An interactive videodisc module for forage quality and testing instruction

D. B. Hannaway,* P. J. Ballerstedt, P. E. Shuler, D. P. Connell, and D. N. Osterman

ABSTRACT

An interactive videodisc teaching module has been prepared on the subject of forage quality and testing. This module uses the USDA Extension Service Interactive Video Extension Network (IVEN) share disc for the visual images and a microcomputer diskette for the text and audio tracks. The random access nature of this medium allows for any image of the disc to be recalled within 3 s, offering significant improvement over linear teaching technologies. This module was designed for and has been used successfully in undergraduate teaching and extension forage education programs, providing an interactive rather than a passive teaching environment. Information for the module was obtained from college textbooks, extension circulars, and the collective experience of research, teaching, and extension personnel. Standard videodisc and microcomputer equipment are used to operate the educational module.

Publications, workshops, and shortcourses have long been the mainstay of extension information methods. Frequent use has also been made of audiovisual materials such as slide sets, audiotapes, films, and videotapes. Where wider distribution of more general material is desired, the broadcast media has been used successfully (Fedale, 1986).

Extension teaching tools for forage production and management typically consist of fact sheets, circulars, slides, and videotapes dealing with individual subjects such as growing white clover for forage or hay quality and testing. Fact sheets and circulars are useful for answering questions originating from correspondence or phone calls, but are less valuable when putting together comprehensive teaching tools. Written materials assembled into notebooks indexed by subject are helpful as reference documents, but lack the flexibility for cross-linking and customizing presentations. In addition, many publications lack the desired visual appeal, because materials are often black and white with few pictures or graphs. Although slides offer greater visual appeal, they normally are developed for a particular presentation or group of individuals and are seldom adequately organized to be useful to other groups. Videotapes are highly desirable teaching tools but are often unavailable for the topic needed or difficult to adapt to a particular presentation due to their linear format.

What is needed is an entirely new information access process to facilitate interactive instruction. In the area of forage production and management, this means a compilation of materials related to the subject which will allow customized presentations, cross-linking of information, high visual impact, and convenient storage and use. Interactive videodiscs linked to microcomputers offer the technology needed to develop this type of highly effective teaching tool.

THE IVEN SHARE DISC

In March of 1987, the USDA Extension Service released the Interactive Video Extension Network (IVEN) share disc (Miller, 1987). The IVEN optical videodisc contains video and still images from 65 different cooperators covering a wide range of subject matter areas. It was produced to demonstrate the value of videodisc technology to a large number of individuals at a low cost to each cooper (Tate, 1986).

One of the subjects contained on the IVEN sharedisc is forage production and management, with images contributed by David B. Hannaway of Oregon State University and Donald Graffis of the University of Illinois. This article announces the development of an interactive videodisc module on the subject of forage quality and testing for extension and teaching use. This module has been used successfully in a junior-level forage production and management class and was designed for extension specialists and county agents in all states and for college, community college, and vocational agriculture teachers.

WHY VIDEODISCS?

Decreasing extension program budgets have resulted in a reduced ability of individual extension offices to meet the needs of their clients. Similar problems exist for undergraduate instruction. In addition, traditional teaching methods involving information transfer techniques have the inherent problem that they must be aimed at the average student or farmer/rancher rather than the individual. Because there is a vast difference of expertise within any audience about a particular subject, material may be too basic for some and too advanced for others. Different individual abilities to absorb new information also means that regardless of the delivery style employed...
in a workshop, shortcourse, or class, only a portion of the audience will have their needs fully served. A larger segment receives incomplete or confusing information (Fedale, 1986).

Ways of imparting information to students and adult learners frequently take the form of lectures or written material, which usually results in a passive learning experience. With the nearly universal availability of microcomputers, however, the movement from passive to active learning strategies may be accelerated (Helgerson, 1987).

Interactive videodisc technology combines the power of microcomputers with the unique storage and display capabilities of laserdiscs. The user has access to computer memory and graphics in addition to the unique features of the videodisc player. Programmed instruction can include full color motion, sound from two separate audio tracks, and hundreds or even thousands of still images. Through computer control, all of these elements can be orchestrated to provide complex and interactive instructional sequences, high-level storage, and retrieval of images. In addition, interactive videodisc instruction is self-paced. Thus, instruction for any task can be done very efficiently (Florell and Nugent, 1985).

USE OF INTERACTIVE VIDEO

Since its introduction, interactive video has gained increasing recognition as a highly effective method of instruction. Regardless of reading level, degree of motivation, or prior knowledge, people using interactive videodisc learned as much as, if not more than, they had with traditional methods, and in half the time. Further, they retained the information and their level of understanding and comprehension increased over time (Helgerson, 1987).

Optical videodiscs offer the advantage of random access instructional techniques, rather than traditional linear approaches. This offers the learner flexibility in viewing or reviewing material of immediate interest. Any one of the still or video images may be accessed from the disc within 3 s, providing minimal delay to the learner. The reinforcement that comes from seeing and hearing the information provides a highly effective and interesting teaching method.

The computer is used to access the laserdisc with a laserdisc player, providing a visual format for educational and informational programs. Based on the user responses to the program material, selected still and video images are displayed, which guide the user through the learning activity.

