

What is Video Good For? Examining How Media and Story Genre Interact

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Research suggests that the educational value of a media format depends upon the ways in which its representational affordances interact with complex features of the learning environment, including learner characteristics, content domains, pedagogical strategies, and cognitive and social processes. In the current study, we sought to understand some of these interactions by studying the impact of two different media (video and text) on learners within varied story types (which embody ideas of different content domains and instructional strategies). We studied how equivalent text and video versions of four different stories impacted participants': interest/engagement, affect/mood, emotional engagement, recall of information, ability to summarize main points, judgments of story quality, and opinions about content matter. Results indicate that while video does not provide an advantage over text on measures of immediate information recall, on other measures of the study there is a more complex interaction between media format, story type, and video style. Explanations and implications of these findings are discussed.

The shift toward newer, digital forms of expression that replace print have consequences for how we think about teaching and researching literacy (Bruce, 1997; Leu, 2000; Reinking, 1998). However, evaluating the effectiveness of video as an instructional medium has proven to be complicated and somewhat contentious (e.g., see the recent debate by Clark [1994a, 1994b] and Kozma [1994]). In his review of early studies comparing vid-

eo with other methods of instruction, Clark (1983) concluded that “media do not influence learning under any conditions ... [they] are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers the groceries causes changes in our nutrition” (p. 445), a conclusion reached by researchers, although somewhat less dramatically in earlier reviews of the literature (Levie & Dickie, 1973; Mielke, 1968; Schramm, 1977).

Researchers who disagree with Clark have argued that media benefits are not simple to identify, and that media effects interact with other educational factors (e.g., contexts, goals, social processes, etc.) in complicated ways. In this view, media have *affordances*—perceived and actual properties (Gibson, 1979; Norman, 1990) that define relationships between media formats and the intentions, perceptions, and capabilities of learners (Weiser & Brown, 1995). Kozma (1991, 1994), for example argued for this contextual stance by considering media to have affordances that “... interact with cognitive and social processes” (p. 11). Salomon (1979) provided the rationale for how media interact with cognitive processes, arguing that the resulting mental activity differs because the underlying symbol systems differ in the way “they structure and convey contents” (p. xviii; xix). Thus, learning in a particular medium is dependent upon navigating the differing symbol system of that medium.

This view is supported by Paivio’s (1990, p. 55) dual coding theory which posits two separate symbolic systems: one system is attuned to verbal information, including auditory processing and language, while the other system is attuned to visual and spatial processing. Even though these systems are functionally and structurally different, they are interconnected in a way that an event in one system can initiate activity in the other. Dual coding theory further suggests that there is little competition for resources when presenting visual and auditory information together, so that multimedia representations have important educational affordances. From this perspective, video, with its visual and verbal codes, might be a more effective and powerful medium for delivery of instructional material than a single representation of just pictorial or verbal code.

The present study is concerned with further exploring the complexity of interactions surrounding the role of media and learning. In particular, this study focuses on the affordances of text and video interacting with different types of content and story-types (e.g., human-interest story vs. informative story vs. artistic work vs. scholarly lecture). Story type is a profitable starting point for investigation because of the vast body of research suggesting that story grammars play a large role in the processing, organizing, and re-

calling of information (see for example Kintsch & van Dijk, 1975; Mandler, 1984).

Historically, studies investigating the role of media in learning have been problematic (as Clark [1983] pointed out). Although there have been many studies that have tried to address the learning benefits of media and multimedia, very few of these studies have focused on comparing media in which information content, instructional strategies, and other aspects of learning have been held constant. The results that do exist, however, shed some interesting light on how visual media may impact learners, and how that impact may differ depending on the type of story that is being portrayed.

