

Editing a Science Documentary: More Than Words (Literally!)

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Imagine receiving a 60,000-word manuscript and being asked to prepare a 4,000-word paper consisting of extracts from it. Of course, you will have to come up with good transitions to put the different sections together. However, when you look at the manuscript, sections appear to be scattered over the length of the text in no defined pattern. Fortunately, you have received an outline of what the final paper should look like. You begin reading the enormous document, cutting and pasting paragraphs, sorting them into the sections in the outline, and finally selecting those for the final version. Only then does editing as you know it really begin.

Sounds weird? Perhaps not if you are film or video editor.

"In television, editing is the process of figuring out—from the 17 hours you shot—what you are going to put on the air", says Beth Hoppe, director of science programs at Thirteen/WNET in New York, "and the film editor takes this cut and that cut and puts them all together."

First, the film editor receives from the film producer-director all the audiovisual material (the "manuscript") with the script (the "outline"). Usually, the ratio for a documentary is 15 to 1—for a 1-hour documentary you shoot 15 hours of film. The editor takes the best shots and attempts to put them roughly in order according to the script. Filmmaker Alan Rosenthal¹ calls this process the *assembly cut*, one of three general stages in film and video editing.

The second stage is the *rough cut*, something like the heavy editing of a manuscript. Rosenthal writes about the rough cut: "Here you are beginning to talk about proper structure, climaxes, pace,

and rhythm. You are looking for both the correct relationships between sequences and the most effective ordering of the shots within a sequence. You are checking whether your story is really clear and fascinating, whether your characters come over well, and whether the film has punch."

Finally, the film editor comes to the fine cut, where the last changes to the documentary are made and narration, music, and effects (such as sounds, transitions, and the like—not necessarily special effects, which create an illusion of the action in the shot) are added.

In some ways, the film editor resembles a copyeditor. Interestingly, for science programs there is also a person who serves as science editor. The science editor's role is "to stay on top of the latest developments in science in relation to the topic we are dealing with [in the documentary] and be sure we don't make any mistakes in the content", Hoppe says, "but not to decide what we are going to produce or what we are going to put out." The person who decides which programs will be aired is the series producer—akin to the editor-in-chief of a journal.

Science and Storytelling

"A science documentary is a film that portrays science to the public in a way that is engaging, entertaining, and educational", says Jared Lipworth, producer of science programs at Thirteen/WNET. "There are many different styles and ways to approach a documentary, but the important factor is that you are conveying factual information."

No matter what style a producer chooses for a documentary, he or she is always trying to tell a story. Tom Linden, professor of medical journalism at the University of North Carolina at Chapel Hill, says the story line is one of the main elements in a documentary. The story line "needs to be accurate and sourced [that is, have

various sources] and the issues need to be in perspective", he says. "There must be an identifiable face [central character] through whom you tell the story: a person, animal, or animated object. For example, in an environmental documentary I did in South Carolina, a river was the face, and I showed the river as a living system."

The film editor puts sequences together to tell a story, ensuring that each sequence has a clear beginning and a clear end, a conflict and a resolution. Hoppe says that there is no formula for editing a film, but there is certainly a way to tell a story. "Think of it as having three acts and an introduction section where you give some background", she says, "but it wouldn't be as formal as it would be for a journal editor."

For a journal editor, the concept of a story line is not unfamiliar. In *Essentials of Writing Biomedical Research Papers*, Mimi Zeiger writes that the story line that runs through a paper reflects the scientific method: "The story consists of four main parts: the question, the experiments done to answer the question, the results found that answer the question, the answer. In addition, the story includes how the question and answer fit in with previous work [and] why the question and answer are important."²

However, unlike journal articles, science documentaries must be entertaining. "In addition to telling a story, you have to convey difficult scientific principles in a simple and entertaining way", Lipworth says.

In television, where documentaries have to compete with reality shows, soap operas, game shows, and action series, entertainment is a must. Lipworth says that it is not enough to have a topic and try to survey an industry or scientific discipline. "For example, we have a new series coming out called 'Innovation' that features new technologies that are having a significant impact on our lives (for example, nanotechnology)",

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Manuscripts versus Tapes

The work of a film editor sometimes resembles the work of a print editor, but it also has great differences. The following table compares some aspects of the editing processes conducted by each type of editor.