The capability of combining instructional courseware with still and video footage in any desired combination makes it possible to provide information in an interactive format. With a videodisc, students may (i) instantly access any still frame or video sequence, (ii) return to a text screen to answer questions, or (iii) branch to a different area of the disc, depending on their interest level or mastery of the subject.

FORAGE QUALITY AND TESTING VIDEODISC MODULE

Why Forage Quality?

Forages are tremendously important to world agricultural production and include plants that are grazed (pastures) and those that are cut for feed (hay, silage, fodder). More than half the total U.S. land surface is grassland, producing the raw materials for the production of meat, milk, and other animal products (Barnes and Taylor, 1985). In the USA, forages account for > 90% of the total feed units for sheep (Ovis aries) and goats (Capra hircus), > 80% for beef cattle (Bos taurus), and > 60% for dairy cattle. In the western states alone, nearly 20% of all cropland is used for hay production. Alfalfa (Medicago sativa L.) is grown on 58% of hayland and amounts to > 90% of all hay produced. Alfalfa is grown on 2.5 million ha (6.3 million acres) in the west and is valued at $2.7 billion (USDA, 1983).

With this value of forage available each year, effective utilization of forages (and particularly alfalfa hay), requires an understanding of forage quality and testing. In addition, recent efforts toward standardizing traditional (laboratory) and new (Near Infrared Reflectance Spectroscopy) methods of testing alfalfa hay (Marble, 1984) have further increased the need for educational information on concepts of forage quality and testing.

Sources of Information

Instructional materials used to develop the forage quality and testing module included an extension circular published by Oregon State University (Hannaway and Ballerstedt, 1988), the laboratory certification manual published by the U.S. Alfalfa Hay Quality Committee (Hannaway, 1984), and the textbook Forages (Heath et al., 1985). In addition, the reviews and recommendations provided by forage and livestock specialists from several states provided valuable information for this instructional module.

Module Description

The module is divided into the following sections: an introduction, methods of accessing, summary information, and reference materials. The introduction presents the purpose of the program, a description of what forage quality is, and why forage quality is important.

The main focus of the program is the methods of accessing section, which is divided into visual and sensory (organoleptic) evaluation, laboratory analyses, and animal feeding trials. The organoleptic evaluation section describes maturity, leafiness, color, foreign material, and odor and condition and explains that these are the important factors that can be evaluated without expensive equipment or laboratory facilities. The laboratory analyses section includes sampling, dry matter, protein, fiber, laboratory certification, near infrared reflectance.
spectroscopy, and explains what tests to perform and why.

The animal feeding trials section describes what these trials are, why they are useful, and what types of trials are normally conducted in research experiments. The summary provides a review of the module (what has been learned) in six summary screens. The references section lists extension fact sheets, experiment station publications, and books that cover the concepts of forage quality and testing.

Recommendations for Use

As part of a junior-level forage production and management course, this interactive videodisc module has been used to supplement the forage quality and testing lecture and laboratory. It provides an alternative format for learning the information presented, and expands on many of the concepts that cannot all be covered in the time allotted for class. Students have used the videodisc as a review for quizzes or exams, and some students have used it as an alternative to class attendance.

The interactive videodisc format is best suited, however, to use as an individual project component of a class. Lectures can be provided on some topics, group projects assigned on other topics, and individual topics assigned on interactive video and computer-managed topics. Using interactive videodiscs in this way allows students a break from the traditional lecture format and provides an opportunity for pursuing the topic at various depths. It is suggested, however, that some structure be provided to guide students through the videodisc, for example, study questions or quizzes could be included as part of the videodisc activity.

CONCLUSION AND SOFTWARE SPECIFICATIONS

The forage quality and testing module described in this article provides an interactive teaching tool utilizing optical videodisc technology. The IVEN module has been used effectively in a junior-level forage production and management course and in extension education programs. We envision its successful application in community college and vocational agriculture programs as well.

Use of this videodisc module requires the diskette containing the instructional information; the IVEN share disc, which contains the forage quality and testing images; and the following equipment:

1. IBM PC/XT or compatible (with 512 K RAM, serial port, 10 MB fixed disk, one floppy disk drive, and MS or PC DOS version 3.1 or higher)
2. Analog RGB monitor
3. Parallel printer with graphics capability
4. Videodisc player (some examples are Pioneer LD-V1000, 2000, 4000, or 6000; Sony LDP-1000-A or 2000)

Optional equipment includes a touch screen monitor, a voice card and speakers, and authoring system software to permit program development (Deter, 1986). This module was developed using an NCR computer system, a Panasonic LD-V1000 video disc player, the TrueSound Technologies sound card, and Visual Technology Associates authoring system (ITV-PAL).

Videodisc equipment may be purchased from various vendors in various configurations, including play-back systems or fully functional authoring systems. Average cost for a fully functional authoring system is $10,000. Playback systems range in cost from $3500 to $5000.

The diskette containing the instructional material is available for $10 from the senior author: D.B. Hannaway, Crop Science Department, Oregon State Univ., Corvallis, OR 97331-3002. The IVEN share disc may be obtained for $50 from the USDA Extension Service in Washington, DC: Tom Tate, National Program Leader for Electronic Communications, USDA-ES, Room 3331-South Bldg., Washington, DC 20250-0900.

REFERENCES