For example, a study by Cowen (1984), concluded that video may have some important affordances for representing character-driven stories. Cowen went to great lengths to establish the equivalence of text and video versions of short vignettes depicting a main character, named Jim, as very introverted or extroverted as he encountered everyday situations (e.g., meeting someone at a restaurant). Results showed that the video version led to better recall of story details but not about Jim's personality. In a second experiment, text information was followed by conflicting video information (and vice-versa), so that, for example, a video of one story depicting Jim as an extrovert was followed by a text of another story depicting Jim as an introvert. Results indicated that participants were more influenced by the video version in their recall and judgment of Jim's character, regardless of the order in which they were presented. Similar results were obtained in a study by Baggett (1979) for a dialogueless movie (*The Red Balloon*), in which video afforded better recall of information than text seven days later, but not immediately following the story. Similarly, Roberts, Cowen, and McDonald (1996) contrasted film and text versions of the short story, *Soap-Box Derby*. They found that participants who experienced the film version of the story displayed better recall of positive and negative emotional states compared with those who experienced only the text versions of the story. Film also led to better recall of secondary information, although not of primary information. There were no differences between the film and text conditions in their perceptions of the characters. In sum, these studies support the idea that for character-driven stories, participants find video to be better suited for portraying character portraits (e.g., emotional states) that are more likely to be recalled.

Studies based upon news stories show a different finding, usually in favor of a learning or recall benefit for text over video (DeFleur, Davenport, Cronin, & DeFleur, 1992; Robinson & Davis, 1990), or possibly no difference between text and video in learning or recall (Neuman, Just, & Crigler,

1992). However, Brosius (1989) and Newhagen and Reeves (1992) showed that *how* images are used in conjunction with the underlying message could greatly influence learning and recall, instead of simply applying a talking head approach (Edwardson, Kent, Engstrom, & Hoffman, 1992). Cooper (2000) found that using video for news stories makes viewers more likely to assign credit or blame to characters in the story, find the stories more personally relevant and important, and generally find the news stories more newsworthy.

These studies suggest a slightly modified version of Clark's controversial statement that there are no educational benefits from media *in general*. Instead, understanding the impact of video or other visual media upon learners will take an accounting of how the representational affordances of different media interact with other complex features of the learning environment, including learner characteristics, content domains, pedagogical strategies, and cognitive and social processes. In the current study, we sought to understand some of these interactions by studying the impact of two different media (video and text) on learners within varied story types (which embody ideas of different content domains and instructional strategies). In particular, we studied the impacts of these two media upon learners as they interacted with a human interest news story, an informative/persuasive news story, an artistic piece (a poem), and a "talking head" lecture. We studied how equivalent text and video versions of the stories impacted participants': interest/engagement, affect/mood, emotional engagement, recall of information, ability to summarize main points, judgments of story quality, and opinions about content matter.

METHOD

Participants

Eighty-four undergraduate students in a college of education took part in the study and received extra credit in their coursework. Seventy-one of the participants were female (mean age 22.01), and 13 were male (mean age 23.08). Participation was voluntary.

Materials

Four stories/narratives taken from original video sources were used in this study, and are described in Table 1. Text versions of each story were

generated to be as equivalent as possible to the video versions. For example, there were no differences between the printed poem and audio soundtrack for the POETRY story, except for one detail. That is, in the video the poet says, “this poem is dedicated to ____” at the start of the poetry reading, but in the text version a byline was added beneath the title, “dedicated to ____.” Two of the stories, AIBO and COLLEGE, were drawn from a national network news program. The text versions of these stories were designed to convey the logos, graphical layout, and rhetorical devices of the equivalent network print service. The network news website was used to generate professional looking equivalent text versions of these two examples. More wording changes were needed in the news stories than in the poetry example. Most of these involved changing the news correspondent’s words spoken in the first person, to the third person more commonly found in print. To further examine the minor differences between the versions, see Koehler (2005) for web transcripts of the video and text versions of the AIBO news story.

Table 1
Summary of the Four Stories Used in the Study

<p>AIBO human interest story</p>	<p>Network news story about a robotic dog being used in assisted living facilities to provide artificial companionship for the elderly. It explores first if people can really bond to a robotic dog, and second if it is ethical to “fool” the elderly into doing so.</p>
<p>COLLEGE Informative story & persuasion story</p>	<p>Network news story about the problems caused by college drinking, including injuries and deaths. Lots of facts are presented to support the claim that it is a rampant problem. The story presents novel approaches being used by colleges to combat the problem.</p>
<p>POETRY Poetry reading</p>	<p>A poem written and read by Ted Berrigan about the search for what was lost in a prior relationship that ends with a final surrender to the wishes of the lost partner that they remain apart. It has overtones of sadness and regret.</p>
<p>LECTURE “Talking head”</p>	<p>Taken from the Society of Mind CD-ROM (Minsky, 1996), in which Dr. Marvin Minsky talks briefly about his theory of language. The video only shows Dr. Minsky talking on a neutral yellow-white background.</p>

Eight web pages were created to display the stories (four stories in both text and video formats). Web pages were also designed to administer the survey questions and collect the data from participants.

