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AUTHOR Kass, Alex; And Others
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ABSTRACT

An effective learning environment must ensure that students are motivated to access whatever information is available, that they have an authentic context in which to situate that knowledge, and that they face challenges that allow them to put that knowledge to use. In an attempt to address these issues, a computer program was developed, called Broadcast News, which teaches social studies to high school students by allowing them to put together a television news show. The learning environment has two distinct layers: a task-environment layer, and an instructional layer. The task environment layer consists of a miniature on-line production facility that students use to create a news show and the initial rough drafts of the stories that students will work on. The instructional layer provides expert feedback and additional sources that students can access to get the information they need to make editorial decisions. Use of Broadcast News includes asking questions of the experts, reviewing source material, editing the story, rewriting, submitting the story for expert review, anchoring, and viewing the show. After completing all the steps, the student may obtain a videotape copy of the show. (AEF)

Using Broadcast Journalism to Motivate Hypermedia Exploration

ALEX KASS, SCOTT DOOLEY, FRANK LUKSA, CHRISTINE CONROY
The Institute for the Learning Sciences
Northwestern University, Evanston, IL 60201
E-Mail: kass@ils.nwu.edu

Abstract: We describe a computer program, called **Broadcast News**, which teaches social studies to high school students by allowing them to put together a television news show. We attempt to show how the journalistic task, as structured by our program, can be used to motivate students to use an embedded hypermedia system to ask questions about social studies issues, to situate the knowledge that the students acquire, to challenge students to put this knowledge to use.

Introduction

In recent years, many developers of multimedia systems have focused primarily on the ways in which such systems can enhance a student's access to information. This is understandable, since easy access to information is a crucial element of effective learning environments. However, if the objective is for students to develop a working knowledge of a subject, then providing access is not enough. An effective learning environment must also ensure that students are motivated to access whatever information is available, that they have an authentic context (Collins, Brown, & Newman, 1989) in which to situate that knowledge, and that they face challenges that allow them to put that knowledge to use. Knowledge that is never put to use during the learning process may be knowledge that is difficult to retrieve and put to use when the need arises in the real world (diSessa, 1988).

In an attempt to address these issues, we have developed a computer program, called **Broadcast News**, which teaches social studies to high school students by allowing them to put together a television news show. We believe that the journalistic task, as structured by our program, does a very effective job of motivating students to use an embedded hypermedia system to ask questions about social studies issues, of situating the knowledge that the students acquire, and of challenging students to put this knowledge to use.

Overview of the Broadcast News System

The learning environment provided by Broadcast News has two distinct layers: a task-environment layer, and an instructional layer.

The task-environment layer consists of a miniature on-line production facility that students use to create a news show. In order to provide students with the ability to create TV-style news, Broadcast News requires some special hardware. The hardware configuration includes an IBM PS/2 with a video card for on-screen video, a laser disc player for video source material, and a video camera and computer-controlled VCR to capture the shows that the students create on VHS tape with the students as anchors. The source material in this layer includes footage from the CNN video feed and text from the AP wire-service. These sources are specific to the news days that the students will be working on and are necessary to put together a show.

The task-environment layer also includes the initial rough drafts of the stories on which the students will be working. These rough drafts are created by the curriculum designer and are constructed to focus attention on the crucial issues in the story. Rather than allow students to write their own, complete stories, students are only allowed to edit these drafts. By giving students a finite number of changes that they can make, the program is able to carefully follow what they do. Providing rough drafts also allows the curriculum designer to structure the learning experience. To provide the appropriate challenge, curriculum designers intentionally place errors and biases into the rough drafts, leave important things out, choose confusing terms, etc. These challenges are intended to raise questions in students' minds. By anticipating these questions and by making the knowledge base easy to explore, the editing task can encourage students to seek out the information required to answer these questions. (For a discussion of our techniques for structuring the editing task, see Kass, et al., 1993).

