UNDERGRADUATE VIDEODISC REPURPOSING PROJECTS: BIG SCREEN RESULTS ON A WINDOWS BUDGET

John Minor Ross
Indiana University Kokomo
Dept. of Mathematical and Information Sciences
P.O. Box 9003
Kokomo, Indiana 46904-9003

ABSTRACT: *Videodisc repurposing is the use of computer programs to control the delivery of an existing videodisc in a way unlike what the original creators of the materials envisioned. This is a review of repurposing projects done by information systems seniors as class projects. In each project, the original videodisc was repurposed following the requests of geology, history, and art faculty members who planned to have their students use the final learning tool.*

KEYWORDS: *Videodisc, CD-ROM, Computer-Based Training, Information Systems Curriculum*

MULTIMEDIA POTENTIAL AND BARRIERS

The Interactive Multimedia '92 conference consisted of three events: the fourteenth Interactive Videodisc in Education and Training conference; the eighth Development of Interactive Instruction Materials conference; and the eighth conference on CD-ROM Applications in Education and Training. Yet, in the past eight to fourteen year period, "integration of multimedia instruction into so-called standard education curricula, in both industrial training and academic education, has been slower than expected." (1) Each year it seemed that some industry analysts were proclaiming it the year of the CD (or videodisc or multimedia or whatever) even as others were noting that prior year predictions failed to happen.

The main barriers to market acceptance were price and development tools suitability. Recently, however, changes have come to the marketplace in the form of new technologies. Undertakings previously too complicated and costly for many universities and corporate training departments are now becoming feasible.

VIDEODISC REPURPOSING AT IUK

What follows is a review of student-designed videodisc repurposing projects at Indiana University Kokomo (IUK) developed in the spring of 1992. IUK is one of eight Indiana University campuses and is located in north-central Indiana. It is a commuter campus with an average student age in the mid-twenties. A DPMA-modeled baccalaureate degree in Data Processing and Information Systems (DPIS) attracts both traditional students and those with prior or on-going information systems (IS) experience.

Results from videodisc repurposing projects in art, history and geology classes in the Fall of 1992 and the Spring of 1993 are summarized. Repurposing, as used herein, refers to the process of selecting and sequencing existing videodisc materials via custom-made programs. One side of a videodisc can hold thirty minutes of full-motion video or up to 54,000 still frame images. The video material is not transferred to magnetic disk or altered on the videodisc itself. Instead, the IUK student-written programs tell the videodisc player to play video sequences by start/end videodisc frame numbers. Video clips were arranged and interspersed with text screens as suited the needs of the topic-area professor.

PROJECTS BACKGROUND

By the mid-1980s, the potential of multimedia was already being exploited. (2) Regrettably, the pricing roadblock was significant. By the fall of 1991, however, new multimedia systems were announced that were, by comparison, affordable and relatively easy to use. Recognizing the educational potential of multimedia, the question became how to go from multimedia ground-zero to educationally effective tools as painlessly as possible at IUK. Specifically, the problem was that professors outside the IS area were unsure as to whether they could quickly become productive using the new technologies. And, without a base of support beyond the IS department, there would be no funding for multimedia systems for our majors.

The solution came via an IS course scheduled the next semester—D490 Current Directions in Data Processing. It was

suggested that the D490 students use videodiscs already available in the market to implement projects under the guidance of a subject matter expert. With this approach, professors with limited IS backgrounds could consider using new technology without needing to learn the associated hardware and software. It seemed like a truly symbiotic relationship where all parties benefit. IS students would get new technology, non-IS professors would get to experiment with video-based instructional tools, and, hopefully, students in such classes as geology and art would have the benefits of having book materials come to life on the screen.

PLANNING FOR SUCCESS

In order to claim some measure of success after the projects, the dimensions of a successful effort were defined before getting under way. IUK administrators were advised that any credit for the success of a project should be attributed to the participating non-IS faculty members. They were also told, in an internal letter, that "regardless of the outcomes of each project, IUK will move considerably ahead in the area of using new technology in support of our teaching mission." In other words, an attempt was made to establish realistic expectations for everyone involved.

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The volunteer faculty participants agreed to: 1) select a videodisc from catalog descriptions; 2) review the disc upon purchase to determine the appropriate material on the disc usable for supplemental instructional purposes; and 3) give instructional design guidance to a development team of two students. The DPIS majors were to develop the software front-end to the video materials. Similar to other early adopters, faculty "were advised to ignore the original purpose of an existing videodisc and to consider how they might use such videodisc-based vignettes in their own classes." (4)

The advice of others was also factored in. Blanton, Robin and Kinzie reported on a repurposing project done at the University of Virginia. Some of their key "lessons learned" were (3):

- be willing to compromise
- plan to spend as much time designing as producing
- make sure the program functions before investing time in aesthetics
- provide information in a variety of formats
- do not depend on users reading directions
- tell user where they are in the program
- be consistent (in button layout and functionality)

PROJECT COMPONENTS

The Videodiscs

Five videodiscs projects were undertaken. A partial disc description from the Videodisc Compendium catalog (Emerging Technology Consultants, 612/639-3973) provides a glimpse into the projects:

Volcanoes: Exploring the Restless Earth - On-location photography and animated drawings of volcanic phenomena.

