An Effective Strategy in Agricultural Safety Training

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People involved in agriculture recognize safety as a vital concern. For this reason, the Agricultural and Biosystems Engineering Department at Iowa State University has an annual undergraduate course offering safety. Additionally, a similar class was offered for the first time last year as an off-campus program for adult undergraduate and graduate level students. This latter course was conducted using 13 - 2 hour video segments and 2 all-day on-campus sessions. A total of 68 students (ages 22-62) participated in the first class that was offered. This article reports on the experience of teaching an agricultural safety course via videotape.

Introduction

People involved in agriculture recognize agricultural safety as a present-day vital concern. Farmers, agribusiness employees and extension personnel expressed a desire and need to learn more about farm safety. However, many are employed full-time and therefore are unable to attend conventional campus classes. A solution was using a videotaped presentation for an off-campus version of an agricultural safety course. Thus students could participate at a convenient time and accessible location. A total of 68 students (ages 22-62) enrolled in the first offering of this class.

The Department of Agricultural and Biosystems Engineering at Iowa State University (ISU) has taught a class in agricultural safety since 1972. Iowa State University is one of a small number of universities involved in teaching agricultural safety as a credited course. Additionally, the ISU College of Agriculture offers off-campus programs as a means for people actively working in agriculture to obtain bachelor's or master's degrees. Videotape is one of the delivery systems used in the instruction of these off-campus courses. The purpose of this article is twofold: 1) to share the authors' experiences and observations from teaching a videotaped class; and 2) to share experiences and ideas for teaching a course in agricultural safety.

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Lehtola and Boyd team taught the on-campus Agricultural Safety class. Lehtola taught the video off-campus version. Both were in the Department of Agricultural and Biosystems Engineering at Iowa State University at the time of the class. Boyd is a 1991 NACTA Teaching Fellow award recipient. Lehtola received a Teaching Excellence Award at Iowa State University for the Ag Safety video course.

Agricultural safety is a subject 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 immediately recognize areas where the information can be applied.

Due to the uniqueness of both the course and the delivery method, the authors hope others find this article of value in the development and implementation of similar courses in their curriculum.

Course Content and Format

The on-campus Agricultural Safety class is a required senior-level, two credit, Agricultural Systems Technology (formerly Agricultural Mechanization) course offered to undergraduate and graduate (minor credit only) students. It can also be selected as an elective by students in other programs. The off-campus version was a two credit offering consisting of 13 2-hour videotapes and 2 all-day interactive sessions on campus.

Both included the following objectives:

1. Identifying agricultural hazards and risks.
2. Implementing strategies eliminating agricultural hazards and risks.
3. Understanding the implications of negligence and liability.
4. Participating in safety-related activities.

Examples of topics meeting these objectives were: hazard recognition, human factors, machinery use, and chemical safety. A detailed list of topics is included in the appendix.

Outside speakers with expertise in specialized areas were invited to give presentations. This helped increase students' awareness of individuals and organizations active in farm safety. The off-campus version was presented during the same semester as the on-campus version. Instructor's presentations for the off-campus version were delivered to the camera, i.e., no audience was present. Sessions with outside speakers were taped with the on-campus class present.

Presently, there is no single textbook covering all the course topics. For this reason the instructor was extensively involved in locating, coordinating, and developing resources appropriate to, and effective in, implementing the class objectives. Materials and references for the course include; 1) FMO: Agricultural Safety, 3rd Ed., Deere and

Co.; 2) video tapes produced by Penn State University, University of Nebraska, University of Iowa, and John Deere; 3) pertinent publications; and 4) hand-outs prepared by the instructor.

Philosophy and Methods

The underlying philosophy in presenting a course of this nature is that "people learn by doing." A review of the literature regarding safety education supports that premise.

Strasser et al. (1973) identified the following implications to safety education:

1. *Traditional education programs that simply involve the presentation of factual information to be memorized or studied for understanding and application are not adequate for safety education.*
2. *Student involvement coupled with group pressures, seems to provide the greatest promise for the modification of human behavior within the limits of our present educational system.*

Steffen's research review (1990) noted the following implications:

Methods recommended for farm safety education involve student activity and student involvement. Key points that should be emphasized in safety education programs include identification of hazards and human factors related to accident prevention.

Silletto's (1976) implications for safety education include:

1. *Safety must be an integral part of all daily activities of persons who work and play in the agricultural environment if that environment is to be a safe place in which to live and work.*
2. *Persons involved in agriculture need to be able to identify hazardous situations.*
3. *Safety education must be continued so that a larger number of our society have an opportunity to develop a more positive attitude toward safety.*
4. *There is a need for general farm education for adults working in agriculture.*
5. *Safety education must be presented in such a way as to help people develop a positive attitude about safety practices and safety regulations which are for the good of workers.*

The instructors' philosophy of participation is embodied in the adage: "Tell me, I forget, Show me, I may remember, Involve me, I understand!"