The second, instructional layer of Broadcast News provides expert feedback and additional sources that students can access to get the information they need to make editorial decisions. When students lack the background

knowledge necessary to understand the issues raised in a story, help is available in hypermedia form. The system contains video of subject-matter experts answering relevant questions. In addition, background material from standard reference works (text and video) is available. A portion of the screen is devoted to displaying questions which students can ask that are relevant to the currently selected text of the story. By clicking on a question, students can bring up an expert who will answer the question, or even multiple experts with different points of view on the question. At any point while the answers are being played, the students can stop the video, and either go back to the editing task, or ask a follow-up question. For students who may fail to notice problems on their own, the program provides some prodding in the form of expert objections to some of their editorial decisions or to the approved draft. The experts also offer unsolicited comments challenging the students' editorial decisions.

Broadcast News allows a curriculum designer the freedom to choose stories that touch on important issues, to structure the students' interaction with the program, and to provide appropriate support material, challenging students and providing the information they need to accomplish their task.

Using Broadcast News

It takes a team of people to put together a real television news show, including producers, writers, video editors, and anchors. During each session with Broadcast News, the student plays some of these roles, and the rest of the roles are played by the computer. In the current version of the program the student's main task, which corresponds roughly to the job of an assistant producer, is to edit the text and video of the rough draft.

When editing a rough draft (Figure 1) the screen is composed of the following items:

- A rough draft of the story, including markers that represent when video will be shown.
- A list of the on-line source material (text files and video segments) related to the story.
- A list of questions about the story that are answered by either text or video clips of experts.
- A collection of relevant hypermedia reference works.
- A set of control buttons the student uses to take editorial actions, such as marking up the story for rewrite, asking for the rewrites to be executed, and giving final approval to the story.

