Agricultural Occupational Health Services and Delivery: Alternative Strategies to Deliver/distance Learning

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Both authors have had experience in teaching an agricultural safety and health class by alternative delivery methods, or distance education. The 1st author developed an agricultural safety class in 1990 that was taught by videotape. The first part of this paper discusses the development and dissemination of that course. The second author taught an ag safety and health class via combination video and webCT. The 2nd part of this paper discusses the delivery of that course.

People involved in agriculture recognize safety as a vital concern. The Agricultural and Biosystems Engineering Dept. at Iowa State University had offered a class in agricultural safety since 1972. In 1990, a videotaped version was developed. Farmers, agribusiness employees, health professionals and extension personnel had expressed a desire and need to learn more about farm safety. However, many of these people are employed full time and are unable to attend conventional campus classes. A mechanism for their being able to take the class was to develop a videotaped version of the class. Thus students could participate at a convenient time and accessible location. The 1st offering of this course by this means attracted 68 students. The class consisted of 13 2-hr. tapes and also required students to attend 2 all day on-campus sessions. Tapes were mailed individually to the students. In subsequent offerings of the class, the latter requirement was dropped since students from out of state were also enrolled.

[ISU had an off-campus program in place where students could work towards a bachelor's or a master's degree. Courses were offered via videotapes, satellite, or on-campus workshops.]

Agricultural safety is a topic well suited for videotape instruction. This method brings the message directly to the point of application. Students can view the tape, step outside their door, and recognize areas where the information can be applied. Students like being able to view the tapes at their convenience (as one student noted, "…video courses are underwear convenient, if the best time for me to view the class is at 10:30 at night, I can do that.") Students can also replay portions of a video if they do not understand the material immediately.

The sessions were taped with the instructor presenting to the 'camera'; i.e., no audience was

present. Students taking the video course said that they preferred this rather than the course being taped while it was being presented to students on-campus. The main reason being that the instructor would look at the camera (in essence looking at the video student), this made the video student to feel that they were a course participant and not just an observer of someone else's class. The course was redone in 1993 and presented on the AG*SAT satellite network. Iowa students received videotapes, while some of the other universities watched it live and others taped it. Although those watching it live by satellite had a fax number they could submit questions to, there was very little 'interaction' from this group. Each site had a coordinator to administer the course. The professor had an 800-phone number the students could call during the week and this seemed to provide the students with the necessary interaction they required with the professor. The course was repeated again in 1995 at Iowa State University. The professor continues to teach using videotape, now from the Dept. of Agricultural and Biological Engineering at the University of Florida. A video version of the course is offered each term. No on-campus sessions are required, since students may be from out of state.

During the spring semester 2000, an Agricultural Safety and Health Course was offered by the University of Idaho with the 2nd author as the instructor. This class was offered as a distance education class in the tri state region consisting of Washington State University, Oregon State University, and the University of Idaho as part of the Tri-State Agricultural Distance Delivery Alliance.

Half of the 18 students were on campus and half were off campus. The course was designed with three goals in mind. One, improve the interaction with on and off campus students. Second, make materials accessible to all students especially if video connection fails. Third, make safety more interesting. To help meet these goals a web support page was set up. Along with the page, WebCT computer software was used to manage the course. WebCT is a program developed in Canada and is licensed to many universities (www.webct.com).

WebCT is a unique program that allows many functions for class web support. It was used for posting the syllabus, time schedule and resources as well as posting class member pictures and e-mail addresses, hosting a discussion group, taking tests on-line, and posting class projects. Once a person is familiar with the software it is fairly easy to set up tests, discussion groups and to provide copies of class slides for the students. Tests can be set up to be graded automatically by the computer or be graded individually by the instructor. In addition pictures and video could be incorporated in the tests. Because of the problem of proctoring tests, the tests were take-home open-book. The course was designed to be 60% of the grade from tests and 40% from participation.

Class discussions were conducted using newspaper articles and personal experience as topics for discussion and applying knowledge learned to the situation. Everyone in the class was able to see each other's remarks and could respond to or add to the remarks. Students seemed to like this part of the class.

WebCT has a management portion to allow the instructor to maintain student scores and other records. To assist in determining student participation the program keeps track of the number of times the student reads and posts articles.