Instruments

Demographic survey. Participants completed a very short demographic survey assessing their age, gender, major, and GPA.

Learning style/media preferences questionnaire. Before and after each story, participants used a 5-point Likert-type scale to rate their agreement with the following statements: (a) “I am generally better able to learn if something is presented visually (TV, pictorially, movies, etc.)” and (b) “I am generally better able to learn something if I can read about it in detail.” These questions were used to judge participants’ preferences for text or video, and the extent to which these preferences changed as they were exposed to stories of both types.

Affective/engagement survey. After each interaction with one of the stories, participants completed an affective/engagement survey consisting of 23 items on a 5-point semantic differential scale with opposing affective adjective pairs (e.g., excited/bored, emotional/unemotional, warm/cold, interested/uninterested, etc.). This instrument was designed to measure the extent to which participants were engaged using a variety of phrasings (e.g., passive/active, engaged/disengaged, etc.), the extent to which they were emotionally affected (e.g., bad/good, strong/weak, troubled/content, etc.), and how they perceived the formal status of the story (e.g., informal/formal, insensitive/sensitive, etc.).

Recall of information. Following each story, participants received a small number of open-ended questions about specific information from the story. For example, following COLLEGE, participants were asked to recall: (a) the number of alcohol-related deaths reported each year; (b) the number of alcohol-related injuries reported each year; (c) the number of alcohol-related sexual assaults reported each year; (d) the name of the university featured in the story; and (e) the name of that university’s president who was interviewed for the story. Similar questions were used for AIBO and for LECTURE. POETRY, however, only featured two recall questions: (a) to whom was the poem dedicated?; and (b) recall a favorite line from the poem.

Summary of main ideas. For AIBO, COLLEGE, and LECTURE, participants were also asked to write a one-paragraph summary of the story to assess their understanding of the main narrative points. Additionally, one multiple-choice question about the main argument put forth in the story was also used to gauge participants' understanding. For POETRY, participants were asked to write a one-sentence summary of the poem.

Opinion questions. Using Likert-scale ratings to measure their level of agreement, several questions targeted pre/post changes in participants' opinions about issues in the stories. For example, both before and after experiencing the COLLEGE story, participants were asked the extent to which they agreed or disagreed with the following statements: "Excessive drinking at colleges is a serious problem"; "There is very little to be done about the problem of college drinking—it's a part of the college culture"; and "Colleges need to aggressively combat the problem of student drinking." For POETRY, participants were asked before and after the poem the extent to which they: (a) enjoyed poetry; and (b) thought they could be a poet.

Judgments about story quality. Likert-type ratings were also used to assess the extent to which students found the stories to be compelling, worthwhile, and of high quality. For example, after COLLEGE, participants were asked to rate their level of agreement with the following statements: "I feel as if I have learned a lot about the issues in this story"; "I would like to share this story with a friend"; and "This report was factually accurate."

Procedure

Participants completed this study on a computer in a computer lab. Once the demographic survey was completed, each participant was assigned to one of 48 possible orderings of the four stories (AIBO, COLLEGE, POETRY, LECTURE) by media pairings. These 48 orderings were constructed starting from the 24 possible orderings of the four stories, then assigning two of them to be video and two of them to be text in such a way that the design was balanced (e.g., Latin-squares) by position (video was equally likely to happen in the first story as the last story).

Participants were first asked some short questions about their opinions (e.g., on college drinking), after which, they experienced a story (e.g., about college drinking) in either text or video, then completed the affective/engagement survey, and answered some additional questions about the story

that was just presented (affective/engagement survey, recall of information, summary of main ideas, opinion questions, judgments about quality, etc.). This procedure was repeated for the three remaining stories. By the completion of the experiment, each participant experienced two stories in text, and two in video.

