

The Theory of the Laser Class: Using Video Disc Technology in Teaching American Government*

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More than a year ago, I chose to title this paper "The Theory of the Laser Class" merely as a pun on *The Theory of the Leisure Class* by Thorstein Veblen (1899). Not until I completed my teaching experiment and analyzed the data did I realize the irony in my choice of titles. I will explain after presenting the study.

Introduction

"Multimedia" refers to combining different electronic media, commonly computers and laser discs, in presenting information. College students learn something about American government when taught using multimedia techniques, but it is not clear what that is. I report a controlled experiment to test the effectiveness of a multimedia method of instruction in political science against two alternative methods. The findings based from this particular experiment raise some questions about designing multimedia applications to achieve one's pedagogical objectives.

Research Design

I used three different teaching techniques at Northwestern University to supplement my lectures on American government and politics to 238 students, 80% of whom were freshmen or sophomores. For ten weeks from late March through May, 1990, I lectured to the entire class on Mondays, Tuesdays, and Wednesdays. All students had identical reading assignments from a common syllabus based on the text, *The Challenge of Democracy* (1989), which I co-authored with Jeffrey Berry and Jerry Goldman.

On Thursdays and Fridays, the class split into 12 discussion sections of approximately 20 students who met with one of four experienced graduate Teaching Assistants (TAs). Each TA taught about 60 students, employing a different technique in each of their three sections:

In the **traditional** discussion sections, the TAs led the class in discussing material from the lectures and from the assigned readings. This is the standard method for involving students in group discussions when courses are very large.

In the **multimedia** sections, the TAs first asked for questions about the lectures and the readings, then they began discussion based on the questions the students had encountered after completing a hypercard-based computer and videodisc unit prior to attending the section. The interactive video (IV)

* An abbreviated version of this paper will appear as "Videopaths to Learning American Government," *T.H.E. Journal*, special edition on Macintosh computers, September, 1990. I thank Apple Computer for its generous support of this research.

activity is described at length below.

In the **computer** sections, the TAs began by asking for questions about the lectures and readings, then they began discussion based on the students' experiences with two programs that accompanied our textbook. The IDEA-log program (1989), used only for one week, helped students understand the nature of political ideology and allowed them to test their own-self classification by answering 20 questions. The rest of the quarter was devoted to the CROSSTABS 2.0 program (Schrodt and Janda, 1989), which won an EDUCOM/NCRIPTAL Distinguished Software Award in 1987. Students used CROSSTABS with self-contained datasets to analyze the attitudes and behavior of 1,775 respondents interviewed for the 1988 presidential election and all 435 members in the 1988 Congress. They discussed their findings in their sections.

Blind assignment The students knew nothing about the sections nor the TAs when they enrolled for the course, so they chose sections only according to their time preferences. The sections were arbitrarily designated as to method only in the second week of the course, after students had completed switching sections to fit any schedule changes. Students were not informed beforehand that the course was being conducted as an experiment. Although many figured that out during the quarter, some were surprised to learn at the final examination that others did different things in their discussion sections.

No differences among groups at the start According to a survey administered on the first day of class and analyzed by sections after the course was over, there were no significant differences among students in the three types of sections on (a) their reason for taking the course (25% took it because it was required), (b) their reported knowledge of American government, (c) their interest in the subject, nor (d) whether they planned to take another course in American government in the future. TAs ordinarily have a substantial effect on students' attitudes toward their discussion sections, but this time each TA taught each type of section. Given no differences at the start, any differences in the treatment groupings at the end of the course should be due to the method of instruction.[1]

Previous research Previous articles have reported significant results from research on the effectiveness of interactive videodiscs in teaching college-level subjects. In an article on using IV in teaching chemistry, Smith and Jones (1989) studied both a preparatory course for students with low placement scores and a second-semester course for engineering majors. They sought to determine how well students learned from their video lessons and how much they liked them. The authors state, "In all cases, we noticed significant gains for the students using the videodisc lessons." A later article by Hardiman and Williams (1990) on teaching college arithmetic in a community college found that the students in the interactive video group were more likely to complete the course with a passing grade. However, they deplored "the lack of randomization" in their selection process. Even accepting these results, chemistry and mathematics are not political science, and there is still room to question whether the multimedia approach transfers well from the physical sciences to the social sciences. Moreover, there is also room for a controlled study with blind assignment of students to treatment groups and with multiple instructors all employing each of the teaching methods.

