Marital Fracture: An Interactive Videodisc Case Study for the Social Sciences

by Rosalyn Gerstein and Russell Sasnett

A two-year project to create an interactive videodisc case study of a marital separation is traced from its origins as personal artistic expression to its application in mediation training. Recent research by the authors into means of repurposing video materials led to the development of software that integrates a relational database of documentary video, audio transcripts, and expert analysis into a multimedia research tool for the humanities and social sciences. This article outlines the benefits of this model and presents guidelines for the design of similar case-study courseware.

Some are silent and thoughtful. Some are moved to tears. Some laugh ruefully, caught in the act of self-recognition. Many are angry, or embarrassed. But few are untouched by the moving portraits on the video screen, and all want the same questions answered: "Are those *real* people? What ever happened to them? Why did they let themselves be the subjects of an interactive documentary?"

This is the typical response to a viewing of our project Marital Fracture: A Moral Tale, a video case-study by Dr. Gerstein about one couple's marital separation. The most unique part of this experience is that viewers are able to find the answers to those questions, and more, by engaging in a graphical "dialogue" with a computer which controls the presentation of the movie. The television screen moves smoothly between documentary video observation and electronic pages which viewers can interact with to change the course of events. At the most sophisticated level, viewers can store their interpretations of controversial scenes for others to see, or edit together new scenes to support their research. Analysis of the movie by professional experts is available in video or textform, which may be displayed simultaneously with each scene. Full transcripts of the video scenes are also available. This multi-media resource book which focuses on a complex ethical dilemma is being posed as a new model for teaching and researching decision-making skills in the social sciences.

Project History

In 1981, Gerstein had received a Vermont Council for the Arts grant to pursue her interests in photographing and interviewing

Gerstein uses the viewing station to browse her video portrait, Marital Fracture. A digital television monitor displays videodisc material superimposed over text created by the experimental frame buffer.

couples as part of an ongoing ten-year commitment to understand women's changing roles and relationships. She was studying the relatively new field of marital mediation as an alternative to adversarial divorce, and the economic effects of separation on women. She successfully mediated two couples' marital separations involving child support and a division of property. Two neighbors, Judy and Alan, asked Gerstein to mediate discussions between them prior to a trial separation. Six two-hour sessions resulted in an agreement arranging for co-custody of their two children and a potential buy-out scheme for their shared house and property. After the mediation was finished, Gerstein asked Judy and Alan if they would be

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interested in "telling their stories" in a documentary movie. This led to the production of some twenty-four hours of original footage over the following two years, starting in Super-8 film and moving later to 3/4-inch video.

Expert analysis displayed simultaneously with full-motion videodisc segments

A transcribed interview is synchronized with video playback

As part of her doctoral program at MIT, Gerstein was conducting research at the Film/Video Section headed by Richard Leacock. The department has a long history in observational documentary, a genre of filmmaking which emphasizes the artist's experience of people and events rather than reporting and editorializing information. This aesthetic combined with Gerstein's own work in photographic portraiture to create a vivid account of a sensitive emotional situation. The edited video includes in-depth interviews with Judy and Alan separately and together over a two-year period, scenes of the parents interacting with their children, their home and work environments, attempts at family reorganization, a follow-up mediation session one year after the initial separation, and a discussion regarding the child custody and support situation. This material was assembled into a half-hour program called Marital Fracture: A Moral Tale, designed to be the first side of a two-sided Level One videodisc.

The finished documentary was shown to prominent experts in law, psychology, and mediation, and their responses in interview form were captured on video. Harvard professor Dr. Carol Gilligan, author of the best-selling book *In a Different*

Voice, comments on the different moral frameworks and means of communication that made negotiation so difficult in this case. Attorney Michael Wheeler, author of *No Fault Divorce* and affiliated with the MIT/Harvard Program on Negotiation, answers common questions about mediator neutrality and power imbalances. New York matrimonial lawyer Sanford Dranoff delineates the changing state of legislation affecting divorce, and spells out a lawyer's view of mediation and its role in separation proceedings. Rosalyn Gerstein, publisher of the *Women's Yellow Pages* with a Ph.D. in communication technology and culture, discusses her differing roles in the case as both mediator and ethnographer. These collected analyses of the documentary and its subject matter were assembled into a half-hour presentation called *Marital Fracture: Expert Opinion*. This program functions as a complementary second side to the videodisc, and the two parts together are also available as a one-hour linear videotape. The disc version includes complete transcripts of the expert interviews, a mediation bibliography, the case history, and individual analyses of each video segment excerpted from Gerstein's dissertation.