Two unforeseen issues arose while conducting this study. The first problem stemmed from a design that allowed participants to click too soon on the button that would allow them to advance to the next screen in the study (a reflex reaction to seeing a button titled “next”). As a consequence, some participants skipped the first video they were presented. Because the hypertext interface was designed to block participants from going back to revisit the stories once the questions were presented, in some cases the experiment had to be restarted for this participant. However, it is important to note that one of the 48 orderings had already been marked as used, and therefore the javascript that ran at the start of the experiment went on to use the next one available. The second issue was more problematic, and has implications for the analysis and interpretation of the data (described later). Once all 48 orderings had been used, the javascript was designed to start over again from the first ordering. In fact, after the 48th participant, the javascript did start over with the first ordering, however, each remaining participant received the same first ordering (the javascript did not increment orderings once it had rolled over from 48).

Measures and Scoring

Affective/engagement measures. The affective/engagement survey was used as the basis to explore the macro-level questions of media and story interactions, since this instrument was common to all stories (whereas other questions were specific to each story). A principal components factor analysis with varimax rotation on ranked responses to the 19 items on the survey was conducted to identify patterns in the responses, and to reduce the number of dimensions of comparison in the analysis (for purposes of increasing interpretability and controlling error rate). The resulting factor scores were used in subsequent analyses.

Recall of story information. Responses to recall questions from each story were coded as right (1), or wrong (0). In some cases, partial credit was given to responses (e.g., a response of “Marvin” was given partial credit for the correct answer of “Marvin Minsky”). All recall questions were coded separately by two independent raters, with an overall agreement rate of 92.9%. Disagreements were resolved by consensus.

Within each story, a total recall score was computed as the average of each of the recall questions for that story. These average recall scores were then ranked (within story), so that the participant with the lowest overall recall score for AIBO, for example, would have a recall rank of 1 for AIBO, and the highest recall score for AIBO would have a rank score of 84 for AIBO (there were $N=84$ participants). The resulting ranked recall scores were used in subsequent analyses.

Story summaries. The multiple-choice summaries were coded as right (1) or wrong (0), and analyzed by a repeated-measures randomized blocking design with three factors: Media (text, video) x Story (AIBO, COLLEGE) x Participant (the blocks in the design).

The one-paragraph summaries were rated on a 10-point scale by two independent raters. Raters subjectively assigned a score to each summary, with higher scores corresponding to better summaries. Prior to rating summaries for a story, raters discussed a sample of the summaries to generate a common coding scheme. The scheme varied from story to story. For POETRY, for example, low scoring summaries used vague terms (e.g., “love”) to describe the poem, whereas the highest scoring summaries referred to the speaker’s search for what was lost in a prior relationship. The independent ratings were reliable (Cronbach’s $\alpha=.917$). For analysis purposes, the ratings were averaged, and participants’ scores were ranked within each story.

Opinion questions and judgments about quality. These questions were analyzed on a question-by-question basis using simple one-way ANOVA (with Media as the factor), since there was no common overlap between stories on these types of questions. These analyses were used to determine if either medium was more or less influential in persuading participants toward a certain viewpoint (e.g., that college drinking is a serious problem), or if either medium was a factor in how participants viewed the story in terms of quality and credibility.

Design and Analysis

Because of the unexpected problems with the software described, we were left with a design that was unbalanced in a couple of ways. First, the ordering of (AIBO - Video, COLLEGE - Text, POETRY - Video, LECTURE - Text) was repeated 35 more times than was intended. So, for ex-

ample, AIBO was administered as the first story far more than was intended. Thus, potential order effects are possible. Second, there are far more observations of AIBO in video (60) than in text (24). To explore the potential threats these unbalances posed to our planned analyses, we compared the data from the first 48 orderings with the repeated administrations of the first order to see if the data could be reasonably combined. There was no statistical evidence that the mean responses in the two sets of data should be treated differently. We then explored the possibility of order effects on our measures using the first 48 data points. We found no evidence of order effects in our data, suggesting that differences in the combined data between stories can be reasonably interpreted as attributable to the stories, and not the fact that AIBO was more likely to be the first story participants encountered. However, the problem of unequal n (60 vs. 24) does limit the statistical power of this study, and may result in either an over- or under-estimate of the type I error rate. From this point on, we report our data as one combined analysis, with the above caveats.