Aspect	Print Editing	Film/Video Editing
Persons involved	Author Scientific editor or editor-in-chief Copyeditor or manuscript editor Proofreader	Script writer Director or producer Film editor
Examples of elements that the editor evaluates	Punctuation; spelling; capitalization; usage; numbers and numerals; quotations; abbreviations; tables, graphs, and art; references; transitions	Video images, photographs, and graphics; animations; audio (music and narration); text (titles and credits); special effects (audio and video); transitions
Story line	The search for an answer Telling a story	Story line essential to documentaries
Clarity	Text, tables, and figures must be clear	Audiovisual language (sound plus images) must be clear
Coherence	Tables, figures, and different portions of text must fit together	Text and image must correspond
Consistency	Spelling, abbreviations, and style must be consistent Information should be consistent (for example, the number of patients in a study should be the same each time it is mentioned in the paper)	Times and places where events occur must be consistent with the story line Background and costumes must be consistent from scene to scene
Accuracy	Scientific information must be accurate; for news reports and feature articles, multiple experts should be interviewed	Concepts need to be accurate in how they are explained in narration and images
Pacing	Ideas should be presented at an understandable pace In journalistic writing about science, quotes and anecdotes should be appropriately distributed	Each shot has its own pacing; the connection of several shots creates the pacing or rhythm of a scene; and the relationship between scenes creates the pacing of the documentary An editor can compress and expand time by controlling the length of each cut
Parallelism	Items in lists Sections of a paper (for example, comparing experiments) Analogous tables and figures Episodes in a narrative	Parallel actions can be shown at the same time by dividing the screen and showing the actions within each division or by alternately showing a fragment of one action and then a fragment of the other
Flow	Achieved through organization and transitions	Good flow can be achieved by smooth transitions, involving the images, the sound, and the narration (for example, the narrator tells what is going to be shown before it appears on screen)
Grammar and syntax	Based on grammatical rules, for example, subject-verb agreement	Filmmaking also has rules, such as for the use of light (for example, light and color have to be consistent from shot to shot), frames (closeups are used for detail, panoramic shots for context), camera movements, and so on; but they are not as strict as for written language Grammatical rules apply to the script
Legal issues	Copyrights regarding reprinted text and images	Copyrights regarding music, images, and footage from other films and videotapes

Editing continued

he says. “We look for the personal stories of the people making the technologies happen, the people moving them forward, and then we try to incorporate the science into their personal stories.”

The film editor tries to create sequences that engage viewers, elaborating emotive shots that will create empathy or antipathy toward the characters in the story. “Unless people have some kind of emotional attachment to the people or the subject matter, it is obvious that they are not going to watch”, Lipworth says. “The idea is to convey what the person’s passions and goals are as opposed to just providing straight science information in a kind of straightforward textbook way. A lot of it has to do with visual, a lot has to do with pacing, to create a flow and pull the viewer into the story that is being told.”

Science on Television

“We all know a documentary when we see one”, says Robert Sternberg, lecturer in broadcast communication at Imperial College in London, UK. “What’s interesting is the variety and range of strategies they adopt to represent the world persuasively.”

These strategies or styles include observational films (documentaries of real people in real situations doing what they usually do), expository films (documentaries with a linear, chronologic flow of image and argument), historical films (documentaries about historical events), cinema verité (documentaries that convey realism, for example, with authentic dialogue), and commercial documentaries (documentaries that sell products or promote an institution). Most science documentaries on television today use the “Hollywood style”, in which the story is primary. Television producers manipulate structure, narrative, and visual elements to tell their story. They can achieve this by staging some sequences, creating moods with music and a voice-of-God narration (a narrator that

knows and explains everything, even what you can’t see in the images), and imposing a dramatic time on the shots (for example, a 5-second sequence can be enlarged to 10 seconds by inserting closeups and different camera angles).

Some experts, such as New York University film studies professor Ken Dancyger, say that the editing of documentary footage often leads to the distortion of the event being presented. “The filmmaker’s editorial purpose often supersedes the raw material”, Dancyger writes.³ But isn’t the editing process—at least in print—supposed to ensure accuracy and prevent distortion of the information? Hoppe says that the devices used to tell stories in fiction films can be equally effective in documentaries, and they do not necessarily affect accuracy. “A science documentary is more similar to a story [than to a research paper]”, she says, “but we have to use the tools available to us, and as filmmakers for television we are telling stories. That doesn’t mean we want them to be inaccurate, but it is a story, and we have many creative pieces to bring it together. We have pictures and we have music and we have the script, and all that has to come together to tell a coherent and compelling story that has good information.”

Lipworth says that the technical devices used in television can surely affect viewers’ perception of science, but he still tries to be accurate. “By using the broad goal of trying to inform and educate the public, you are always looking to make sure you provide balance throughout and show all the viewpoints”, he says. “That’s what we do as TV producers, and we need to make sure that we do that to the best of our ability.”

Communicating science on television is not easy, and Hoppe recognizes its limitations. “We are not out to tell everything there is to know about a topic”, she says. “My goal, the reason why I am in television—I don’t have a science degree—is to bring interesting stories to a broad general



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From *Secrets of the Pharaohs, a Secrets of the Dead* special that investigated Egypt’s great mysteries through science. To make the program entertaining, the filmmakers told the story of the scientists looking for answers to these mysteries. (See more on the series at www.pbs.org/wnet/pharaohs/index.html.)

audience: a story that has good information, interesting facts, and educational value. If people want to know more, they can read a paper.”

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