As the video production of Marital Fracture was nearing completion, Sasnett began working with Gerstein at the Film/Video Section of the MIT Media Laboratory to envision the possibilities afforded by computer-controlled presentation of the videodisc segments combined with color graphics and high-quality text. This collaboration led to the development of Reconfigurable Video™, a software technology designed to assist in the organization and delivery of video resource databases on optical videodisc. A relational database was constructed to describe the video segments, allowing them to be related to audio transcripts and expert analysis in text files. A graphical user interface was developed to enable users to find and edit video presentations using the database records. Finally, a page formatting module was built to aid in rendering pages of high-quality, anti-aliased text, incorporating color illustrations and video windows. A four-minute demonstration of this prototype Level Three delivery system is included on the videodisc.

The Marital Fracture video is being used to train mediators at the MIT/Harvard Program on Negotiation and at the Cambridge Children's Hearing Project. After watching the first half-hour of Marital Fracture, students are given role-playing assignments as either Judy, Alan, or the Mediator. Each party receives a packet of information delineating the resources available to them, and the needs which must be met. The documentary video is particularly useful to the simulation experience by making vivid the emotional dimension that is so often lacking in traditional case studies.

> The power of video comes from its ability to render actual people and situations, so that we realize that these aren't just raw statistics we're talking about, that these are complicated decisions in which there are rarely any easy answers...[In mediation] for example, I find the body language of negotiating parties to be an invaluable clue to their emotional state, and you just can't get that kind of richness out of a paper case-study.

Attorney Michael Wheeler
MIT Dept. of Urban Studies

After the simulation, students view the second half-hour of video containing the analysis and opinions of recognized experts commenting on the case. Then they are asked to write evaluations of their simulated mediation experience, and to compare agreement drafts prepared in class with actual details from the case of Judy and Alan in Marital Fracture. Interest has been expressed in developing other curricula in psychology and women's studies, and in the usefulness of the video as a self-help resource for couples having marital difficulties.

Design Philosophy

The primary concern in the Marital Fracture project has always been to define problems and design solutions based on content. Often the fascination with technology in a research environment allows tool-building to become an end in itself, with little regard for the needs of communicators and information distributors. Imagine a publishing industry investing so much capital in state-of-the-art printing plants that it simply couldn't afford good writers and designers. This situation is not unlike that in the world of interactive video, in which technology draws the lion's share of budgets, resources, personnel, and attention, allowing creative and artistic development to suffer. This lopsided balance must be corrected if interactive video is to be successful as a true publishing medium, reaching outside the arena of skills training in the technical fields. General audiences are accustomed to high-quality as an integral component of all mass-media presentations, and simply will not tolerate poorly conceived and executed text and visuals.

It is important in such a technology-driven medium as interactive video to understand the difference between a feature and a benefit. For example, an overlay graphics card with a touchscreen interface constitutes part of the *features* of a delivery system. Unless concrete *benefits* to viewers from any such technologies can be stated, the opportunity cost of their use in a particular project is likely to be an adverse affect on other critical areas, such as video production and graphic design. Particularly in interactive video, there are always limited resources to divide among an over-abundance of needs.

In the development of our videodisc project, we tried to concentrate on four essential criteria:

1. We would invest in a rich and original intellectual property.
2. The presentation would be supported by a wealth of information to increase the usefulness of the project over time.
3. Graphics would be visually satisfying, and the presentation would encourage reading, viewing, and browsing for substance.
4. The package would allow for changing applications by being easily alterable, appealing to a wide range of potential viewers.

These criteria might just as well apply to the creation of a best-selling book to ensure a long shelf-life. They are certainly necessary when developing a videodisc which utilizes technology to deliver content effectively. Most people underestimate the level of creative talent and understanding that is required to best use the capabilities of optical videodisc, or most media for that matter. In order to achieve viewer acceptance, we knew the material on the disc had to have visual content and graphics as compelling and accessible as any other publishing venture.

In addition, conventions had to be developed to make it comfortable to find one's way in an opaque medium where structure is not readily apparent. In a linear movie the artist can create a feeling of suspense which is acceptable to passive viewers. The audience surrenders control to the filmmaker in the belief that it will be entertained and engaged as the story moves along to a satisfactory conclusion. In the case of interactive videodisc, viewers are given the helm, but the course is still left unknown. It is a definite challenge to avoid confusion as part of the new experience of interactive video. Hence, the problem of viewer navigation becomes the main focus of the design phase.

Educational Goals

The last decade has seen a tremendous increase in the use of video materials in curriculum, with few corresponding developments in technologies which allow simple and effective management of video resources by the people who use them. At universities all over the country, case-study videotapes are becoming the preferred mode of teaching the complexities of decision-making and behavior: in medicine, business, law, and psychology. Paper case studies are hindered by the layers of interpretation that separate students from the situation being examined; the language is already loaded with judgments that students must accept at face value. The use of video case studies may be more appropriate in applications which require students to perceive phenomena directly and develop their own interpretations.