1 I am grateful to my Teaching Assistants--Sung Gul Hong, Hoon Jaung, Todd Schaefer, and Paul Sum--who had to make three different preparations for their sections.

The Multimedia Application

The interactive video component of the course requires further description. Ninety minutes of video material covering events and personalities in American politics were culled from *The Video Encyclopedia of the Twentieth Century*.^[2] With assistance of Pioneer Communications of America, this material was reproduced on three sides of two videodiscs in CAV format.^[3] The resulting videodisc contained hundreds of brief film clips on five topics: (1) The Watergate affair; (2) Ideology, the Media, Participation; (3) Presidential Popularity; (4) Civil Rights and Equality; and (5) The Vietnam War.

Apple grant

To assess the value of incorporating these videos in the basic American government course, we submitted a proposal for this experiment to Apple Computer.^[4] Apple kindly provided seven Macintosh SE computers and funds to purchase an equal number of Pioneer 4200 videodisc players and television monitors to create the multimedia stations used in this project. Apple also supplied a Macintosh Plus computer to each TA to compensate for their extra work in teaching their sections three different ways. The University Library cooperated by purchasing modular carrels designed to accommodate the equipment and installing them in its Media Facility, where the students did their multimedia assignments. ^[5]

Using the hypercard stack

Assignments in the multimedia sections consisted of going to the multimedia laboratory once a week to run a "Democracy" hypercard stack that accessed the material

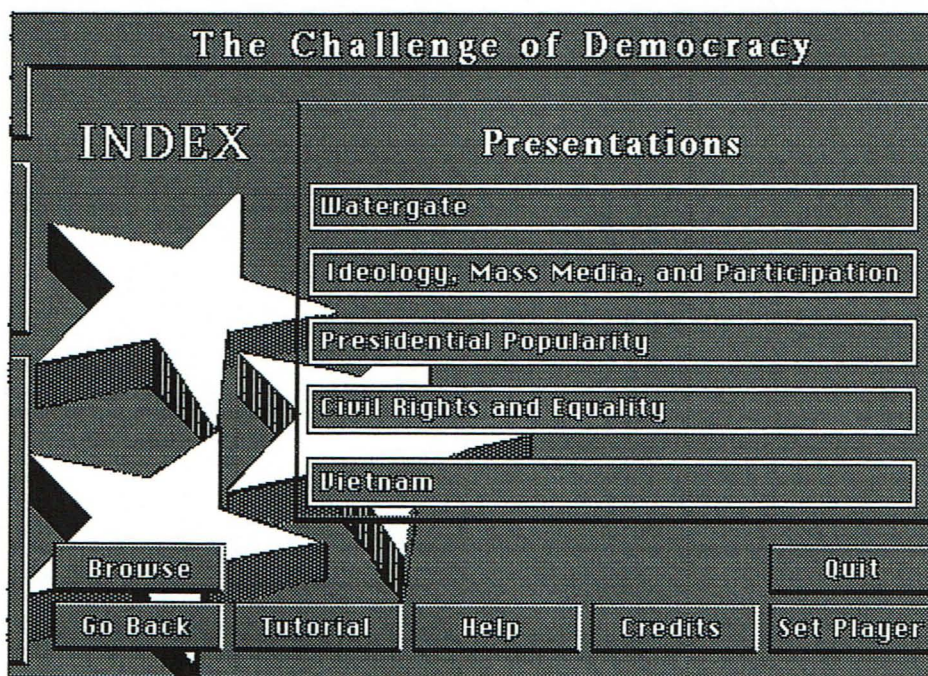


Figure 1: Democracy Menu

on the videodiscs. My colleagues in Academic Computing at Northwestern University created a general hypercard authoring stack for linking the video frames with text displayed on the computer screen.^[6] I used this tool to create separate "paths" to the video events for the five units. Each path consisted of from 17 to 36 computer screens containing background information about the video events that the student was about to view and hear. Figure 1 shows the menu presented to each student soon after entering the Democracy stack.