We had intended that the data collected through the *Learning Styles/Media Preferences* questions would be useful, among other things, as covariates in our analyses to explain some of the variation in why some participants performed better with video than others. However, in all of our explorations of the data, none of these questions served any predictive value for any of our measures or outcomes, and therefore are not used or reported in our analyses.

Measures that exist for all stories in this study (e.g., *Affective/engagement factors*, *Recall of information*, and *Story summaries*) were analyzed using a repeated-measures randomized blocking design with three factors: Media (text, video) \times Story (AIBO, COLLEGE, POETRY, LECTURE) \times Participant (the blocks in the design). Measures specific to only one story (e.g., opinions about POETRY), were analyzed using a one-way ANOVA with Media (text, video) as the only factor.

RESULTS

Affective/Engagement Survey

The factor analysis of the responses to the items on the survey produced three factors accounting for over 60% of the variance. The three factors were easily interpretable as:

- *Interest engagement*—This factor accounted for 40% of the variance. The largest contributing component scores corresponded to semantic differential ratings of *active, engaged, excited, interested, lively, and vivid*.
- *Positive affect*—This factor accounted for 12% of the variance, and the largest contributing component scores corresponded to ratings of *good, friendly, happy, content, and warm*.
- *Emotional engagement*—This factor accounted for 8% of the variance, and corresponded to ratings of *personal, sensitive, warm, emotional, and informal*.

The means and confidence intervals for each factor score by Media, Story and Media x Story cells are summarized in Table 2. Results are discussed by factor in the sections below.

Table 2
Estimated Cell Means and Confidence Intervals for Each of the Three Factors

	Interest Engagement		Positive Affect		Emotional Engagement	
	Mean	95% Conf. Interval	Mean	95% Conf. Interval	Mean	95% Conf. Interval
AIBO						
Text	.12	(-0.23, 0.46)	.79	(0.33, 1.25)	-.34	(-.73, .05)
Video	.64	(0.46, 0.81)	.54	(0.31, 0.78)	.27	(.07, .47)
COLLEGE						
Text	.67	(0.49, 0.84)	-.50	(-0.74, -0.27)	-.38	(-.58, -.18)
Video	1.19	(0.85, 1.53)	-.60	(-1.06, -0.15)	-.21	(-.60, .18)
POETRY						
Text	-.47	(-0.83, -0.14)	.24	(-0.22, 0.70)	.89	(.50, 1.28)
Video	-.42	(-0.60, -0.25)	-.37	(-0.60, -0.13)	1.02	(.82, 1.22)
LECTURE						
Text	-.78	(-0.95, -0.60)	.12	(-0.11, 0.35)	-.75	(-.95, -.55)
Video	-1.14	(-1.48, -0.79)	.23	(-0.23, 0.68)	-.85	(-1.24, -.46)
OVERALL						
AIBO	.38	(0.20, 0.56)	.67	(0.43, 0.91)	-.04	(-.24, .17)
COLLEGE	.93	(0.75, 1.11)	-.55	(-0.79, -0.31)	-.29	(-.50, -.09)
POETRY	-.46	(-0.64, -0.28)	-.06	(-0.30, 0.18)	.95	(.75, 1.16)
LECTURE	-.96	(-1.14, -0.78)	.17	(-0.07, 0.41)	-.80	(-1.01, -.60)
TEXT	-.12	(-0.25, 0.08)	.16	(-0.01, 0.33)	-.15	(-.29, .00)
VIDEO	.07	(-0.06, 0.20)	-.05	(-0.22, 0.12)	.06	(-.09, .20)

Interest engagement. Figure 1 graphically depicts the estimated means (Table 2) for interest engagement. Note that participants found AIBO and COLLEGE to be generally more interesting than POETRY and LECTURE. This is supported by the results of a 3-way ANOVA (Media x Story x Participant block) indicating a significant main effect for Story, $F(1, 245) = 86.111, p < .001, \eta^2 = .51$. Inspection of the estimated confidence interval confirms non-overlapping estimates of interest engagement for each of the four stories except for POETRY and LECTURE (which they did not find very interesting overall), indicating that participants did see very real differences in their level of interest based upon the type of story.

