

Energy content of alfalfa hay – TDN of alfalfa hay is
>3. 55% (from feeds table)
1 ton or 2000 lb contains 1100 lb of TDN

Value of energy in hay – Weight of TDN in 1 ton of hay x cost of energy from corn = value of hay

>4. 1100 lb TDN/ton hay x
>5. 3.75¢/lb TDN = \$41.25 value/ton of hay

If the hay sells for \$42 per ton, is it a cheaper source of energy than corn at \$1.68 per bushel? Obviously not! If cost is more than value, NEVER buy.

NOTE: The screen displays information until an answer (>) is needed. Type in the value at the arrow (>). Once they have completed one arrow they are automatically sequenced to the next arrow. In this manner, the student is led through the problems in a step-wise fashion consequent to his ability to obtain specific information contained in the problem and place it at the appropriate arrow.

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SOME GUIDELINES ON THE USE OF MULTI-MEDIA FOR TEACHING

John H. Behrens*
University of Illinois

At conventions or conferences in recent years publishers and producers are often displaying materials for use in elementary or secondary grades and you have probably noticed the profusion of materials that are offered as multi-media. Many of these are earnest attempts to provide a well-rounded system of materials on a subject. Others are frauds and merely present a neatly packaged program that meets the definition of multi-media merely by content of materials such as a filmstrip with a record and accompanying script.

The purpose of this paper is to present some guidelines, from our experience with an advanced farm management course, on the use of multi-media and multi-image in the context of the definition of instructional media.

Terminology: Media

A dictionary definition for media (plural of medium) is, "any means, agency, or instrumentality: as, radio is a medium of communication" and "any material used for expression or delineation: as in art, the painter's favorite medium was oil."

Bretz (1) in his book, *A Taxonomy of Communication Media*, defines media "A means of effecting or conveying something. Medium is a general term roughly comparable in many ways with tool, instrument, vehicle, means, etc." He then refers the reader forward to communication medium which he defines as "A system for conveying messages through reproducible and self-contained programs." And again he forwards the reader to his definition of instructional medium, "Any component of the learning environment which provides or helps provide stimuli to learning."

Multi-Media

We conceive of multi-media as combinations of instructional media which motivate students and help reach the terminal objectives of the instructor. To be most effective, these combinations of media should be used simultaneously.

Professor John Herbst utilizes 2 x 2 color slides, 16mm black & white motion pictures, overhead transparencies, amplified telephone, and printed handouts to teach management and operations of a confinement swine system with the owner-operator (Figure 1). Maps, schematic diagrams, record sheets, and data are presented on the left screen and slides and movies are presented on the center screen. The farm operator discusses his program with Professor Herbst. Two images may be presented simultaneously, for example, a picture of the maternity house by slide and floor plan of the house by overhead transparency. As details of the facility are discussed additional slides are presented. For example, the overall floor plan on the overhead is left in place for student reference while color slides are used in sequence to explain farrowing crates by overall and close-up detailed photogra-



Figure 1

phy. Copies of record forms can be shown on the overhead projector and the students can compare them to completed printed materials in their possession. Similarly, students can enter data on printed hand-outs while information is presented progressively by the instructor and in this case by the farmer. In cases of tele-lecture presentation the resource person on the end of the line has a copy of the visual materials that the instructor is using. This usually takes the form of a duplicate set of slides or black and white composites of the slides and photoduplications (Xerox, Thermofax, etc.) of the overhead transparencies. Blank slides in the slide projector allow the center screen to be darkened when not needed and keeps control of the system in the hands of the teacher.

Multi-Image

Instructional media reinforce each other in a true multi-media presentation. In turn, a multi-media presentation may develop into a multi-image presentation. Multi-image is an extension of the multi-media concept utilizing more than one projected image in the learning environment.

In the Office of Agricultural Communications at the College of Agriculture, University of Illinois at Urbana-Champaign we use for multi-media two screens (or one large screen surface) one slide projector; possibly a movie projector, either Super-8 or 16mm; an overhead projector and an audio source. The instructor can be reinforced by recordings or amplified telephone. Multi-image media involves the use of more than one image of the same or similar kind (for example, three 2 x 2 color slides) projected simultaneously on one large or multiple screens and controlled by a pre-recorded program source.