Educational methods of involvement, participation, case studies, and simulations were incorporated in order to develop correct behavior for emergency or hazardous situations. In an emergency, people tend to follow reflex actions. The ultimate safety training develops correct behavior as the reflex action. This is appropriate for agricultural situations. Murphy's (1980) discussion of human behavior and agricultural safety illustrates the validity of the above-mentioned methods and premise:

Unless you subscribe to the discredited theory that all people are suicidal in nature, one would think that a higher value would be placed on the alternative that would protect decision-makers. And it surely would if all safety decisions were made in a rational, cool, detached, and objective manner. But this simply is not the case in real life. Many of the decisions involving safety behavior which lead to accidents are made in moments of high stress, considerable aggravation, and acute uncertainty.

The result is that safety decisions are often made while the decision maker is anything but a rational being.

Educators recognize that people learn in different ways; therefore, a variety of teaching methods is more apt to reach a greater number of people. People also learn better when more senses are involved, e.g., sight and sound promote learning more effectively than does sound alone.

Much safety instruction is associated with graphic depictions of bloody injuries. Indeed such pictures do have a valid role to play in the recognition of hazards and accident consequences. However, this method should not be used exclusively.

People respond well when taught the scientific principles and reasons why a situation poses a hazard. They are more likely to develop correct behavior if they *understand* why in contrast to just being told not to do something. Course materials and resources incorporated this philosophy.

Assignment Examples

The concepts of active involvement and participation were promoted through the use of specific case studies, simulations, and assignments that could be applied to ones' own situation, e.g., farm or workplace.

Simulation Lab

A lab was conducted involving simulation of farming with a disability. The FaRM (Farm Family Rehabilitation Management) program of the Iowa Easter Seal Society provides technology and support services enabling the severely disabled to remain active in the farm operation. FaRM personnel came to campus and worked directly with the students. Objectives included 1) developing an appreciation and understanding of the difficulties incurred by the disabled in carrying out basic farm tasks; and 2) creating solutions to facilitate accomplishment of these tasks (in many instances, such solutions also benefit farmers without disabilities). The lab consisted of four stations with several tasks being attempted at each station. Stations and tasks are listed in the appendix.

Upon completion, students were given the opportunity to develop solutions for making these tasks easier to perform. Ideas were reviewed by FaRM program staff. Several were later adapted for use by individual clients. FaRM personnel were enthusiastic about becoming involved at the classroom level. Agricultural Systems Technology students may become local machinists and eventually be asked to develop or fabricate appropriate solutions for similar problems.

Homework Assignments

Assignments distributed during the semester promoted practical application of the lessons. Guidelines and objec-

tives were provided; however, students had the opportunity to apply the assignment's stated principles to their own specific situations.

Term Project

Students were required to perform a hazard identification survey of their farm or workplace. Furthermore, they were to target one of the identified hazards and eliminate it. Oral presentations of student projects were given during the second on-campus visit. For example, extension and vo-ag educators developed educational programs relevant to farm safety. Farmers created innovative solutions for the removal of agricultural hazards at the farm-site. Class members involved in agribusiness directed their projects towards improving workplace safety. Student response to the project was extremely favorable. A frequent comment was that they could apply what they were learning to their own situations.

"Tell me, I forget, Show me, I may remember, Involve me, I understand!"

Many students accomplished the hazard identification portion using a videocamera. This proved effective in recognizing and correcting hazards. When compared with the common written checklist approach, hazards viewed on a TV screen seem more vivid and real. Hazards worked with and ignored on a daily basis were recognized as hazards when viewed through the eye of the camera. It has been observed that farm wives are a responsive target audience for farm safety programs. Observation of a hazardous activity (on the TV screen) by the wife/mother frequently resulted in immediate hazard removal and correction.

The authors strongly recommend use of this method for performing hazard identification and farm safety audit activities.

Aspects of Video Teaching

The authors encourage those interested in video teaching to study related literature and to consult with experts. Video does present challenges not encountered in the classroom. A key element is careful planning. In the classroom one may use a film or video produced by a university or business. When using these materials for video class delivery; however, additional lead-time must be allowed for correspondence with copyright holders requesting permission for such use.

Many fear video limits student participation and interaction. During this course participants attended two all-day sessions (each on a Saturday) on campus. The first was at the beginning of the course and the second near the end. Each session included active student participation. A 1.5-hour exam was given during the second session. People take video classes for their convenience. Two on-campus sessions were considered adequate; more may have discouraged enrollment due to travel requirements.

Classroom instructors have different teaching styles. Likewise when using video, a style that works well for one may not work for another. There is a tendency, while video teaching, to feel every second must be filled. As a result, prepared overheads may be shown too quickly. Taking time to write key points as the lesson progresses makes it possible to go at the learner's pace. Even though students can review a tape, it is more comfortable for the learner to proceed at a pace similar to the classroom. The off-campus instructor successfully used a combination of the two styles.

