DOCUMENT RESUME

ED 420 083 CS 509 838

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TITLE When an AVID Makes You Rabid: Restructuring Media Production Curricula in Response to the Nature of Nonlinear Video Editing.
PUB DATE 1997-06-04
NOTE 14p.; Paper presented at the Annual Meeting of the Association for Media and Technology in Education (Vancouver, British Columbia, Canada, June 4, 1997).
PUB TYPE Guides - Non-Classroom (055) -- Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Course Descriptions; *Curriculum Development; *Editing; Higher Education; *Instructional Innovation; *Mass Media; *Production Techniques
IDENTIFIERS *Nonlinear Models; Technology Integration; University of Missouri Kansas City; *Video Production

ABSTRACT

For a new course in media editing at the University of Missouri at Kansas City, a nonlinear, affordable AVID Media Suite Pro system was selected for the student video laboratory, a textbook was chosen, and an instructor was trained. However, there were difficulties concerning the acquisition, delivery, setup, and debugging of the editing hardware/software. Nonlinear editing compels a different way of preparing for the edit session and of working through distinct and dissimilar stages of editing. Illustrating these new methods and concepts within the course was done using the usual mix of lecture, text study, demonstration, and student productions. But unexpected changes had to be made to accommodate physical peculiarities inherent in this new type of media editing technology. Of particular concern were computer-related characteristics that proved to be more difficult to accommodate in an instructional rather than a commercial media environment. In all nonlinear situations, video and audio material must first be transferred onto computer disk drives before editing, and this takes place in real time--there is no quick on/off of video and audio materials or the editors using them, and keeping every student's media files always loaded quickly "eats up" available disk storage space. Short courses limited to eight students with content limited to nonlinear editing are now being tried. Once the technology and price solutions get to the point where nonlinear stations are as easy as tape stations, there can be a return to the holistic learning experiences that work well for students. (NKA)

When an AVID makes you rabid: Restructuring media production curricula in response to the nature of nonlinear video editing.

Presented at the 1997 conference of the Association for Media and Technology in Education in Canada

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A recent annual survey of video editors conducted by TV Technology (May 1996, vol.14, no.10) showed that nonlinear computer based editing systems now account for almost half of the editing production workload performed in a wide variety of media locations, ranging from small post houses to major broadcast stations. This was a limited scale survey, relying on less than two hundred mail-in responses, but it is a good indicator of how pervasive nonlinear video editing technology is becoming. In Kansas City specifically, about forty such editing systems are now in operation, and these systems are being acquired at a much higher rate than tape-based systems. Obviously, centers of training and education that offer media production curricula will have to acquire nonlinear systems sooner rather than later and integrate study and instruction in nonlinear methods into their programs.

We in the Communication Studies department at the University of Missouri at Kansas City took our plunge into nonlinear instruction in the summer of 1995. Since the Kansas City professional editing community is heavily dominated by AVID products, principally the Media Composer, we chose the related but more

affordable AVID Media Suite Pro system for our student video laboratory. The class text selected (largely by default since it is shipped by AVID to their Media Composer users as a bonus) is Digital Nonlinear Editing by Thomas A. Ohanian. With an instructor trained on an AVID Media Composer through a summer professional internship, an existing course titled Advanced Media Production Techniques to apply the AVID in, and with the hardware, software, and text all selected, it all should have been a "green light" situation, just like any other media production course launched anew in the past. Things, however, turned out quite differently. The first major obstruction, not pedagogical in nature but still worth some detailing, concerned the acquisition, delivery, setup, and debugging of the editing hardware and software. Problems here delayed the startup of the course by over six months!

Lessons in acquiring the technology

As is the case at many universities, UMKC has direct purchase agreements with computer manufacturers that do not allow acquisition of micro-computers through the usual vendor-reseller venue. The exclusive direct purchase route is supposed to ensure the lowest possible price and obviate the cost of bidding in exchange for large volume university-wide buying. We were obliged to get our PowerMac 8100/100 AV direct from Apple, our RAM upgrade chips as part of a mass chip purchase coordinated by our Computing Services department, and only

the AVID software and proprietary plug-in NuBus boards from AVID. This was supposed to be a formula for cost-saving, but was instead a formula for disastrous time-loss and employee, faculty, and student grief.