2 CEL Educational Resources; 477 Madison Avenue; New York, N.Y. 10022. (Telephone 1-800-235-3339.) Ethan Cosgriff, then a graduate student in political science, identified many hours of material in *The Video Encyclopedia* relevant to American politics. CEL gave permission for a portion of these selections to be reproduced on a videotape distributed by the Houghton Mifflin Company in conjunction with *The Challenge of Democracy*.

3 Richard Johnson of Northwestern University's Language Laboratory created the original 90-minute videotape containing the material and then supervised creation of the videodisc at the Pioneer laboratories in Carson City, California.

4 Philip Galanter, Manager of the Advanced Technologies Group in Academic Computing at Northwestern University, joined with me in submitting the proposal to Apple Computer.

5 I thank Stephen Marek and Stuart Baker in the Library's Media Facility for their cooperation in this project.

6 William Parod of our Advanced Technologies Group was mainly responsible for preparing the hypercard stack. Philip Galanter helped design the approach.

**Unit 1:
Watergate**

Students selected a path to one of the five units by clicking on its title. Figure 2 provides an example of one of the screens from the video unit on the Watergate affair. This screen was accompanied by a film clip, lasting less than a minute, of Nixon's press secretary, Ron Ziegler, denying any White House involvement in the Watergate break-in after the story broke. (Most film clips were similarly brief; few lasted more than two minutes.)

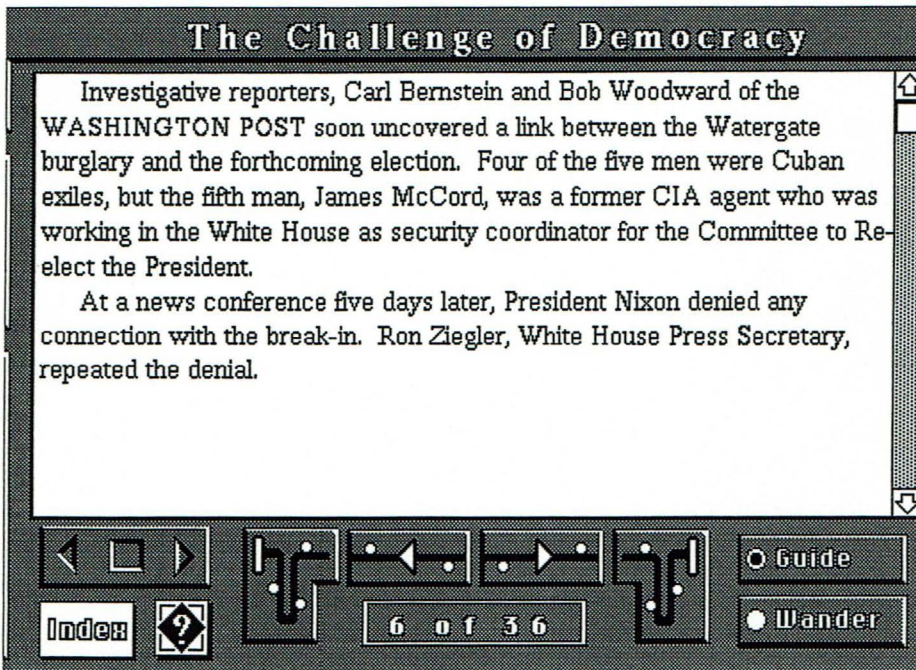


Figure 2: Text on Presidential Denial of Watergate Cover-up

Information in other screens described events leading to the Senate Select Committee hearings on Watergate and to key portions of those hearings, including John Dean's unshakable testimony about White House involvement and Senator Baker's memorable query, "But the central question at this point is simply put: What did the President know and when did he know it?" The videos continued with revelations from the White House

tapes, the roll-call vote in the House Judiciary Committee to recommend impeachment on three counts, and President Nixon's final appearance at the White House before departing by helicopter. The last video showed President Ford announcing his pardon of Richard Nixon.