A variety of presentation formats are possible and a few possible combinations are illustrated with figures 2, 3, and 4. The actual combinations are dependent upon the creativity of the developer, physical resources such as space and equipment, and

*John H. Behrens, Coordinator of Instructional Resources, Office of Agricultural Communications, University of Illinois at Urbana-Champaign.



Figure 2

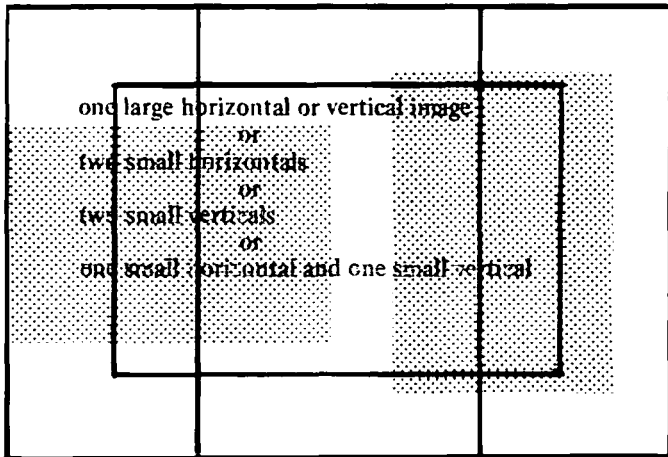


Figure 3

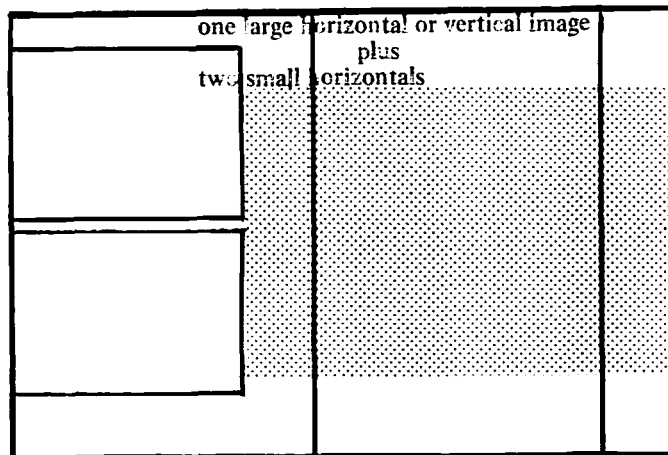


Figure 4

economics of time and money. Figure 2 is probably the most prevalent type of a multi-image presentation but is not necessarily the most effective. The main disadvantage is with front-surface projection and availability of multiple screen units. Figures 3 and 4 represent more interesting and effective patterns which will be discussed later.

Uses of Multi-Image Media

There are several advantages of multi-image media. As educators, we must understand that the student is subject to a higher degree of technical sophistication in his exposure to commercial communications media and entertainment and needs to be challenged to hold his attention and interest.

Multiple images can support each other. An overall picture of a machine, for example, can be reinforced with an experimental header, can be reinforced with a close-up slide or a motion sequence by a movie projector, or combinations of these two media.

Multi-imagery can be progressive. One area of the screen can be used to present material in sequence. As the sequence progresses the composite image is built-up on an adjacent screen area. Two or more combinations of images, such as a graphic drawing, a photograph, and an exploded view can all reinforce each other while the learner checks one against the other and has instant selection of a viewing medium without being dependent upon

the material to be repeated or missed.

Variety is possible with multi-image-media. Media pre-recorded with other media messages, such as statements, discussions, or answers to questions from other talent sources, can be used to reinforce visual images and the main message.

A large amount of material may be presented in a relatively short time for an overview of certain subjects. For example, I used multi-imagery techniques to show 360 2 x 2 slides and two Super-8 film segments within a time framework of 32 minutes for a presentation of India. The audience was presented a wide variety of conditions and facts in a smooth flow of imagery reinforced by sound. A unit prepared by our office for presenting a program on agricultural policy used a whole series of images of fruit and vegetable products from the wholesale market in Chicago while the narrator discussed this aspect of product pricing. A normal presentation would have probably projected one image of the outside of the market.