Unfortunately, film and videotape have the following major drawbacks for use as educational aids:

1. It is difficult and time-consuming to access any part of the material at will, necessitating long and inaccurate searches.
2. The presentation is 'cast in stone' and cannot be altered.
3. Image quality is doomed to deterioration due to contact between the physical media and its playback device, making it difficult to maintain archival quality over time.
4. The coordination of supplementary documents with the visual content is clumsy and expensive.
5. It is impossible to provide a Table of Contents due to the lack of built-in addressing mechanisms.

These problems tend to eliminate the possibility of individual exploration and analysis, and cause these linear media to fail the test of adaptability. Curriculum is constantly changing, and methods are needed which allow revision.

The combination of computer-controlled videodiscs and high-quality graphic displays is capable of solving the problems inherent in film and videotape educational materials, and providing the sort of flexible teaching and research tools that these applications demand. The best solutions will not be designed by isolated technologists, however. Careful con-

sideration must be given to the combination of film aesthetics, information systems, and the fundamentals of graphic design. Above all, any proposed solution must take into account the current methodology of educators and researchers, and foresee how they can be adapted for new media. Previous proposals for interactive video in university settings have suffered from high single-use development costs and limited adaptability of the videodisc content.

The model of instructional design that is effective in industry, where an external authority prescribes a path of instruction and a test for competency, is not always appropriate in higher-level education. Especially in fields dependent upon research and analysis, student-initiated exploration in a controlled environment may be a much more effective means of teaching those skills. The strength of the Gerstein/Sasnett model is its focus on the provision of substantial amounts of both video and textual resources, and the means to mold these raw materials into courseware at the delivery site. Faculty are given the ability to structure new presentations in response to their own classroom requirements. This avoids the problems inherent in having a programmer mediate between faculty needs and computer-enforced constraints.


Detal of the viewing station, displaying transcript in sync with video segments

Implementation

More than a year of effort has gone into the creation of our prototype Level Three delivery system. For the graphics display we chose an experimental 640×480 by 8-bit frame buffer from IBM, on loan to MIT's Visible Language Workshop. This microcoded bit-slice display processor has a 256-color look-up table, and is capable of very fast area copies (bit-blit operations) and anti-aliased text display. The host machine is an IBM PC/XT, connected to Sony LDP-1000A videodisc player via a serial port. At the time we chose our hardware environment, there were no frame buffers that allowed real-time video windowing (not just video keying). There is now at least one company (Parallax) offering such a product. We simulated the effect with a Toshiba digital television monitor capable of placing shrunken NTSC images from the videodisc over the analog RGB output of the frame buffer.
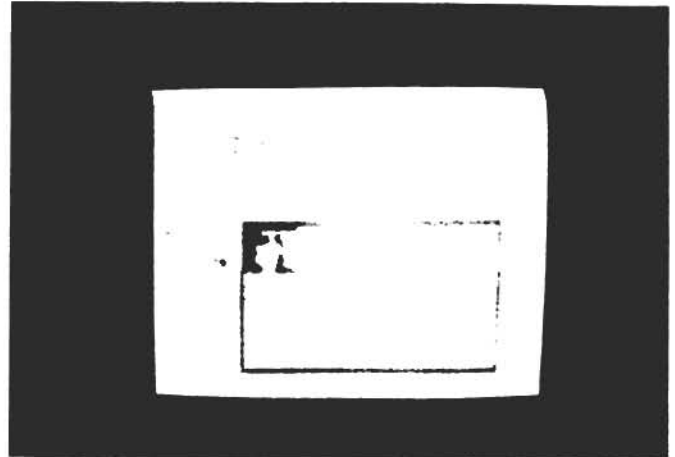
An index card from the video database, used as part of the Reconfigurable Video system.
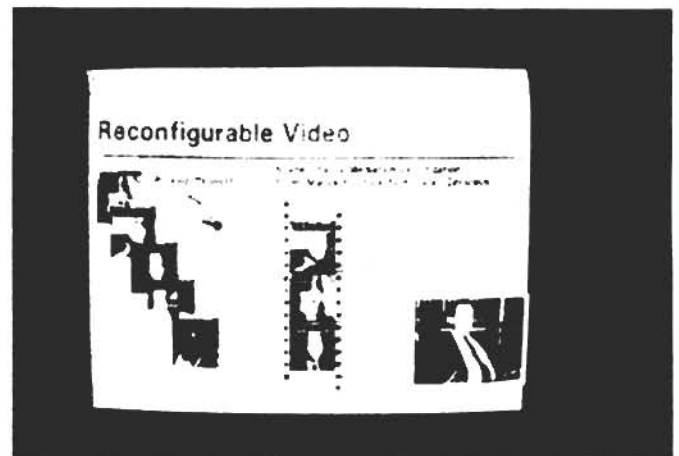

A video sequence under construction. Picture icons are from the video database. The filmstrip represents the new playing order of the video segments.