**Pedagogical
objectives**

Each unit concluded with a computer screen that posed questions to be discussed in the student's Thursday or Friday discussion section. The questions were designed to elicit student opinions rather than correct answers. For example, the Watergate unit concluded by saying, "Now that you have read and viewed this presentation of the Watergate affair, what do you think about the crime and the punishment?" and then posed these questions:

- Was the break-in at the Democratic Headquarters and the subsequent attempt at a cover-up sufficient grounds to impeach a president?
- Was Nixon right in resigning from office following the committee vote, or should he have demanded that the issue be decided by the full House?
- If Nixon had been impeached by the House, should he have fought to the end and demanded trial by the Senate?
- Did President Ford act in the best interests of the nation by pardoning Richard Nixon?

- Were constitutional issues really involved in the Watergate affair?

These questions, and others asked at the end of each unit, were designed to encourage discussion of the topics portrayed in the videos. The content of the other four units can be summarized more succinctly. Table 1 reports the number of computer screens containing explanatory text to accompany each of the units and the approximate time required to read the text and view the videos.

TABLE 1: Video Units, Computer Screens, and Viewing Time

Videopath Unit	Computer Screens	Approximate Time
The Watergate Affair	36	35 min.
Ideology, Mass Media, and Participation	20	25 "
Presidential Popularity	32	30 "
Civil Rights and Equality	18	20 "
The Vietnam War	17	20 "

**Unit 2:
Ideology, Mass Media,
and Participation**

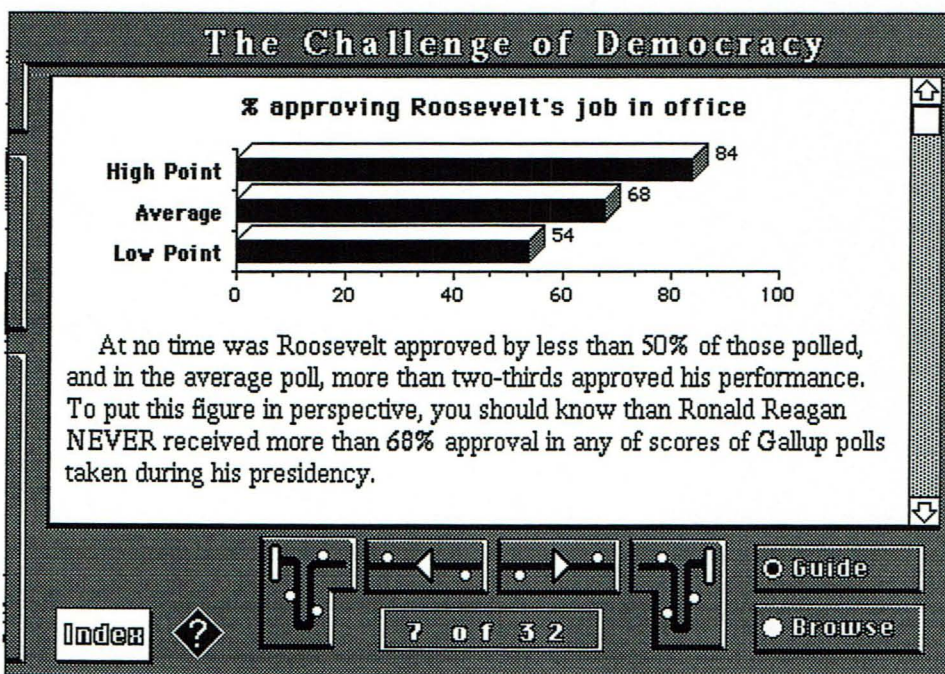
Unit 2 on "Ideology, Mass Media, and Participation," covers three different but related topics. The first segment briefly portrays liberal and conservative views of the role of the federal government in the economy during the depression as represented by President Franklin Delano Roosevelt and his Republican opponent in 1936, Alf Landon. The second segment shows how presidential campaigning styles have been affected by television, as illustrated first by films of Roosevelt and Truman and then of John Kennedy and Richard Nixon in the 1960 campaign debates. The third segment focuses on unconventional political participation, vividly portrayed by the demonstrations outside the 1968 Democratic Convention, which resulted in clashes between youthful protestors and the police and national guard. Unit 2 concludes with these discussion questions:

