Color Microfiche: An Attractive Alternative for Use in Independent Study Systems

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The traditional method of providing audiovisual study materials for independent study systems has been the two-by-two inch slide with each student study carrel equipped with a slide projector and cassette tape recorder.

With the advent of videodisc technology, interest has been expressed in using this as a medium for storage, retrieval and display. Brown, Stolurow, Fowler and Sustik (1979) at the University of Iowa have proposed the videodisc be considered seriously as an "intelligent" display when coupled with a microcomputer. The advantages advanced for this system include the extensive capacity for the storage of visual frames (54,000 still images per side) and its ability to present in random order any of these frames or a combination of still and moving pictures. The simplicity of one stand-alone unit could facilitate student use. A number of investigators recognize the limitations of such a system which include the role of the teacher in courseware preparation, cost of equipment and cost of courseware, system reliability, size of the project and amount of material required.

A third possibility has existed for some time but has not been exploited widely except in isolated applications. This is the use of color micrographics or microfiche as the visual medium for stills. Several years ago Philips introduced a combination still and motion picture programmable device wi[th] sound using cassette motion picture techn[ology] and currently Revox have available [a] programmable audiovisual microfic[he] viewer. The University of Florida Den[tal] School has adopted this approach for [its] audiotutorial programs (Dills and Ba[...] 1980).

NRC has considered the possibility of [...] or microfiche as an audiovisual peripheral [to] its CAI project; however, it discarded t[he] idea because of the lack of "in-house" fi[...] production capability.

The University of Guelph has develop[ed] an in-house color microfiche production u[nit] and, while the specifications are propriet[ary] information at the present, this fiche h[as] been produced at Guelph at a cost of $28 p[er] master and $2.35 per duplicate. A comme[r]cial service is available from Rochester b[...] $200 per master and delivery schedu[les] reduce its attractiveness.

The remainder of this paper will exam[ine] the possibility of color michrofiche as [an] audiotutorial medium and compare it w[ith] color slides. In addition the prospect of t[...] as an alternative to the videodisc in an [in]telligent terminal will be considered.

Color Slides and Color Microfiche

The first advantage presented by co[lor] microfiche is economy in storage. A carou[sel] slide tray holds 80 slides, whereas in the same storage area can be stored 39,200 images on a four-by-six inch microfiche, using 98 images per fiche.

Retrieval is simplified with indexing but since in audiotutorial applications one is dealing with an organized sequence of images, the task becomes one of selecting the correct sequence.

The slide has the advantage of ease of editing in that each frame can be changed without interfering with the other slides in the sequence. This advantage is lost in microfiche since any change requires creating a new master and duplicates. However, since audiotutorial materials are carefully structured, there is less tendency for random revisions. It is important to provide for some revision on a recurring basis and for the purpose of illustrating the comparisons, an annual allowance of 25 percent has been considered for necessary revisions.

Table 1 compares the cost of each system for a 30-position audiotutorial installation using 20 instructional units per academic year.

In Table 2 a comparison of the equipment costs is shown for the two systems using manually operated microfiche readers. If programmed or automated systems are required the equipment considerations change markedly. A caramate-type slide viewer, with sound and programmed sync pulses, costs in the range of $525.00 whereas a programmable fiche display unit costs in the order of $3,000.00 including sound.

Figure 1 combines the equipment and courseware costs for different size classes. The data here are based on a four-year course cycle allowing an annual replacement of all fiche and a 25 percent annual revision of the slide material. In both cases it is assumed all equipment is written off and due for replacement.

Summary

In this discussion color microfiche has been shown to have substantial cost savings over conventional slides for audiotutorial or independent study programs where high quality display of color visuals is required. In addition the ability of microfiche to compact a large quantity of visual images in a small space gives it decided advantages where storage space is a consideration.

Automated Display Systems

With the growing availability of computer based learning systems interest has recently focussed on display devices that have substantial capacity for random retrieval of high quality visual images.