Several disadvantages are as follows: A multi-image production requires a much higher expenditure of production time; a wider range of resource materials; more and specialized equipment; and more set-up time per minute of presentation than a multi-media or a single image presentation.

screen

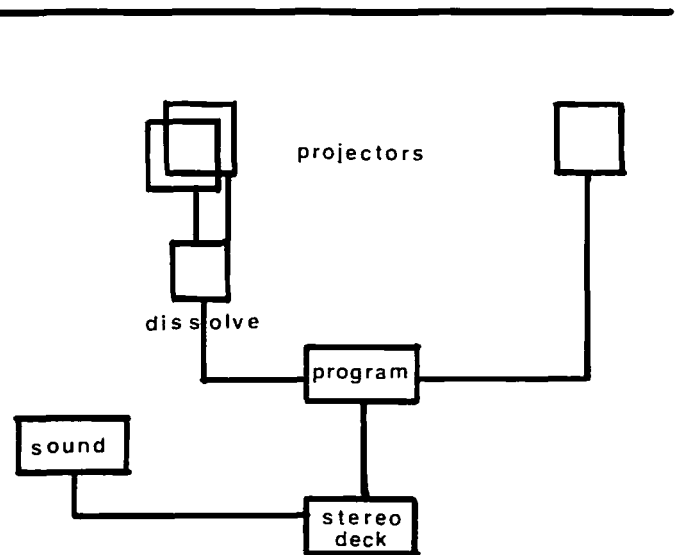


Figure 5

Guidelines for Multi-Image-Media

Components basic to a multi-image presentation are shown in Figure 5. Supplemental components are shown shaded.

Once the need has been established for multi-image-media and the commitment to a multi-image production made, the following guidelines are offered:

1. Rear screen projection is probably the most successful and useful projection technique for multi-image productions. As indicated in Figure 5, a considerable amount of equipment is needed. Front-surface projection can be quite distracting to the audience and is often in competition with the actual message that is being presented. Front-surface projection is suitable if long-throw lenses and high light output projectors are available so the equipment can be located behind the audience. Ideally, they should be operated in a projection booth to minimize noise and distraction. Conventional projectors, such as the Kodak Ektagraphic, can be fitted with short focus wide angle lenses and used very effectively in rear projection. Slides need to be reversed for rear projection. The advantage of close proximity to the screen with wide angle lenses is offset by the need to keep the projection axis perfectly perpendicular to the screen surface to prevent keystoneing and distortion. Simple drapes around the edges and bottom of the screen dress-up the performance, provide visual isolation of the equipment, and help keep projection noises to a minimum. Rear projection effectively hides all the mechanical aspects of a program and the audience can focus their attention completely on the message.

2. A stereo sound source is required. One channel can provide the audio message and the second channel can control the program source. We have found that stereo cassette decks are the best units to provide this source. Existing amplifying equipment can be fed the audio signal from

one channel and the program driven from the second channel. A separate sound amplifier might be needed under some conditions if existing equipment is not available.

3. A multi-channel programmer is needed if more than two channels of information are to be required. A person can manually operate two units by following a script but will find it quite a hassle if he tries to coordinate three or more channels. Two types of programmers are generally recommended. One type is called digital and the other tone. Either kind is effective and the selection should be based upon dealer availability and price. Do not underbuy program capability because as you gain experience you will need and want more channels, so buy beyond your first need if at all possible.

4. Dissolve controls provide flexibility and variety to your programming. Buy a dissolve control that has the capability of being programmed to dissolve between slides or "cut" from one slide to another instantly under control of the program unit. Variety is essential and a presentation that dissolves from one image to another at a fixed rate can become mo-

notonous and boring. A dissolve unit solves this problem.

5. Specialized equipment will probably be needed as you gain experience. Right angle lenses and mounting bases will become essential if you wish to use dissolve units with rear projection. A right-angle wide angle lens is necessary to show motion pictures in the right perspective with rear screen presentations.