- Why do you think voters in the 1930s accepted President Roosevelt's case for "government as the solution," whereas voters in the 1980s accepted President Reagan's view of "government as the problem"?
- Has television contributed to the quality of election campaigns and to the quality of the candidates?
- Was the demonstration at the 1968 Democratic National Convention a legitimate expression of unconventional political participation?
- Did Mayor Daley and the police act properly in suppressing it?

- Do you think that the new Mayor Richard Daley is ready to host another Democratic National Convention in Chicago? Is the party?

Unit 3: Presidential Popularity

Unit 3 on "Presidential Popularity" assumes that most students in the introductory course on American government can judge the popular appeal of presidents Reagan and Bush from watching them frequently on television, but that relatively few students have had much opportunity to judge the quality of previous presidents. The videopaths then show selected film clips of the presidents from



Roosevelt to Bush. Each clip was followed with text commenting on presidential popularity in the context of sample survey data. For example, President Roosevelt's famous "I hate war!" speech in 1936 and his dramatic address to a joint session of Congress, asking for a declaration of war in response to the Japanese invasion of Pearl Harbor, were followed by the computer screen in Figure 3 that presents the Gallup data on Roosevelt's popularity.

Figure 3: Screen showing Gallup Poll data on Roosevelt's popularity

Unit 3 concludes with these questions:

- Would John F. Kennedy's popularity have held up if he had been able to finish his term in office?
- Why is it that people perceive Reagan as one of our most popular presidents when the poll data show otherwise?
- Is there any relationship between presidential popularity and ability to get Congress to cooperate with the president?
- Is there any relationship between presidential popularity and presidential "greatness"?
- What chance is there that history will revise the public judgment of any of our least popular presidents?

**Unit 4:
Civil Rights
and Equality**

Unit 4 on "Civil Rights and Equality" begins by linking the civil rights struggle of the 1960s to actions taken by President Truman in the 1940s, to President Eisenhower's use of troops to carry out a court to integrate a high school in Little Rock 1957, and to President Kennedy's nationalizing the Alabama National Guard in 1963 to insure a court order to admit two black students to the University of Alabama over Governor Wallace's opposition. The rest of the unit focuses on Dr. Martin Luther King Jr.'s leadership of the civil rights movement, including his prophetic speech in Memphis the night before his assassination. It closes with these questions:

- If democracy means majority rule, why shouldn't a white majority be able to curtail the voting rights of a black minority?
- Should social equality always take precedence over personal freedom in prohibiting all forms of racial discrimination?
- Was non-violence the right strategy for the civil rights movement?
- If Martin Luther King had not been assassinated, would he have been a candidate for president? If so, would he had done as well as Jesse Jackson?
- Women have also fought for social equality. How has the civil rights movement differed from the women's movement in relying on the federal government and in relying on its own leaders?

**Unit 5:
The Vietnam War**

Unit 5, "The Vietnam War," begins by noting that few students realize that American military involvement in Vietnam lasted for more than 14 years, about twice as long as World War I and World War II combined. It contains several computer screens at the beginning explaining how the U.S. got involved in such a disaster and shows how the war played on the television screens of the public at the height of our involvement. It ends with these questions:

- Would U.S. involvement in Vietnam have been any different if President Johnson had asked Congress for a declaration of war against North Vietnam?
- Would the outcome of the war have been any different if President Johnson had granted the extra troops that General Westmoreland requested in 1968?
- Was the "domino theory" validated in Southeast Asia?
- What effect, if any, has the "Vietnam paradigm" had on American foreign policy in Nicaragua?
- What lessons should the Russians have learned from Vietnam when they entered Afghanistan?