AVID strongly recommends purchasing the entire system, computer and all, direct from them. It costs more money to do that, but in exchange for the premium price tag you get single source responsibility for the performance of the system. Should you be so lucky as to have the components you collect from multiple sources actually work together as they ought, you should consider yourself to have used up all the luck you are reasonably entitled to for the rest of this century. There are many horror stories of pieced together systems, assembled strictly according to manufacturer's specifications, that refuse to function. Ours is one of those stories. Had we acquired the system complete from AVID, it would have been pre-tested and run-through, and any failures after delivery would be the responsibility of AVID and would be handled with overnight (or over two nights) tradeouts of suspect components. For those who "build-it-themselves", failures are the responsibility of "the other guy".

To begin the saga, we first installed the required RAM upgrade chips (from vendor "A") into our PowerMac (from Apple) according to the limited instructions provided by Apple. The system files quickly became corrupted, and after several dozen system file reinstalls, which also became corrupted, Apple technical support finally provided additional guidance on the correct order in

which to install our RAM chips. But this did not transpire until after three weeks of instructs from Apple to reinstall system files, rebuild desktops, reinstall system files, purge VRAM, reinstall system files, etc.

After installation of the software and NuBus cards (from AVID), we had a complete failure to launch the application. An AVID supplied utility that queried the type of cards installed in the NuBus slots reported that the AVID cards were not being recognized by the PowerMac. On the basis of this information, the AVID technical people said "it's Apple's fault" but the Apple technical people said "it's AVID's fault", with neither side accepting responsibility for solving this problem. This is how the situation remained, with both sources insisting that it was "the other guy's problem" for weeks. It became incumbent on us to prove whose responsibility this should be.

This we did by taking our AVID software and cards and finding another AVID user with an identical system and talking them into letting us take their boards out of their computer and putting ours in and trying it out. Our AVID board set worked and we then presented this evidence to our Apple authorized service representative who eventually acknowledged the strength of that evidence and ultimately replaced the PowerMac motherboard. Then our AVID cards worked and the application worked, sometimes. Fortunately for us, AVID technical support ran us through a number of tests and identified this problem as being due to a bad AVID JPEG card, which they replaced overnight with a

completely dead AVID JPEG card, which they replaced over another night with another AVID JPEG card that worked.

Still there were application freezeups. Having replaced just about everything once except the RAM upgrade chips, we demonstrated that we had learned our trouble-shooting lessons and replaced the RAM upgrade chips with another set of RAM chips. The system finally "works"...it only freezes up about once a day. We have been told by professional nonlinear editors that that is a good thing...be happy with that.

The major lesson we learned here is that if you don't buy it all from one source, you are on your own when things don't work. Needless to say, whatever money was saved by assembling it ourselves was lost in wasted staff and faculty time.

Another caution to mention here is that professional grade nonlinear editing software/hardware demands the most of the host microcomputers serving as the platforms for these memory and speed intensive applications. We did not realize that our PowerMac 8100/100 AV had a problem when it was first put into service because it was used with the Photoshop and Pagemaker applications which did not use additional NuBus cards. It is possible to have a microcomputer with undetected defects that won't be discovered until long after its warranty expires when a demanding application is added.

Lessons in delivering lessons in the technology

There were numerous expected changes in the aesthetics and editing methods that would need to be taught as part of a nonlinear class. These were forecast through reviews of the course text and AVID documentation and by observation of professional AVID editing sessions. Clearly, nonlinear editing compels a very different way of preparing for the edit session and of working through distinct and dissimilar stages of editing. Illustrating these new methods and concepts within the course was done using the usual mix of lecture, text study, demonstration, and student productions.

However, unexpected changes had to be made in order to accommodate physical peculiarities inherent in this new type of media editing technology. Of particular concern were computer-related characteristics that proved to be more difficult to accomodate in an instructional rather than commercial media environment.

Students are used to arriving for a tape editing session with their field tapes in a bag or box, powering up the system, and getting right down to the task of editing. In all nonlinear situations, video and audio material must first be transfered onto computer disk drives before it can be edited, and this takes place in real time. Transfer (or digitizing, capturing) takes the full running time of all video and audio shots or clips, plus the time it takes to select these segments, plus any time required to adjust video and audio input levels, plus any keyboard entry

of camera log information that is needed to identify each media item.