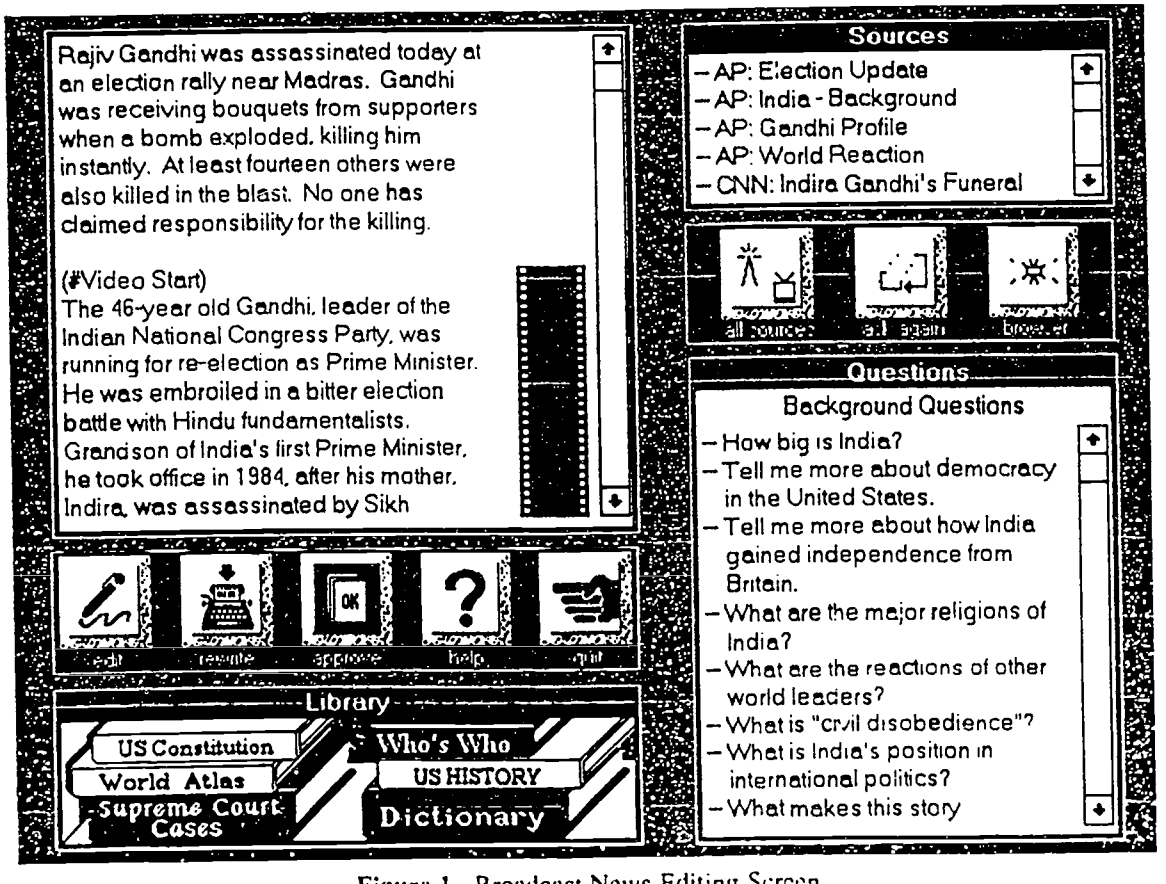

Figure 1. Broadcast News Editing Screen

After the main editing task is complete, and the show is ready to "go on the air," the student is allowed to play anchor. The editor's job is the one that challenges the student to think about the issues behind the story; most of the learning is expected to take place during that phase. The anchoring phase is included because students generally enjoy it, and because it allows them to produce a videotape of their show, which can motivate them to invest more of themselves in their work.

An Example of Broadcast News in Action

A typical session with Broadcast News, in which the student plays the role of assistant producer, begins with a note from the boss, the executive producer, describing the day's assignment. The student's job is to edit the lead story for May 21, 1991, the day that Rajiv Gandhi, the former Prime Minister of India, was assassinated.

After reading the memo from the boss, the student proceeds to the main screen (Figure 1). Students generally begin by reading the rough draft of the story. The first sentence of the Gandhi story reads: "Rajiv Gandhi was assassinated today at an election rally near Madras." Many secondary-school students do not fully understand the references in this sentence. Many do not know who Rajiv Gandhi was or where Madras is. To alleviate this problem, the student can turn to the story questions.

Asking Questions of the Experts

Our prototype system includes video clips of two experts, both Northwestern University professors. One is a former president of NBC and professor of journalism. The other is on the political science faculty, and is the author of a very popular college-level political science textbook.

When no particular portion of the story is selected, the system offers questions that are general to the entire story. The box in the lower-right corner of Figure 1 depicts this situation. One question available is, "What makes this story newsworthy?" Clicking on this question brings up a video clip of our journalism expert, explaining that Gandhi was a world leader and that news is the reporting of change, such as the death of a world leader. While the answer is being delivered, the question list changes to present follow-up questions.

In addition to general story questions, specific questions pertaining to portions of the story are available. By selecting a range of text in the story, the student tells the system to bring up a set of questions related to items mentioned in the selected text. In the Gandhi story, if the student selects the first sentence, the system will bring up a set of questions about Gandhi, Madras, etc. One of the questions is "Who was Rajiv Gandhi?" If the student asks this question, the political science expert explains that Gandhi was a former prime minister of India, who was running for re-election. Follow-up questions a student might want to ask are: "What does it mean to be a prime minister?", "What is an assassination?", What was Gandhi's political platform?", and "Why was Gandhi running for office again?"

The student may also click on the video marker to see questions that relate to the video used in the story.

Reviewing Source Material

Before editing a story, it is usually a good idea to look at the source material for the story. Selecting a source from the list makes it display on the screen. One of the wire service articles for the example story is titled "Gandhi Profile". The example text article tells the location of Madras in India and more about the Gandhi family and how long they have ruled India.

Video source is available as well as text. In addition to providing background knowledge, the video source can be inserted into the broadcast in place of the video that is currently designated to be included in the story.

Editing the Story

After asking any introductory questions, the student should be ready to make some edits. Choosing a sentence and clicking the Edit button brings up a menu of the following rewrite options: Add to selected text; Change selected text; Delete from selected text; or Revise entire paragraph (Figure 2).

In the example story the opening sentence has very little detail. The student may want to add some information about Rajiv Gandhi. Once the student has chosen what type of edit to make, a new menu appears detailing the edits that are available. For example, choosing "Add to selected text" brings up a menu of the following more specific choices on which the student can add detail: Gandhi's family; Gandhi's Title; or Location of Assassination (Figure 2).

