Education

A Simple, Inexpensive Technique for Making Slides

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A simple inexpensive technique for making color slides of text, tables, charts, graphs, and lists has been successfully implemented in our department. The technique is to use a 35-mm camera on a tripod to photograph the appropriate information displayed on the remote video display unit of our dedicated nuclear medicine computer system. This method is simple and less expensive than either having diazo slides commercially prepared or in-house production of Polaroid slides.

The clinical applications of computers in nuclear medicine are well known (*1-6*). We have found that the computer can also be used to help make color slides for continuing education, lectures, orientation, case presentations, and scientific papers. In the past, we have used both a commercial diazo method and instant Polaroid slides. Each of these methods has its particular drawbacks.

Materials and Methods

Figure 1 illustrates the basic relationship of equipment for this slide production technique. Our institution uses the MDS A^2 computer, with 1980-A software. It has a 64 K word memory, a processing terminal, a remote acquisition terminal (each with 128 K byte memory), and a remote video display unit (Medical Data Systems, Inc., Ann Arbor, MI). We use a 35-mm single-lens reflex Pentax camera, mounted on a tripod, which is used with either of the two following lens systems (Asahi Optical Co., Ltd., Tokyo, Japan). Lens system 1 is a 50-mm, 1:1.7 lens with a close-up attachment lens No.1. Lens system 2 is a 70–120-mm zoom lens, 1:3.5 used at the 135-mm setting. The film we use is Kodachrome 64 (Eastman Kodak, Rochester, NY).

Our technique requires two steps preceding photography. In order to have a place to write text, a blank screen must first be obtained. The next step is to access to computer software, which will actually display the text on the remote video display unit.

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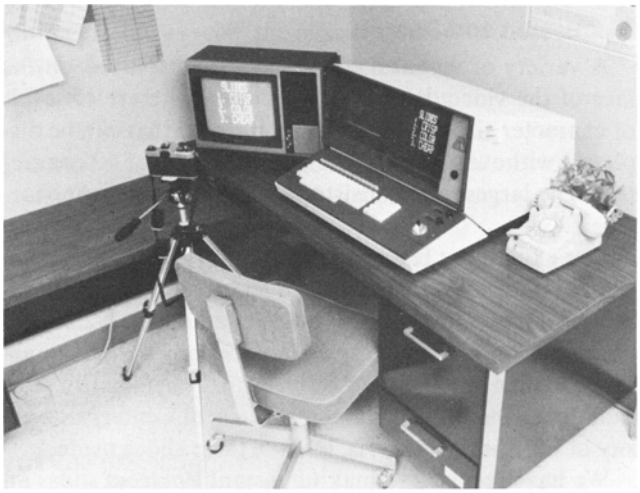

FIG. 1. Camera on tripod positioned in front of remote video display unit.

We access any available data file on the patient utility program (PU), list patients (LP), or list studies (LS). We then go to a static display mode, which is accessed with a command display image (DI) and static image (ST). Next, we proceed to display utilities (DU) and blank the screen with image display command (IM). This command blanks only the acquired data image and does not affect the text buffer.

To access the computer software, the following commands are necessary. Return to systems utilities (SU), using any of the methods available. Access text editor with the command TE. A colon (:) will appear as a prompt for the next entry. Enter KE, escape, escape (KE$$). Once in the text editor program, a menu of commands appears on the screen. These are basically self-explanatory, and allow one to change color, size, and position of characters.

In order to exit from the program, control H, escape, escape (H$$) must be entered at the keyboard.

The displayed information can be photographed as soon as it is typed on the terminal, if it is judged to be esthetically acceptable.

We use lens system 1, and position the camera approximately 15 in. in front of the video unit (Fig. 1) when large

characters or a single word are centered on the display.

Lens system 2 is used with the camera positioned 7 ft in front of the video unit when five or more lines of small-to-medium sized characters are to be photographed.

A cable-operated shutter release is used to eliminate movement. An *f*-stop of 11 with 1–2-sec exposure is used. The proper exposure time can be determined by using an incident light meter or a camera with an automatic meter with manual override to simplify the process. The small aperture increases the depth of the field, reducing some of the fuzziness along the periphery caused by the shape of the video tube.

As an alternative for close-up lens No. 1 (lens system 1), a 50-mm macrolens can be used. A 135-mm portrait lens can be substituted for the zoom lens (lens system 2).

Discussion and Results

A variety of verbal messages can be displayed on the face of the video display unit because there are 15 levels of character size. The maximum number that can be displayed without any enlargement is 20 lines of 60 characters. The largest size consists of a single line of four characters.

Our experience has been that well-organized scientific presentations that include diazo slides have been well received. Unfortunately, the diazo method, at $2.25 per slide, is relatively expensive. In addition, we had to arrange to take our prepared material to the medical illustration department of Sacramento Medical Center, University of California at Davis, to have these slides made.

We have resorted to making instant Polaroid slides on occasions when we were pressed for time. The main advantage is that they can be made within the department, in approximately 1 hr on a copy stand with 46-L Polaroid film. The drawbacks of this technique are that they are limited to black on white, and that they are relatively expensive, at $5.80 per 8-exposure roll.

Slides made with a 35-mm camera and the computer provide professional-looking slides at a fraction of the cost (Table 1).

TABLE 1. Comparison of Slide Production Techniques

	Diazo	Polaroid	Computer
Time	3 days	1 hour	2 days
Cost	$45.00	$15.00	$5.00

Time and cost based on production of 20 slides

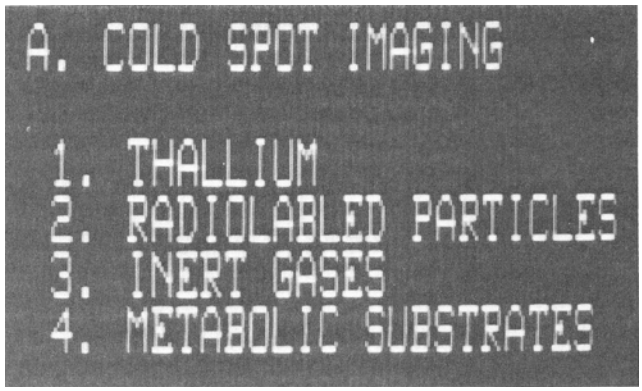

FIG. 2. Sample of slide produced by this technique.

One technical limitation is that it is almost impossible to totally eliminate slight bending at the top and bottom of the video screen, even with the camera carefully positioned and centered at 7 ft.

Several excellent resource manuals are available to aid in preparing slides and audiovisuals for scientific presentations. Our preference is a Kodak pamphlet (*7*).

We have our film developed, but not cut, at a local drug store, and mount the slide ourselves to insure proper centering (Fig. 2).

Conclusion

We find this color slide-making technique useful in our department for a variety of purposes. Users of other computer systems should be able to modify our technique to meet their needs.

References

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