In the tape world, several students can quickly rotate through an editing station in a day, making productive use of every hour it is available, carrying their media with them. In the nonlinear world, there is no quick on and off of video and audio materials or the editors using them.

There are two ways of handling the loading up of a nonlinear system: keep everyone's video and audio material on the disk drives storing these media, or delete old and reload new video and audio material each time a new student takes over the system. In the commercial post-production world there typically will be video and audio media for just one or two projects loaded up for a day, with the edit sessions running from about four to ten hours each. The loading up process, usually called digitizing or capturing, may occupy about ten percent of the commercial project's computer time. In the academic environment, limiting access to the nonlinear system to just one or two students a day cuts down on the number of access opportunities in the semester. A one hour session in trimming down a rough cut will actually be a one hour editing plus realtime video and audio load time. Loading time is not editing time, and it subtracts from the actual editing time available in the day.

On the other hand, keeping every student's media files always loaded will quickly eat up the available disk storage space. There is great variance in determining the storage capacity of a disk drive being used for video and audio

files, but it generally requires about one gigabyte to hold eight minutes of minimally compressed material that can be considered comparable in image and sound quality to what is delivered to the home from broadcast or cablecast sources. This is a major storage bottleneck. Whether you're considering fixed disk drives or removable drives, the storage expense is great. While prices continue to drop, with a gigabyte now costing less than a thousand dollars (on a drive that is fast enough to run broadcast quality video and audio in and out), this is still a significant expense item to be adding onto a single editing station.

Restricting students to a low ratio of raw field to finished program video/audio material will work against one of the great virtues of nonlinear editing, the capability of quickly sorting, searching, and accessing a large volume of footage. It might seem an economical idea to ask students to pre-edit their material by capturing only what appears to be the most viable, but this will leave unaccessible (unless you go back into capture mode) material which might later seem worthy of reconsideration. Uncaptured material certainly won't be nonlinearly available while editing. It's important to remember that nonlinear processes ideally should encourage quick testing and trial of editing solutions, and this is possible only when every usable shot or audio clip is immediately accessible. A time hurdle (a need to go back to capture mode, a need to recapture or batch digitize an entire project) will block the freedom and inclination to experiment, improvise, and play with optional versions.

It becomes clear then, that unlike the "just walk in anytime, anybody" tape editing station, the nonlinear station requires considerable session setup time and/or a very small number of pre-loaded projects. For a media production program such as ours, which normally has a large number of students per class who each work on three different projects over a full fourteen week semester, our nonlinear system threatens to become a very constricting bottleneck.

One solution to this bottleneck would be to have a number of low-cost *editing simulators* running on out-of-the-box midrange computers. It is very difficult to justify $30,000 to $80,000 for one single editing station. Educational institutions expect computers to be priced at about $5000. For instructional purposes, "limited edition", educational, and tryout versions of professional software programs are exactly what is needed to handle large numbers of students within a broad-based media production curriculum. (Unfortunately, the only "simulator" offered by Avid was a hypercard stack program that crashed anytime it was used in an nonlinear fashion.) What is needed in education is a simulation of "the real thing" that is comparable in functionality to Adobe's *Premier* and Avid's *Videoshop* that will run on afforable Pcs. We can much more easily justify six PowerMac 7500s, all running *Photoshop*, *Pagemaker*, *Premier*, *Illustrator*, etc. than one single 9500 running *Media Composer* or *MCExpress*. The economics and human dynamics of education are not those of a broadcast station or post house. It is the lack of awareness of this reality on the part of nonlinear technology providers that most obstructs education in their technology.

We are now trying short courses that are limited to eight students. Here the content is limited strictly to nonlinear editing. This is a major departure from our usual way of teaching video production where all of the elements of production (scripting, shooting, lighting, budgeting, aesthetics, editing, etc.) are integrated and developed through course sequences with increasing complexity and more sophisticated project design and objectives. Rather than being holistic in our approach to media creativity, we are regressing backwards to the "night school-software package workshop" method of fragmented instruction.