Reference

- (1) Bretz, Rudy, *A Taxonomy of Communication Media*, Educational Technology Publications, 1971

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AGRICULTURAL BUSINESS INTERNSHIP PROGRAM

by Thomas I. Gunn

Chairman, Department of Agricultural Economics
California State University - Fresno

A new academic emphasis developing in many institutions of higher education is career education. Programs being initiated provide opportunities for students to integrate their academic training with direct practical experience in businesses, community agencies and organizations. These career education programs have been in the form of internships, cooperative education projects, work-study and various other types of learning programs where credit is awarded.

One of these programs is the Agricultural Business Internship which was established in 1972 by the Department of Agricultural Economics at California State University-Fresno. This program has been so successful that the entire School of Agricultural Sciences is now establishing a coordinated Agricultural Internship Program which will encompass all departments.

The purpose of the Agricultural Business Internship is to give upper division students an opportunity for specific supervised experiences in an actual agricultural enterprise and to receive university credit at the same time. The program has made it possible to develop a close relationship between the agricultural business community and the Department of Agricultural Economics in the educational process of students. It has also given faculty relevant business and economic examples for classroom instruction.

Certain features of the Fresno State internship program are unique. Because of the proximity to the campus of so many different agricultural businesses, many internships are arranged so that students spend only one full day per week with the cooperating firms. This permits the student to take courses at the university while concurrently completing an internship. Thus, a close student-advisor contact is insured. This closeness to the students contributes greatly to maintaining a strong academic emphasis. Many internships or similar programs at some institutions have lost contact with the internees because they were not on campus for long periods of time.

The central location of Fresno State to many different types of California agricultural enterprises offers a prime setting for an internship program. With expansion to the entire School of Agricultural Sciences, new features of the program are contemplated. Some of these will permit more flexibility in the amount of time that a student can devote to an internship. In the past, up to 6 semester units of credit have been allowed. Under the new program, from 1 to 8 units will be permitted. The credit allowed will be determined on the basis of the expected time to be spent on the internship, as well as other factors.

Under the Agricultural Business Internship Program, a student is expected to become acquainted with the entire operation of the business. The cooperating firm agrees to provide opportunity for the internee to become familiar with all aspects of the business by actually doing (where possible) rather than just ob-

serving. The supervisor in the cooperating business establishes a schedule of activities for the internee during the entire period of the internship.

To maintain close supervision over the program, students are required to periodically meet (every two or three weeks) with their internship advisor to discuss problems and determine the progress they are making as an internee. In addition, the advisor contacts by telephone, or personally visits the cooperating business several times during the semester to ascertain progress of the student.

As a part of receiving university credit for the internship, students must prepare various reports. A weekly report is submitted to the advisor in which the activities of the internee are recorded for that particular week. A final comprehensive report must be prepared which is graded and serves as a record of the internship. This report includes such things as: history and organization of cooperating business, services of business, work accomplished by task assigned, problems observed and alternate methods of solving them, how the program has helped the internee, etc.

These training programs with agricultural firms have provided students the opportunity to become acquainted with the day-to-day operations of businesses and to develop skills not readily available in the classroom. The Fresno State program has included the following types of cooperating firms: commercial banks, land banks and production credit associations, agricultural chemical and seed businesses, farm equipment agencies, corporate farms, radio-tv broadcasting stations (Farm News), and legislative committee. Banks and farm credit institutions have been utilized to the greatest extent because of ongoing training programs they conduct for their employees which could be adapted to university internship students. However, during the past year more students have been placed in firms involved in selling and marketing agricultural products. As the internship program expands to all areas of the School, many different types of firms representing various aspects of agriculture will be included in the program.

In general, most agricultural business firms, when approached by the university, have been willing to cooperate in the internship training program. These concerns are interested in broadening the learning experiences of students. Some firms find that internship programs are a means of looking over prospective employees before hiring. Also, the public relations of cooperating agencies and businesses are improved when cooperating with institutions of higher education in career education programs of this type.

The success of the Fresno State program is expressed in comments received from some of the cooperating firms:

"We would like to thank you for allowing your students to participate in this program with us. It gives us an opportunity to know the stu-