It is important to note that none of the choices is intended to be *right* or *wrong* in any absolute sense. Different students will make different choices, just as different television stations make different choices. The point is not to test the student to see if he or she can come up with the right answer; the point is to require thinking about

the issues and making decisions. However, the fact that there is no definitive right answer does not mean that the experts do not have their preferences. If the student opts for adding detail about the method of assassination, the political scientist will object: "I think that the details of the assassination are less important than what this means for the future of Indian democracy." But the fact that an expert disagrees doesn't mean the student has made the wrong choice. The student may find that the experts have incompatible opinions. The students might get challenged no matter what choices they make. The point of the challenges is to make sure students think about what the important issues are and reach an informed decision.

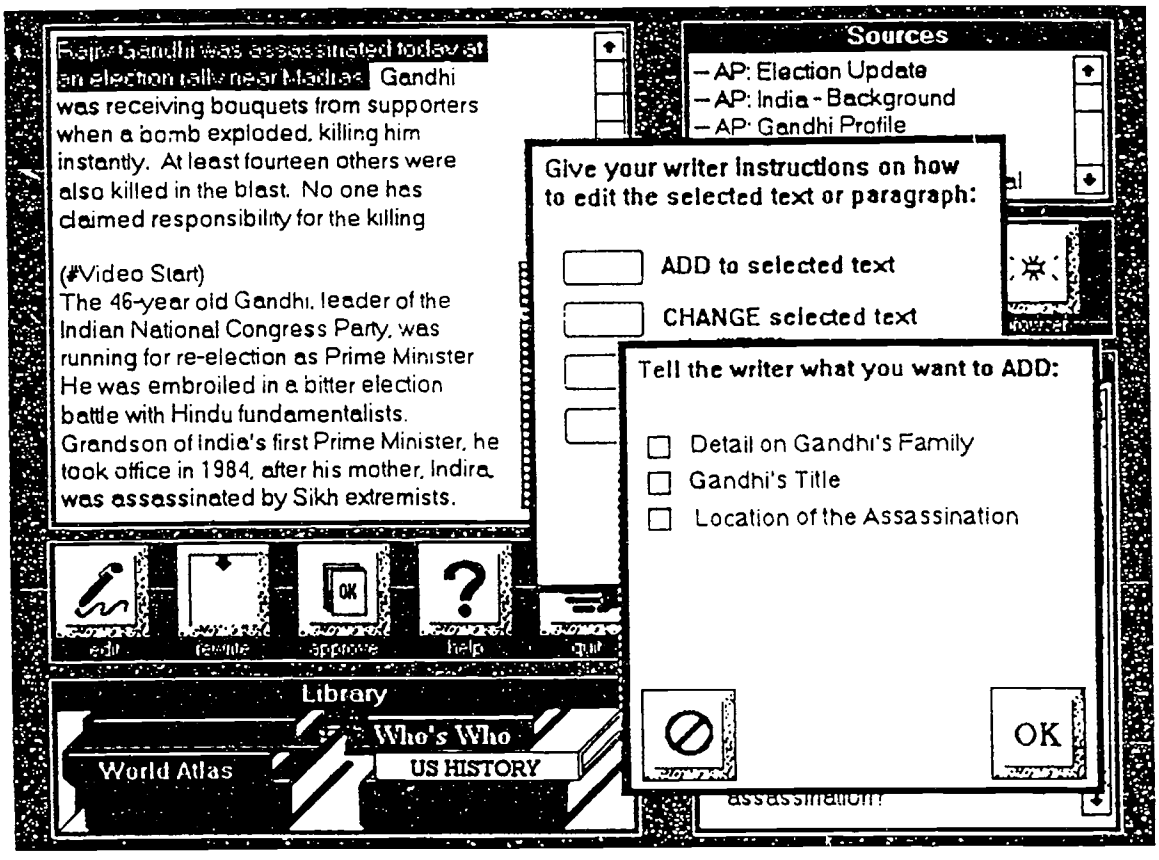

Figure 2. Rewrite Options

After a student chooses to make an edit, such as "More on Gandhi's title", the selected text gets "marked up" by having its color changed to red. The student can also make changes to the video clip used in a story. The edited text or video will remain marked until it has been sent back to the writer to have the prescribed changes made.