Benjamin Franklin: Citizen-Sage of a New Age - Explores the genius of Benjamin Franklin as writer, inventor, ambassador, and citizen-sage of a new age.

Michelangelo: Self Portrait - Chronicles the artist's life, motivations, frustrations, and triumphs as culled from his personal letters, diaries, poetry, and essays.

The Computing Technology Videodisc - Covers: history and development of computing technology, computer components, computer applications, and computer programming.

The final disc used came from a disc/software set done for high school students on chemistry lab experiments. Work done on this disc was of a prototype nature by a science education professor and was never intended for actual use at IUK.

The Hardware

To display video images mixed with computer generated menus, we purchased three IBM PS/2 Model 57 SLC systems with the base configuration: 6 MB memory, 160 MB fixed drive, 2.88 MB 3.5 inch diskette, CD-ROM drive, M-Motion video adapter, audio capture/playback adapter, handheld OCR/graphic scanner, and a mouse. From a separate source, we also purchased three Pioneer 8000 laserdisc players. These players can access any of the 54,000 tracks in a half second (each track represents either a still image or a 1/30th of a second of full-motion).

The Software

The 57 SLC Academic Package was released with various preloaded software products including Asymetrix's ToolBook 1.5 (to be used along with Windows and Microsoft Multimedia Extensions). While Toolbook 1.0 was considered innovative but slow by reviewers, version 1.5 had been tuned, and hardware speeds had picked up, to the point that it could now be used for most training needs. One corporate early adopter of ToolBook was AT&T subsidiary NCR. They used ToolBook to build a system-configuration tool for their salesforce to use to illustrate the power of a new multiprocessor computer. NCR reported that "the No. 1 advantage to using ToolBook is a shorter development cycle. We can complete a project now in about a fourth of the time it used to take." (5)

Not surprisingly, Multimedia ToolBook is not the only product available for the task. However, at a list price of $695 vs. $8,000 for Authorware Professional for Windows and $4,995 for IconAuthor, it was "especially attractive for those with

more time than money to invest in development tools." (6) ToolBook was also the only one of the three that allowed the developer to make unlimited runtime versions at no cost.

RESULTS-TO-DATE

Videodiscs were ordered at the start of the spring 1992 semester. The IS student designers spent six weeks learning the hardware and software and then met with individual faculty members to design the projects. All projects were intended as one-way lab exercises —no on-line testing of skills was included. The IS students were encouraged to keep their solutions as simple as possible with the reminder that "'glitz and glamour' are not necessary for effective learning; often the 'bells and whistles' detract from learning. In this case, the student [user] may remember the 'special effects' and not the content." (7)

The developments went well. Three projects were used by geology, history, and art classes during the fall of 1992 and the spring of 1993. Another videodisc is awaiting live use in the summer of 1993. Student user comments collected were heavily favorable:

- I liked using this system because it was short and to the point. The video pictures were more real life than in the book and you could also go over a part and take notes again if you wanted to.
- I thought the whole thing was pretty cool. It's a little easier to learn by sound and visual aids then it is to read and learn.
- What I liked about the videodisc was it was easy and fun to use. It was very informative. I think it is a nice supplement to lecture but could not replace it.

To more formally assess student user attitudes toward the videodisc-based learning systems, a Likert scale (5 to 1, strongly agree to strongly disagree) questionnaire was placed next to the systems in the computer lab and filled in on an anonymous basis. The questionnaire was designed so that it would be expected that questions would be answered where agreement with one item (i.e., "I liked using the videodisc system and mouse") should likely correspond with disagreement with other items (i.e., "I would have learned the material better in class lecture"). This turned out to be the case and the attitude scale proved to be "well-constructed" (8) with an alpha reliability coefficient of .86.

Based on analysis of the questionnaires completed, respondents in the first group of student users (n=27) were 48% 17 to 24 years of age and 64% were female. The only gender or age significant results were: younger students self-reported learning easier versus books alone ($p=.045$); and females were less likely to be current PC users ($p=.028$). In general, students who would "want to use this type of resource in other classes" (74% of respondents) also reported:

- similar or better learning than in a lecture (67%, $p=.004$)
- increased interest in the disc topic (56%, $p=.001$)
- enjoying using the videodisc system (82%, $p<.001$)
- learning was easier than only having a book (74%, $p<.001$)

The IS student developers reported liking the opportunity to work with videodisc hardware and ToolBook's object-oriented language before facing the job market.