Lesson objectives were stated at the beginning of each tape.

A cautionary point when video teaching is, DO NOT LET THE MESSENGER BECOME THE MESSAGE. New methods are fine when utilized as tools, but too often using these new tools becomes the purpose. Instructors and media people sometimes feel that video teaching must be glamour and glitter. Students, however, indicate they want the instructor to be an instructor and not a show-person!

To promote participation, a toll-free phone number was provided for students to contact the instructor. A video segment of students introducing themselves was taped during the first on-campus visit. Reviewing this tape enabled the instructor to feel personally involved with the students. Additionally, the instructor compiled a follow-up summary of student projects and safety interests. A copy was mailed to each student upon completion of the course.

An unanticipated benefit of the video delivery of agricultural safety was the involvement of the entire family in viewing the tapes. The instructor used scale models of equipment as well as stuffed animals "on the set." Many students reported this approach attracted the children and noted the effect this had; e.g., children no longer begged for rides on equipment or wanted to play in grain wagons. Their seeing someone on TV explain what could happen had more impact than hearing Mom or Dad say "NO!"

As previously mentioned, guest speakers were taped with the on-campus class present while other presentations were made only to the camera, i.e., with no audience present. All were professionally videotaped in a classroom-studio at the ISU Media Production Unit. Video teaching must be recognized as a team effort. The Media Production Unit at ISU handled all the video production technicalities, and the office of Off-Campus Programs in Professional Agriculture handled the mailing of assignments, tapes, and other class materials. The instructor was ultimately responsible for course content and presentation. Key points the authors wish to pass on regarding video teaching include:

1. Support and encouragement by the college and department are essential.
2. Team work in the presentation, production, and implementation of such a course is necessary.
3. There is much more required than having a colleague aim a camera at the instructor -- the videotaping must be professional.

4. The instructor must feel comfortable and talk with the audience rather than at them.
5. Extra preparation time is necessary. This must be recognized by departmental administrators when establishing teaching assignments and work-loads.

Video teaching *is* rewarding. Participating students tend to be motivated and self-disciplined. Our experience coincides with the experiences of Goetsch and Cunningham (1991). They stated, "The GPA's are high, indicating the students' motivation and ability to learn from the videotaped course." Their Food Science class had a high percentage distribution of A and B grades (A=41%, B=43%). Likewise, the safety course grade distribution had a high percentage of A's and B's (A=68%, B=26%).

Factors contributing to high grades include:

1. Self-motivated students are involved. Students who aren't motivated or self-disciplined do not enroll in video courses.
2. Students can review a tape as often as necessary and learn at their individual pace.
3. Adult students perform well when they recognize direct and immediate applications for the learning.

Conclusions

The off-campus instructor had no prior video experience, but found it very rewarding to teach using this medium.

By sharing these experiences the authors hope that others can learn of the potential for teaching farm safety. People are concerned and want to become part of the solution to farm safety problems if provided the opportunity. There is also great potential for using videotaped instruction as an effective delivery tool.

This course proved applicable and valuable to the participants. Measurement of accidents that were (and will be) prevented as a result of students' participation, enthusiasm, and increased awareness is impossible. Participants responded favorably to the class, with many planning to promote farm safety in their communities.

The synergistic effect of (video) teaching agricultural safety at the *point of application* was found to be a key element in the recognition and elimination of hazards. The video medium is indeed a viable and effective tool for reaching the agricultural audience.

References

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Appendix

Course Topics

- Hazard recognition and identification -- general and machine
- Human factors affecting the operator/machine/environment interface.
- Grain handling safety -- combines, grain drownings, auger-elevators, grain dusts.
- Tractor safety -- examples of accidents in Iowa, prevention and preparedness measures.
- Noise in agriculture.
- Chemicals in agriculture -- pesticides, NH3, manure gases, silo gases, confinement system hazards and health risks.
- Fire safety -- general and agricultural.
- Livestock handling safety and zoonoses.
- Farming with disabilities.
- Lawn mowing safety.
- Farm well and groundwater concerns.
- Liability and negligence.
- Trenching safety.
- Electrical wiring.
- Preparedness for agricultural accidents and rescue.

Simulation Lab Stations and Tasks

1. Farming with the use of only one hand
   a. start a nail
   b. hook up a milking machine to a cow
   c. scoop corn
   d. hook up a PTO
2. Farming with an above-knee amputation
   a. climb a ladder
   b. milk a cow
   c. mount a tractor and depress the clutch and brake pedals
3. Farming from a wheelchair
   a. mount and dismount a tractor
   b. ascend and descend a hill/incline
   c. move a bale of hay
   d. scoop corn
   e. open and close a gate
4. Farming with a vision loss
   a. start a nail
   b. locate a specific socket and wrench in a tool box
   c. hitch a wagon and PTO to a tractor