Rewriting the Story

Students may, at any time after making an editing decision, choose the Rewrite button and send the marked text and video to the programmed writer for a rewrite. The story returns with changes made as directed. In the example story, if the student has asked for more detail about Gandhi's title in the lead sentence, it will come back transformed from "Rajiv Gandhi was assassinated..." to "Former Indian Prime Minister, Rajiv Gandhi was assassinated...".

Submitting the Story for Expert Review

After receiving the rewritten text, students may make more editing decisions, do more research, or decide that the story is ready for broadcast. When the student decides the story is good enough to go on the air, she chooses the Approve button. Upon student approval, the program checks with each expert for comments on the story.

Regardless of how well the rough drafts are crafted, students cannot always be expected to address all the points in the story that the curriculum designer feels are important. In these cases, after the story is approved, one or

several experts will explicitly raise the issues by commenting on them. Although the student is not required to take action on any of the comments, it is expected that they will often serve as motivation to reread the story and consider the issue.

Anchoring the Story

After giving final approval for a story, the student next needs to anchor and videotape it. For this, the program provides a mini-studio (Figure 3) including a camera, programmed teleprompter, and video viewing window. Just as in a real studio, the student can practice the story first, starting and stopping the teleprompter and seeing how the video will work with the story. Unlike a real news show, the student gets to decide when she is ready to start anchoring. When ready, the student clicks the Go On The Air button. The introductory graphics announcing the news show roll and then the teleprompter starts. The student reads the story as it scrolls by in the teleprompter. Upon reaching the part of the story that indicates the video should start, the student clicks a button to start the video, then chooses another to switch the video source back to the camera. When finished taping, the student can view the show.