Student response to using WebCT has been positive. Some student quotes include:

"You could take the tests at a convenient time and I tend to remember more by taking tests by notes. Class discussion was neat to see how other people view issues."

"For one I would like it to be more user friendly. Other than that I found it very helpful as well as very interesting. I can honestly say I learned a lot from this class by the Internet portion."

"I liked the web-based portion of the class because it was readily available to me when I wanted it. Also I could work at the pace that was comfortable to me. Accessibility was a problem at times…"

"I enjoyed the online portion of the class. I really liked the chance to go to the website and get notes and take my tests."

"You can communicate with others across the state."

"I liked being able to get the notes off of the web, I also liked hearing what other people had to say in the discussion groups. I didn't like how the tests were only 60 minutes however. It seemed like it always took me a little longer than 60 minutes to do it."

There were a few problems that occurred during the course with the Internet and adjustments had to be made. Problems included:

1. the main server can go down and projects will be delayed
2. a firewall at a community college network may not allow the program to function properly and the computer people need to work out details for students accessing the program
3. student access to computers varies
4. it does take a lot of time to prepare and plan the lessons and get the student interaction.

The author felt that this method of teaching is effective and worthwhile.

Another example of using a distance delivery method for presenting agricultural safety and health information was used by the National Education Center for Agricultural Safety (NECAS). The Iowa Communications Network (fiber optic) was used to teach 700 firefighters about the hazards associated with chemicals when responding to fire and rescue emergencies in Iowa.

The Iowa legislature sponsored a program that would create a higher level of awareness and knowledge among firefighters, EMS personnel and police officials about the potential hazards when responding to fire and rescue emergencies. Specifically, the Iowa legislature was interested in training that would protect emergency responders from agrochemicals that were burning, leaking or spilled on Iowa farms, or in the rural countryside. Funding was approved and the Iowa State Fire Marshall was given the responsibility for coordinating the training program. That office contracted with NECAS to develop, implement and evaluate the training program.

NECAS conducted a needs assessment of the farm chemicals that are stored, handled, and or

used on Iowa farms. Additionally, several noted trainers were recruited from agribusinesses in the Midwest to assist with the development of training materials and their presentation. These farm chemical experts worked closely with the NECAS staff to develop three, 2 hour programs, including training on hazard communication pre-planning, haz-mat requirements, placarding systems, human health effects, environmental impact(s), personal protective equipment, decontamination procedures, and patient care.

Several options were considered for the delivery and dissemination of the training program. Since Iowa has a comprehensive fiber optics system (Iowa Communications Network - ICN) connecting all universities, colleges, hospitals, public schools and other sites in the state, it was decided to utilize this communications tool to maximize the exposure for at-risk emergency responders.

During presentation of the Iowa Farm Chemical Awareness Program, 32 ICN sites were accessed statewide, with over 700 students participating. Pre and post-testing of the students demonstrated that there was significant knowledge gain among the participants. The fiber optics communications system proved to be an efficient and effective means for reaching rural, at-risk emergency responders.

The weak areas for using this system included that each site needed a coordinator to take care of the meeting room and to insure that equipment was working. Hands-on demonstrations were limited. The latter could have been incorporated into each site, however, it would have added considerably to the costs of presenting the program. Scheduling of such a program can also be a problem.

Tormoehlen et al. presented a paper at the Agricultural Safety and Health in a New Century Conference in April 2000. Their paper titled, "Effectiveness of Electronic-based Strategies for Teaching Agricultural Tractor Safety" discussed a comparison of teaching via 3 methods: 1) interactive multimedia CD-ROM, 2) world wide web site and 3) interactive student training manual. They concluded that:

1. The interactive multimedia computer-based CD-ROM program was more effective at creating a gain in knowledge when compared to the Web and traditional instructor based teaching strategies. Based on the results of this study CAI/Multimedia programs can be used effectively to teach the classroom requirements of the Farm Tractor and Machinery Safety Certification course.
2. Youth prefer to learn using electronic tools such as CD-ROM and web sites.
3. The computer program can reduce the need for traditional instruction by providing much of the written information and reinforcing that information with videos, sound, graphics, and interactive exercises. However, the computer is unable to answer student questions as they arise or to adapt readily to needs of individual students. And
4. High quality graphics, sophisticated animations, video and 3-D animations add to the effectiveness of an electronic based curriculum. The CD-ROM used higher quality graphics, more sophisticated animations, video and 3-D animations. The web site was designed using lower quality graphics, simpler animations and no video or 3-D animations. This was done so that the web-based program could be effectively accessed using a modem and phone line.