Ideally, we should have several nonlinear stations, all with four times real time video and audio "streaming" capture and batch digitizing. Media file storage should be dirt cheap, and disks should be removable. Manufacturers promise more for less in the future, and we wait for the future to get here soon. Once the technology and price solutions get to the point where nonlinear stations are as easy-on and easy-off as are tape stations, we can return to the holistic learning experiences that work so well for our students. Until then, we seem to be compelled to employ very fragmented learning modules in order to introduce our students to nonlinear editing technology.

DIFFERENCES BETWEEN COMMERCIAL AND EDUCATIONAL NONLINEAR EDITING ENVIRONMENTS

	COMMERCIAL	EDUCATIONAL
NUMBER OF USERS	Two to three experienced editors working fulltime schedules. Editor specific custom features.	Six or more inexperienced editors working part time in lab sessions. Standard default features required.
PROJECTS PER DAY	One to two. Manager controls schedules.	Two to four (or more?) Scheduling much less adaptable.
MEDIA DRIVE USE (9 Gigabyte)	Current project (simultaneous access) Last and/or next project also loaded. Batch digitizing for later revisions.	Three to four projects (sim. access) Other projects "immediate" access. All projects must be batch digitized, which loses many parameters/FX.
MEDIA FILE STORAGE	R-MAG expense justified. Digital backup systems time justified.	"Immediate" access time-coded videotape Difficult to justify added expenses/time
SESSION SUPPORT	Full-time staff dedicated to system Assistant editors prepare sessions (media digitizing, logging, deletions).	No full-time staff dedicated to system Part-time staff might prepare sessions.
MEDIA ARCHIVE	Various digital storage formats can be cost justified.	Only videotape is cost-effective now.
OUTPUT QUALITY	Can be used at off-line or on-line resolution levels	Assuming no on-line tape conforming is available...on-line quality is required.
UPGRADES / SUPPORT	Commercial demands justify monthly upgrade expenses.	Institutional budgets restrict upgrading. Old product support dwindles quickly.
CONTROL	Clients call the shots.	Students have creative freedom within bounds set by course objectives.

Addendum to When an AVID makes you rabid: Restructuring media production curricula in response to the nature of nonlinear videediting:

Results from teaching nonlinear editing in a one month course

Nonlinear editing is substantially different from linear tape editing. Aside from the obvious differences in devices and random access control, there are many changes in how the editing process should flow in order to realize the maximum benefits from nonlinear editing and nonlinear thinking. As Ohanian notes in his text Digital Nonlinear Editing, one of the great challenges in making the transition from linear to nonlinear is the purposeful forgetting how things were once done.

Linear tape editing is an edit event to edit event chain-building process. Each tape edit involves selecting the desired shot, trimming the shot, determining the shot transition, and creating the visual effects. All of these different decisions/actions transpire for each edit event. In nonlinear editing, it is not only possible but desirable to work through a production in discrete editing stages: a rough cut where shots are sequenced, then a refined stage where shots are trimmed, and then another stage where effects are added and rendered. While there may be many instances where it would make sense to position, trim, and effects render a shot completely before moving ahead, it is preferable to work through a project in stages so as to focus the editor's attention and decision-making more clearly.

The ideal then, is to have students work through an editing project in a stage by stage manner: media capture with levels control, bin notations with storyboard, rough edit, trimmed edit, edit with titles and effects, and at least one revised edit.

Working through on a stage-by-stage basis, with feedback from the instructor at each stage, requires a large span of course time. Unlike the linear tape everything-at-once marathons, the discrete stages of nonlinear require an evaluative overall examination at each stage before continuing.

In a professional session, these overall examinations take place as the editor and producer move from stage to stage in a one day block of time; they do not need to submit the results of each level of refinement to an outside person for approval, just the finished product. While the instructor could also simply grade the final product only, this will not encourage nonlinear thinking and working from rough to refined. There needs to be a method for requiring a student to regard nonlinear editing in a nonlinear fashion, and evaluation of each discrete stage would appear to be that method.

Unfortunately, a one month course schedule does not afford the time necessary to execute and evaluate in stages. While the short course does reduce the physical bottleneck of the technology, it does not afford the timespan needed to structure, encourage, and assess nonlinear thinking. Students will still be trapped in linear procedures on a nonlinear system. We continue to wrestle with this dilemma.

CS505838

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