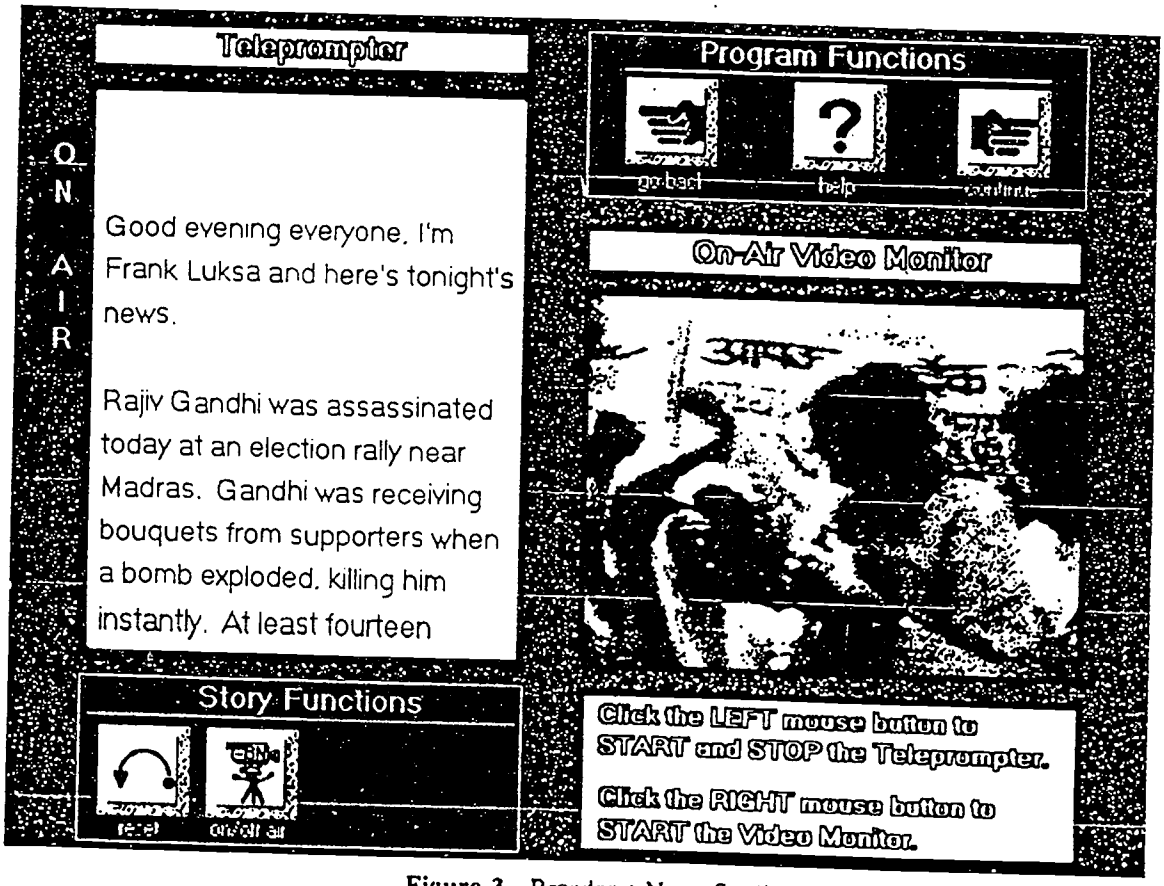

Figure 3. Broadcast News Studio

Viewing the Show and Finishing Up

In the viewing screen, the student is presented with a video monitor cued to the beginning of the introductory graphics that start her news show. In addition to watching her show, the student may also choose the NBC News button to see what the network decided to do that night. In our example news day, the student sees that NBC also chose to use the Gandhi assassination as the lead story. The comparison between what the network put together and what various students put together is a good starting point for a class discussion.

After completing all the steps for a news day, the student can take the videotape of the show with her. As students complete more news days, they get more responsibility for stories and the show as a whole. Students can look forward to eventually being able to write their own stories starting from only the source material.

Current Status and Future Plans

Work on the Broadcast News system is proceeding on three fronts in parallel: 1) extending the application; 2) developing a curriculum based on the use of the program; 3) extending the authoring tool that facilitates the creation of new Broadcast News sessions. In addition to our work on developing Broadcast News, we are also evaluating the system under controlled experimental conditions at a nearby high school.

The Broadcast News program is at the stage of an advanced prototype. Students can use the program in the assistant producer role, developing a small number of stories. However, the current version of the program lacks some features that we deem important. For instance it does not allow the student to review the events that took place following the date of the news day the student worked on. Getting a recap of events is important to allow a student to understand how events unfolded.

Also, the program currently provides a rather limited range of reference material: Dictionary entries defining words in the rough draft, and the AP and CNN news services. A broader range of materials is needed.

We are currently developing a course on the First Amendment to the U.S. Constitution. The course will consist of a series of Broadcast News sessions, all of which touch on a First Amendment issue. Through a set of stories addressing issues such as the burning of a U.S. flag, censorship of high school newspapers, and the use of allegedly obscene music lyrics, we believe we can bring alive the conflicting needs for both freedom and order in our society. To produce good stories in this unit, students will need to know fundamentals about our government such as the organization, responsibilities and interactions of government branches, as well as the content of the U.S. Constitution, how it was formed and how it can be amended.

In addition to work on the application, we have been developing an authoring system to allow a content expert to construct new Broadcast News sessions by entering rough drafts, background information, and expert commentary into the system. The content specialists on our development team are currently using an initial version of this tool. Eventually, educators should be able to use the tool to develop new Broadcast News sessions without needing sophisticated computer skills.

Conclusion

We believe that providing an authentic, exciting activity is the best way to stimulate learning. The activity serves to motivate students, and also to provide them with a context in which they can use the information made available to them. The task provided by Broadcast News - editing a TV news story - seems to be a good one for these purposes for the following reasons: students are excited by the task; the task allows them to produce a concrete artifact in which they can take pride; and the task can be structured to focus students' attention on specific social studies issues. In this context, the expert commentary we have captured on video disc and placed in a hypermedia knowledge base can be used to best effect. All instruction is presented at precisely the point in the student's activity when it is directly relevant to something the student wishes to do.

To summarize, here is our recipe for an effective learning environment: Provide students with an exciting activity that is carefully structured to focus their attention on the issues you wish them to learn about, and provide them with the expertise and the information resources needed to answer the questions that will naturally arise when they attempt to perform the activity.

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