**Student preferences
for the video units**

When the students were asked at the end of the course which of the five video-paths "was most important to your understanding of American politics," 41%

chose the Watergate unit, compared with 27% for Civil Rights; 14% for Presidential Popularity; 11% for Ideology, Media, and Participation; and 6% for Vietnam.

Evaluation

A great deal of attention was given to evaluating the results of this experiment. At the end of the quarter, students in all the sections were asked to complete another questionnaire that repeated several questions asked at the beginning and that contained new items about their feelings toward the course. Students were also asked to write down "anything you liked or didn't like about the teaching method used in your discussion section." Those in the multimedia and computer sections were presented with additional items tailored to their particular experiences. Finally, four students were selected at random from each of the twelve discussion sections and invited to participate (for \$5.00) in a "focus group" conducted by a professional interviewer to evaluate the course.[7] Of the forty-eight invited, twenty-five students met for ninety minute sessions in one of three focus groups--one for each teaching method--with their discussions openly tape recorded. So we have a great deal of very good information on which to evaluate the experiment, but given the allotted space, the findings can only be sketched out here.

Multimedia was liked

Overall, the videodisc units were well received by the third of the class that saw them, as reported in Figure 4. Of the 78 students who completed the special questions pertaining to the multimedia sections, 93% agreed that "The realism of the video segments helped me understand complex events more than only reading or hearing about them." Another 89% *disagreed* that "The video segments were not worth the time they took away from reading the text." About 82% agreed that "The videos helped me feel with others were experiencing in unfamiliar situations." Virtually everyone (99%) *disagreed* that "The program

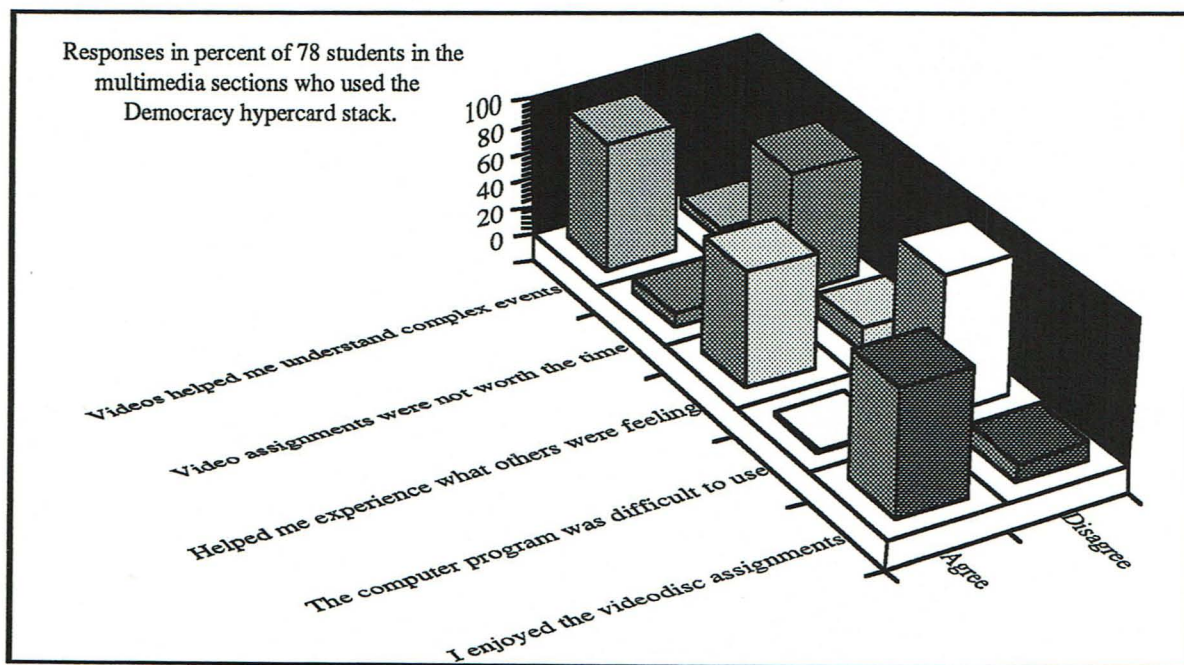


Figure 4: Student reactions to viewing the video units

7 The focus groups were conducted by Ms. Heather Thiessen, a PhD candidate in political science employed by DDB Needham Worldwide, a major advertising agency in Chicago. Ms. Thiessen had served as a TA in my American government course.

was difficult to use." And 89% agreed that they "enjoyed doing the computer and videodisc assignments." Moreover, several students said that they got the sense "of being there" when they watched the videos.