Project Descriptions

The volcano project opens with title information displayed in front of a red lava flow at night. A series of questions is posed and then a video clip plays addressing each question. One returning adult geology student reported she viewed the project three times: first she read the questions and just watched, next she took notes, and finally she just watched it again for fun.

The Ben Franklin disc was considered a bit shallow for university use as purchased. This was solved in the IUK project by rearranging the video materials and adding text material provided by the instructor. Student viewers made such comments as "very interesting — makes things almost fun to learn."

The Michelangelo project opens with titles over a scanned graphic sculpture and then offers a menu of thirteen chapters on Michelangelo's life and works. Additional text materials including hypertext hotword definitions were supplied by the instructor and a graduate student. (It was surprising when starting the Michelangelo disc project that the computer majors could already name the four great Italian renaissance artists. They admitted, however, that it was only because the four, Leonardo, Michelangelo, Raphael, and Donatello, were the names of the Teenage Mutant Ninja Turtles!)

Programming Review

The IS student developers reported liking the opportunity to work with videodisc hardware and ToolBook's object-oriented language before facing the job market. While it was hoped originally that the projects could be done without using any programming, each project ended having to make at least some use of ToolBook's OpenScript language.

The code example shown is the script for a single screen button done by student Monica Taylor. The code is executed when the user clicks a mouse button while the pointer is on an on-screen button labeled NEXT PAGE. Her task stemmed from a professor who wanted to show two art still images from different parts of a disc side-by-side for comparison purposes. The videodisc can only feed one image into the PC at a time. However, the M-Motion card can remember image windows while the videodisc switches to another live image.

To have more than one image on a screen, I made a video screen through Multimedia [menu choice in ToolBook] and then I made a button, which I also made into a video screen. I then put the script in the NEXT PAGE button on the page

Figure 1: CREATION OF A BUTTON AND VIDEO SCREEN

```
— Script for button "BUTTON1" of page 21.
— This is an "object" which "handles" a "buttonUp" message.
to handle buttonUp
   set my ClipSide  to "1"          — set videodisc side
   set my ClipStart to "15524"      — still frame number
   set my ClipEnd   to "15524"
   set my audLeft   to "true"       — use one audio track
   set my audRight  to "false"      — of the two
   set my ClipNote  to ""           — display no note
   get aacs_videodisc()       — plays the videodisc and
                              — sets "it" to TRUE if OK
   if it is not TRUE
                  request "This object requires the IBM AACS System Book."
   end
   go to next page    — go to next page in book
   get tbkMCIchk("play videodisc from "40458 to 40458")
end buttonUp
```

previous to the dual screen page — and it works. (See Figure 1)

After the semester finished, we discovered that such multiple windows may also be implemented by saving still images (from videodisc or live camera input) to magnetic disk.

FUTURE MULTIMEDIA ACTIVITIES

Supported by the results-to-date, six new videodisc projects relying on six new faculty sponsors are underway in the Spring 1993 semester: Teaching With Groups (education); Therapeutic Communication (nursing); Infection Control (nursing); visual illusion experiments (psychology); BioSci II (biology); and Introduction to Economics (business).

It is recognized that interested non-IS professors can learn to work with OpenScript. However, the learning curve is very steep for programming novices. Therefore, tentative plans call for a more non-threatening approach. The instructor would select a videodisc, identify materials to use and fill in forms describing the linkages and additional text requirements. ToolBook template page formats would then be sequenced and tested by student computer lab assistants during slow times in the labs.

Many other projects remain to be explored using features largely ignored during the first phases. IUK faculty have expressed interest in using digitized audio, still images captured to magnetic disk, and classroom roll-in systems (yet to be purchased). A new library building, started this year, will include a lecture hall equipped with multimedia display technologies. Future analysis efforts will establish a focus for the inquiry to set "boundaries" and determine "inclusion-exclusion criteria for new information that comes to light." (9)

Regardless of future lessons to be learned, the results-to-date show that a relatively small investment can quickly bring multimedia technologies into the teaching/ learning process.

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AUTHOR'S BIOGRAPHY

John Minor Ross is an Associate Professor of Data Processing at the Kokomo regional campus of Indiana University. Prior to joining IUK in 1986, he worked thirteen years in various industry computing positions. He received a BS from Indiana University, an MBA from the University of Dayton, and is currently working on a doctorate in Instructional Systems Technology from IU. He has published in Simulation & Gaming, Museum News, Collegiate Microcomputer, Information Executive, and Educational Technology.

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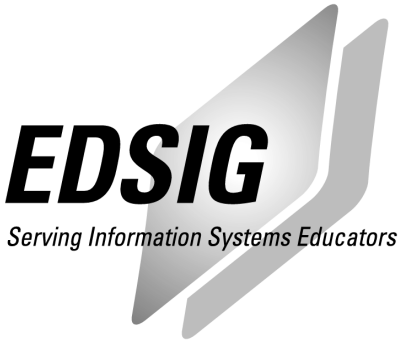

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