The random access slide unit faces significant limitations in the number of visual images which can be conveniently left up on the system. In contrast the videodisc has a surfeit of capacity with 54,000 individual frames per disc side (Whillans, 1980). While

Table 1	Courseware Cost Comparisons Color Slide vs Color Fiche		
		Color Slide (80)	Color Fiche (
Master copy		$ 36.00	$ 30.00
Duplicates		1,260.00	70.50
Unit total initial cost		$ 1,302.00	100.50
Revisions			
slide — 25% per x 3 years		976.50	301.50
fiche — annual remake x 3 years			
Total course cost per unit		2,278.50	402.00
x 20 units per course		45,570.00	8,040.00
Annual courseware cost on 4-year cycle		11,392.50	2,101.00
ratio		5.67 :	1
Annual courseware cost per student assuming 20 students per station or 600 per course		$ 18.99	$ 3.35

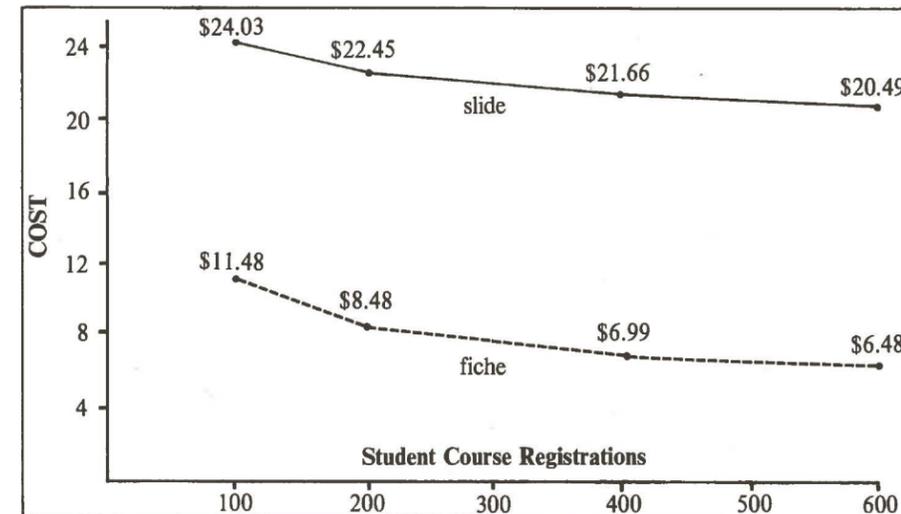| Table 2	Equipment Cost Comparisons Slide vs Fiche		
		Slide	Fiche
Equipment cost			
30 units @ 200		$6,000	
@ 250			7,500
Annualized cost over 4 years		1,500	1,875
Cost per student per year		$ 2.50	$ 3.125

Figure 1 Annual cost differential including equipment and courseware between color slide and color microfiche in a twenty-week independent study course based on per student costs.

its storage capacity can be readily accessed by a microprocessor its color quality and resolution are limited to television quality. Furthermore, a major drawback would appear to be the cost of and inconvenience of courseware manufacture. While revision in the programming of existing frames is readily achievable it is not possible to add new material without pressing a new disc. In applications where it is essential to update material the videodisc would appear to have serious limitations for instructional application.

A third alternative to be considered is color micrographics. Sutcliffe (1979) suggests that microforms be considered, Computer Assisted Retrieval (CAR), because of the "unmatched storage density". He points to the sudden merger of computer and micrographic technologies which until recently have been viewed as competing opponents.

Dills and Bass (1980) report that at the Department of Dental Education, University of Florida, they have successfully employed a Revox microfiche-tape unit using a digitized encoder to present randomly selected visual frames in a branching or programmed learning application. Our investigation of a similar device indicates that while it will achieve this with a high quality image it is limited to 60 frames per four by six inch fiche and each fiche must be inserted separately.

A system available from I.M. Bruning International provides for random access of up to 3,000 frames. A cartridge system holds 30 fiche and any frame can be retrieved within three seconds. The system has been upgraded so that it can be controlled by a microprocessor giving extensive flexibility in programming of visual material. The ease of fiche loading in the cartridge coupled with the in-house fiche production capability, developed at Guelph, puts the preparation and programming of audiovisual courseware within the reach of educational and training institutions.

