000 hosts connected. WWW traffic surpassed all other forms of data transmission in April of 1995. Estimates of the number of users, those connected to these host machines through dial-up or local area networks (LAN’s), range from 25 to 75 million people and some expect the number to double in 1996.

Supporting all of this growth is being accomplished by the convergence of technologies, each advancing at astonishing rates. Fiber-optic technology allows 25,000 telephone calls to occur on a “wire” 1/10 the size of the former twisted pair, two inches in diameter. The digitizing of microwave signals more than quadruples the available channels on both satellite and ground-based systems. Multiplying the effect of expanding bandwidth, the rapid compression and decompression of data has allowed much more data to be perceived than is either sent or received. These rapidly improving algorithms and processes allow interactive videconferencing to occur at transmission rates that are 3/17,117 of what was standard 10 years ago. Today’s digital videconferencing systems typically use the equivalent of six digital phone lines (384K). Industry representatives are confident that the systems will perform as well or better on two digital phone lines (128K) by the year 2000. Even with the advances in these two technological trends, increasing available bandwidth and using less bandwidth per operation, there is concern that the pipes between networks will remain the limiting factor as we move into the information age.

The distinctions between computing, networking, and telecommunications are becoming blurred, the technologies are merging. John Sculley describes the information age as a "paradigm shift of a new kind for the world's information services - computers, consumer electronics, communications, and information - will converge." ... 

Meaning to Agricultural Education

What are the implications for agricultural education? This rate of technological change places tremendous demands on our existing training models. In 1991, 1/3 of American workers had been with their employers for one year, and 2/3 for less than five years. In the near future, constant training, retraining, job-hopping, and even "career-hopping" (Hart & Devereux, 1994, p. 2). The growing sophistication of information workers will change the bargaining relationship between employers and employees, since for the first time in centuries workers will own the means of production (knowledge and information) and have broad access to the tools" (O'Hara-Devereux, & Johnson, 1994, p. 28).

We, in agricultural education, find ourselves three questions, 1) Are we providing an education to students that will prepare them to compete in the economy as it will exist in the future? 2) Are we preparing our students to be life-long learners so that they can remain competitive throughout their working careers? and 3) Are we prepared to meet the training and retraining needs of the agricultural industry as it will exist in the future? Before you answer the first two questions, note the following trends. In 1991, for the first time ever, companies spent more money on computing and communications gear than on industrial, mining, farm, and construction equipment combined. According to the American Society for Engineering Development Institute reports that 71 percent of secretaries now perform duties previously performed by management. The Bureau of Labor Statistics reports the number of workers in the USA alone was $21,000 since 1987. The Department of Labor estimates that by the year 2000 at least 44% of all workers will be involved in the gathering, processing, retrieving, or analyzing information. Are we helping students prepare for a lifetime in this increasingly technical, organizationally flattened workplace? You decide.

The answer to the third question is clearly no. It is estimated we currently have 1/6 of the capacity necessary if all worker retraining were...
CALL FOR APPLICATIONS

A committee has been appointed to solicit and review applications for Editor-Elect of The Agricultural Education Magazine. Individuals interested in applying for the position of Editor-Elect should submit:

1. five copies of their resume;
2. five copies of a letter of application telling why the applicant is interested in becoming Editor-Elect and describing any changes or innovations the applicant believes would improve The Magazine; and
3. five copies of a letter of support from the applicant’s immediate supervisor indicating the applicant has the administrator’s support in undertaking this professional responsibility and that the administrator will provide necessary secretarial, Student worker, and other assistance necessary to produce a high quality professional publication.

Applications are due July 1, 1996 and should be submitted to:

Dr. Joe W. Kotrlik, Chair
Editor-Elect Selection Committee
School of Vocational Education
Louisiana State University
Baton Rouge, LA 70803-5477

Potential applicants are encouraged to contact any member of the selection committee to discuss the Editor-Elect position and to obtain more detailed information on the support needed. The selection committee members are:

Joe W. Kotrlik, Louisiana State University (504) 388-5753 - FAX (504) 388-5755
Lou B. Riesenberg, University of Idaho (208) 885-6358 - FAX (208) 885-4039
Don Sliger, Oregon Department of Education (503) 378-3584 - FAX (503) 373-7968
MeeCee Baker, Greenwood High School, Millerstown, PA (717) 589-3116 - FAX (717) 589-7096
Ed W. Osborne, University of Illinois (217) 333-3166 - FAX (217) 244-7503