The dynamic video window enlarges to display a preview of the new edit.

The backbone of the software system is a relational database describing the individual video segments and their content. Ashton-Tate's *dBase III* was chosen for its simplicity, power, and general availability. Lattice's *dBC III* software library was used to develop a database interface on C on an IBM PC. Additional software controlling an online 1-inch video editing

system allowed our database to be constructed automatically as the premaster tape was being edited. An option allows any industry-standard CMX Edit Decision List (EDL) to be converted to our *dBase III* format. The SMPTE time code addresses are eventually converted to videodisc frame numbers at the time of playback. An intelligent software package manages video control commands regardless of format (tape or videodisc), making possible some simulated branching prior to actual disc pressing. Video segments may be located by theme or textual description, as determined by the database designer.
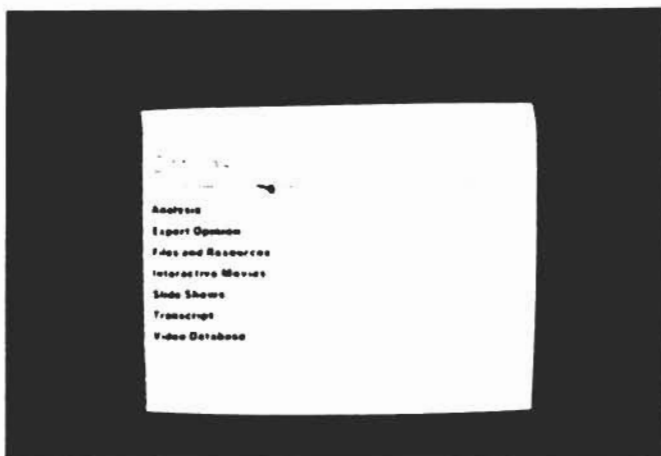
Some of the menu options for the interactive video program
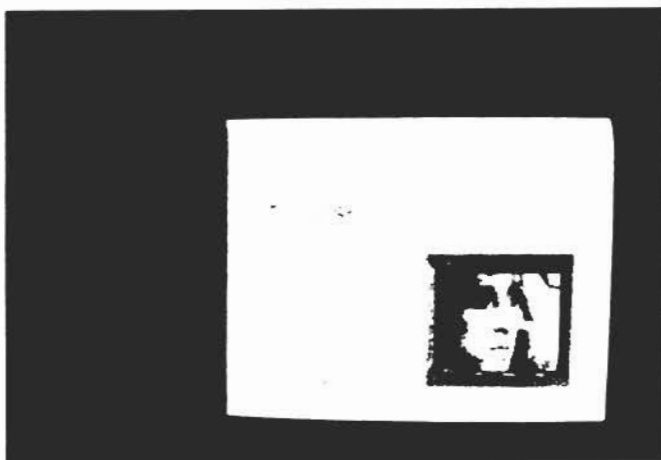
One of the many resources and articles available in the electronic book.

The database stores descriptive information about each video segment, including in- and out-frames, enabled tracks, and the name of a data file containing an optional digitized sample frame. All other fields are left entirely to the designer's discretion. The optional sample frame is chosen by the editor during premastering, then digitized in a true-color frame buffer and saved as an 8-bit picture icon at 64×64 pel resolution. This icon serves as a handle for our specially designed graphical user interface, which represents the database as a deck of 3-by-5 cards, with a picture icon "stapled" to the upper-left corner of each. Operations are provided to give the user control over all the basic editing functions. Splicing one piece of video to another becomes a simple matter of moving a representative frame of the new shot onto a filmstrip symbolizing a larger sequence. Picking a new order for a scene is as easy as shuffling a stack of postcards.

There is also a network database called the VideoFile™, which creates links between the video segment records and other data. Links can be made between audio-visual segments and blocks of text. Text segments are defined with a mouse by visually "clicking" at the in- and out-points, similar to the Macintosh convention. An outline processor was constructed which converts a standard text file into a hierarchical menu structure. Any number of text or video segments may then be attached to each node in the outline tree. Viewers may traverse up and down the tree, applying display functions to the current node and/or all of its descendants. The final software module is an electronic page formatter, which interprets commands embedded in normal text files. This allows for the creation of high-quality anti-aliased text pages, as well as the placement of pictures and graphic primitives useful for displaying articles.

Summary

The authors would like to see documentary art and videodisc technology applied to a larger educational arena which encompasses the humanities, arts, and social sciences. Documentary video creates a vivid record which appears to capture all one needs to re-explore process and meaning. The contribution of this work is in the provision of sufficient material and means of access so that viewers can study the construction and better understand the influences which make up a visual account.