Other applications of this approach would seem to be indicated in art, medical and architectural libraries where reference to slide materials is presently cumbersome and time consuming. An automated index system with microfiche display of color slide images would eliminate some of the current costly

storage and time aspects of search and retrieval.

Conclusion

This paper has suggested that a transfer of color slide material to color microfiche has significant potential for savings in courseware and storage costs. Currently available hardware makes this approach attractive for student operated audiotutorial systems, computer controlled learning systems and visual retrieval systems in libraries with large slide collections.

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The Question of Display: Folk Festivals

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An increasing number of cities across Canada have ethnic groups making multicultural presentations to the public. The authors, a design and housing professor, and a communication and education professor were requested to give a workshop on display techniques to an ethnic group planning a three-day folk festival. Questions about display were received in advance, as well as at the workshop. The purpose of this paper is to present this case, identifying the questions and offering some possible solutions.

Why Display?

Ethnic groups planning a folk festival may have four basic reasons for including display as a part of the festival: educational, artistic, social or commercial.

Educational

An ethnic group has information which may be shared. A purpose for the ethnic group is to develop interest and understanding in the cultural background of their group. This is based on the assumption that others want to learn about their culture. A display of artifacts from the country of origin can hone the curiosity of the viewers to come again, to travel, and to ask questions. Within the ethnic group, the more knowledgeable members may wish to promote standards for others. Good displays start people thinking and discussing the things that are different and the things they like. Therefore, a good display will help to summarize ideas or to clarify those that are abstract. The area where the display is placed may have several areas, so attention-getting displays can remind visitors to go to another section. Comparisons may be made, for example, comparisons of the ethnic populations in Canada, with the population in the homeland. A display could present this information visually to the visitors.

Artistic

Many of the community buildings used for ethnic displays are open structures. For the folk festival, displays may be used to give beauty to the surroundings. An atmosphere similar to the homeland may be created. The color, shape, and design of artifacts and costumes will create a happy, fun-filled mood. Those who set up the displays will develop their creative skills. Appreciation for patterns, materials, and colors will be fostered for those who come to the festival.

Social

Participation implies socialization. A

"hands on" display where the visitors touch, taste, or try making an ethnic item will involve the visitors in the culture. Those who manage the event will find a folk festival provides these management opportunities: to plan and to cooperate with other ethnic groups; to set up the display, to man it, and "to strike the set" when the festival is over. Throughout the preparation and implementation of a folk festival, relationships will be built and ideas shared.

Commercial

Finally, a folk festival is a business. Souvenirs, food, drink, and entertainment may be marketed. A good display will move the goods toward the buyer and motivate visitors to spend money to take a bit of the festival home. Sales of ethnic foods will be clinched if samples and recipes are displayed.

These are some of the answers to "why display?". If a folk festival group decides to include a display, the next question is...

What is a Good Display?

Many criteria distinguish a display. To be effective the display needs to attract and to hold attention long enough so that the total message is recognized. Emphasis is probably the most important facet of a display. The other criteria which comprise a good display such as simplicity, contrast, visibility, stability, meaningful lettering, available resources, and strategic location support this goal.

Emphasis

If a display is eye-catching, emphasis will be achieved. Emphasis means that some part of the display is attention-getting because it is different or unique. Emphasis could be obtained by having movement of parts within the display as in the use of turntables, mobiles, or changing pictures. The use of spot lighting to focus attention on one or more facets of the display can be a means of attracting attention. Using appropriate background music is another way interest in the display and in the country of origin can be created. The use of bright, warm colors such as red, yellow, or orange achieves emphasis. Enlargements, blow-ups, or mirrors incorporated as display background materials can unify a theme and substantiate the message, thereby achieving emphasis.

Using a piece of furniture such as a chair or chest within the display adds to the three-dimensional quality and provides a support for displaying items such as pillows and linens. For best effects, the furniture should be from the same ethnic origin as the re-