**Criteria for judging
multimedia effects**

The perplexing news comes from evaluating what students had learned about American government through exposure to the three teaching methods. I was prepared to find no significant differences in cognitive knowledge as tested on examinations. Disconcerting though it may be, different methods of instruction in the social sciences rarely yield significant effects when students are examined for knowledge of course content (see Ingram, 1987, pp. 27-31). In my course, students were graded on four factors: (a) an essay-type midterm examination (25% of the course grade); (b) a seven-page term paper--whose nature depended on the type of section (20%); (c) attendance and participation in their discussion sections and a short quiz based on the sections (15%); and (d) a 60-item multiple-choice final examination covering the entire course

**Multimedia group
showed no gains
in performance**

In keeping with the research tradition, none of these factors displayed any significant differences among sections, based on an analysis of variance using the standard .05 level of significance. However, students in the traditional sections actually scored higher on the final examination, with a mean score of 45.4, compared with only 43.4 for those in the multimedia sections and 43.1 for the computer sections (significant at the .103 level).[8]

**Multimedia group
showed no gains
on other criteria**

From the beginning, the experiment was not expected to show any effects in cognitive learning from participating in either the multimedia or computer sections. In my proposal, I had counted on demonstrating positive effects using three different criteria. My main criterion was whether students were more likely to take another course in American government, based on their multimedia experience. Using a paired t-test to compare the same students' responses to this question on the first day of class and at the end of the course, I again found no significant differences at the .05 level among the three groups. To my surprise, students in the traditional sections were the only ones to be more, rather than less, likely to take another course. The second criterion--whether students became more interested in the subject over the course--also showed no significant difference by the paired t-test. The third criterion--how students rated their knowledge of American government--showed highly significant increases (beyond the .0001 level) within all three groups. A separate analysis of variance for students' self-rating of knowledge at the end of the course detected no significant differences among the groups, but again students in the traditional sections rated their knowledge slightly higher.

According to these quantitative indicators, students in the multimedia (and computer) sections performed no better than those in the traditional sections (indeed a little worse) and displayed no distinctive interest in the course, no greater sense of knowledge, nor more of an inclination to take another course in American government. How can we square these results with the other quantitative measures of student opinions of their multimedia experience? The students' essay comments and the discussions in the multimedia focus group help explain why the students liked the videos yet did not feel that they benefited much from them in the course.

8 This difference was sufficiently large that I added two points to the final examination scores for all students in the multimedia and computer sections to adjust for their participation in those sections.

**Essay comments
and focus groups**

First of all, students can distinguish between what they enjoy doing and what helps them learn. Second, students are quite instrumental in their view of learning, which for many meant "doing well" in the course. Consider some reactions to the Watergate unit, which was judged the "most important" of the five units in the multimedia sections. One student in the multimedia focus group said:

I liked the videos ... But I have procrastination problems, so it really helps if I have a regular discussion section during which we discuss the readings assigned for that week. Otherwise I won't [do the readings]. But I would have preferred a little during my discussion section to talk about what we were doing in class. Mostly we just talked about the video units. I saw the videos before the discussion section but a lot of time I didn't do the reading.

Another student wrote this comment on the survey form:

I think that the discussion section should have focused more on class lectures and the text and not the video segments. The video segments on Watergate, for example, went very in depth into the affair. However, Watergate was not a great issue in the lectures.

Yet another in the focus groups said, "The videos were very interesting, but it's not going to help us on the final."