However, they did recommend that:

1. Additional research be conducted to measure the long-term knowledge retention by students who receive computer-based instruction compared to the knowledge retention of students who receive traditional instruction.
2. Research is needed to determine if the educational strategy employed effects a positive change in safety and health attitudes and if so is one strategy more effective then another.
3. Research is needed to determine if one educational strategy is more effective than the others in bringing about actual behavior change.
4. Research be conducted to address the issue of identifying a method to determine which instructional method is most beneficial to each individual student.
5. Research be conducted to determine whether hands-on experience available only through the traditional instructional method will improve operator skills and safety information retention during the driving test portion of the certification process.
6. Research be done to examine whether completion of the computer-based course should be considered adequate safety training, particularly for youths with no prior experience in tractor and machinery operation.

For the classroom portion of the Tractor and Machinery Certification course, the interactive multimedia based computer programs developed were shown to be as effective as traditional instruction. Used as supplemental material, computer programs can provide technical information about topics, which many instructors may not know thoroughly.

The authors encourage those interested in teaching via alternative delivery methods to study related literature and consult with experts. These methods do present challenges that are not encountered in the classroom. Careful planning is crucial. For example, in the classroom, one may use a film or video produced by a university or business. However, when using these materials for video class delivery, additional lead-time must be allowed for correspondence with copyright holders requesting permission for such use. There may also be costs associated with getting permission to use the material.

When a person is teaching via video, one may have a tendency to feel that every second of tape must be filled. As a result prepared overheads and materials may be gone over too fast. Taking time to write out key points (as one would do in a classroom) was a technique used to assist the instructor in slowing down and proceeding at a pace conducive to the learner.

Lesson objectives must be clearly presented at the beginning of each session. Worksheets, outlines, study guides, and other materials need to be sent to the student at the time of, or prior to the delivery of the tape. Many of these materials can be sent directly to the student electronically.

The important item to remember with the use of any alternative delivery method is, do not let the messenger (the medium) become the message. With new technology comes the temptation to use all the 'bells and whistles'. That is fine, just be sure that they can be used effectively. Too often an instructor spends more time messing with the equipment than in providing the lesson. This is extremely frustrating.
When the 1st author taught the 1st version of the video class in 1990 an unanticipated benefit

occurred. Many students commented that when they were viewing the video on ag safety, that the entire family became involved. The instructor used scale models of equipment as well as stuffed animals on the set. Students reported that this approach attracted the children and they noted the effect that this had; e.g., children quit begging for rides on the tractor and decided that playing in grain wagons wasn't the thing to do. It was a combination of their seeing someone on TV explain what could happen if they did had more impact that hearing mom or dad say "NO!"

In conclusion, these examples show that alternative delivery methods do provide a mechanism to reach audiences that would not be, or are not easily reached through traditional delivery methods. These methods provide a means to provide training, or continuing education for audiences such as ag teachers who need courses to keep their certifications current, and agribusiness personnel and others. This is also a means for teaching health professionals about agricultural exposures.

BE AWARE!
BE ALERT!
BE ALIVE!

References

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Steel, S. The Iowa Farm Chemical Awareness Program. Personal Communication. January 2001.

Tormoehlen, R.L., E. Sheldon, and R. Reeder. Effectiveness of Electronic-based Strategies for Teaching Agricultural Tractor Safety. Paper presented at the Agricultural Safety and Health in a New Century Conference. Cooperstown, New York. April 28-30, 2000.

Web Sites

Examples of web sites where people can obtain ag safety and health information include:

National Ag Safety Database: http://www.cdc.gov/niosh/nasd/nasdhome.html
Iowa State University Tractor and Machinery Virtual Classroom: http://www.tmvc.iastate.edu/
Florida Ag Safety Network: http://www.flagsafe.ufl.edu