This was a common complaint among the students, who judged the teaching methods according to how they thought they would be tested on the common material at the end of the course. By this standard, those in the traditional sections were the most satisfied by their section experiences. This finding is not unique to my class but conforms to research by Barrall and Hill (1977), who queried students about eight different instructional options and concluded that students preferred the traditional lecture-discussion format over all other options. It is entirely possible that the "traditional" method, which simply allows students to discuss the course lectures and readings for an hour with a teaching assistant, has some unappreciated merits.

Conclusion

Several criticisms can be addressed to my study. Many students in the multimedia and in the computer sections, who learned that they were doing something "different," were put off by the experiment. Several students in the multimedia focus group said that they felt like "guinea pigs," and students in both the multimedia and computer groups complained that it was unfair that they had to do something "extra." Obviously, these complaints would vanish if all students in the course had used the videos. One could also argue that my application, while multimedia, was not truly interactive but simply a form of "page-turning," and that a truly interactive application would produce better results.

Another serious criticism is that the multimedias and the computer techniques were used in the discussion sections and not integrated into the lectures, which was precluded by the experimental design. Based on my own experiences in teaching statistics, I am confident that I could generate more student interest in using CROSSTABS in research if I personally referred to it in my lectures. I suspect that this is true with the video units too. Moreover, there could be major flaws in the design or execution of the units themselves, despite the students'

overwhelmingly positive reactions to their experiences.

Further analysis of the large quantity of information collected in this experiment may eventually explain why students in the multimedia sections did not react more positively to the course than those in the traditional sections. Whatever the explanation, it certainly appears that teaching with multimedia in the social sciences does not produce the same robust results that others have found in the physical sciences. One can certainly argue that multimedia produces other forms of learning that are not measured by performance in the course nor by attitudes toward it. Evidence of other learning surfaces in a student's comment in the focus groups on viewing Martin Luther King's 1963 "I have a dream" speech at the Lincoln Memorial:

I sat there and bawled. I felt like the biggest jerk. I was sitting in the library with the headset on bawling, and people were walking by, looking.

Several others commented on this ability of the videos to help one "experience" the event, which presumably benefits learning. If that is so, then advocates of multimedia in teaching bear the burden of identifying and demonstrating these benefits--and whether the results are worth the considerable investment in time to produce IV material and in the cost of the equipment needed for teaching with it. My own effort to demonstrate these benefits was disappointing.

The laser class and the leisure class

Finally, it may be worth commenting on the irony of my title, which plays off on Thorstein Veblen's, *The Theory of the Leisure Class*. When I am in a cynical mood, I am tempted to quip that my study was aptly named because the "laser class" also does not work. But there is a serious point of reference with the Veblen book. *The Theory of the Leisure Class* introduced the term "conspicuous consumption" into the social science literature and discussed the influence of wealth on social behavior in the form of "pecuniary emulation." Veblen was especially concerned about the expression of the pecuniary culture in higher education: "It is in learning proper, and more particularly in the higher learning, that the influence of leisure-class ideals is most patent" (Veblen, 1934, p. 364).

While Veblen was writing about different issues at a different time, I also worry that pecuniary influences are distorting our approaches to education. Obviously, there are elements of "conspicuous consumption" by individuals in acquiring the fastest computer, the biggest hard disk, and the latest software. (I am as conspicuous a consumer of computer hardware and software as any person in political science, for I strive to acquire the newest in *both* Macintosh and DOS worlds.) But I am more worried about the pressures on educational institutions rather than on individual consumers. Beguiled by vendors selling the fastest computers, the biggest hard disks, and the latest software, my colleagues and I pressure our institutions to acquire state-of-the-art equipment as it hits the market. As a consequence, there is a tendency for university purchases of computing hardware and software to be vendor-driven, with faculty and administrators responding to electronic promise rather than to educational results.

I do not deny the value of computing technology in education nor do I wish to curtail explorations in innovative methods of teaching. However, I do urge that educators pay serious attention to assessing the gains and losses from their innovations. In my own case, I have been forced into some serious rethinking about the place of multimedia technology in political science education.

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