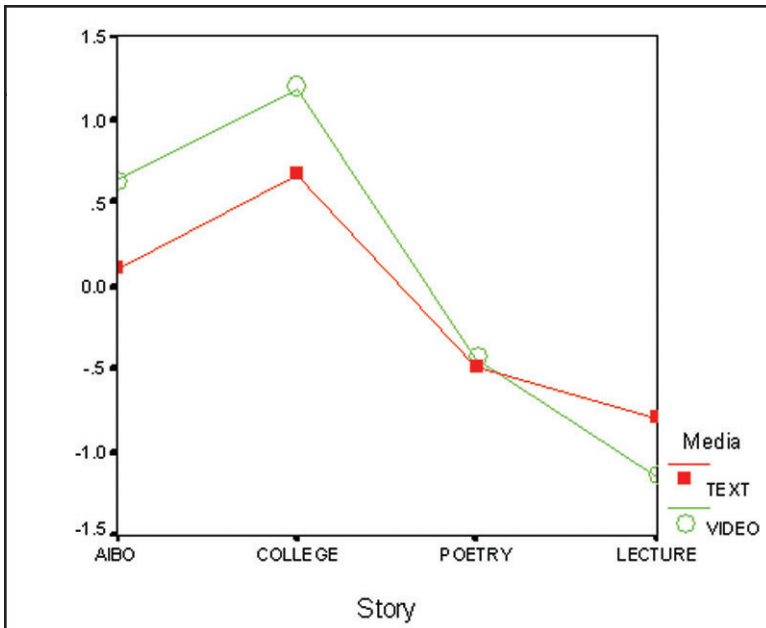


Figure 1. Graph of the estimated cell means for interest engagement

In two of the four narratives, the video version of the story was rated as more engaging (AIBO and COLLEGE), and in one case it was rated as less engaging (LECTURE). This relationship is again further strengthened by the ANOVA suggesting a significant main effect for Media, $F(1, 245) = 4.68, p = .032, \eta^2 = .02$, and a significant interaction (Media x Story), $F(3, 245) = 4.44, p = .005, \eta^2 = .05$. Note that for AIBO and COLLEGE, the text and video confidence intervals are nonoverlapping, indicating that participants who experienced the video versions of AIBO and COLLEGE found

the story significantly more engaging and interesting than their counterparts who read the text versions of these stories. However, this is not the case with the LECTURE about linguistics, or the POETRY reading. Here simply adding video of the author speaking did little to help engage participants (and possibly hurt). The large differences in AIBO and COLLEGE are enough to suggest the main effect, however the interaction is more interesting, suggesting that video does not simply lead to higher levels of interest or engagement, but rather it depends upon the story it is used to portray (and probably how it is used to portray it).

Positive affect. Looking across the stories (Figure 2), there are considerable differences in the impact on participants' mood based upon the content they experienced. Inspection of Table 2 reveals that estimates of Positive Affect on POETRY overlap with LECTURE and COLLEGE, but otherwise the four stories are distinct from one another. Interestingly enough, not only was COLLEGE most likely to engage and interest participants, it was most likely to negatively affect their mood (perhaps not surprising given the participant population—college undergraduates—and the content of the story—the serious problems of college drinking). AIBO, a human interest story about raising the spirits of elderly patients seems to be the most uplifting. The 3-way ANOVA confirms the significant differences in positive affect by story, $F(3, 245) = 18.28, p < .001, \eta^2 = .18$.

Looking at the main effects for Media, however, reveals no significant difference, $F(1, 245) = 3.38, p = .067, \eta^2 = .01$. Nor is there an interaction effect (Story x Media), $F(3, 245) = 0.96, p < .41, \eta^2 = .01$. However, a univariate test of the media differences within POETRY shows a large, statistically significant difference, $F(1, 82) = 12.45, p = .001, \eta^2 = .13$. Participants who saw the video were much more likely to report feelings of sadness than participants who read the poem. It is interesting to note that the poem is about lost love, and is generally a sad poem. But, it seems, by seeing the author read the poem, and hearing the inflection in his voice, participants were better able to pick up on the tone of the poem.

Emotional engagement. Participants saw differences in the stories according to how personally emotionally engaging they were (i.e., ratings of personal, sensitive, warm, emotional, and informal). POETRY was rated the highest on this measure, and LECTURE (not surprisingly) was rated the lowest (Figure 3). A statistically significant difference by Story supports these findings, $F(1, 245) = 54.36, p < .001, \eta^2 = .40$.

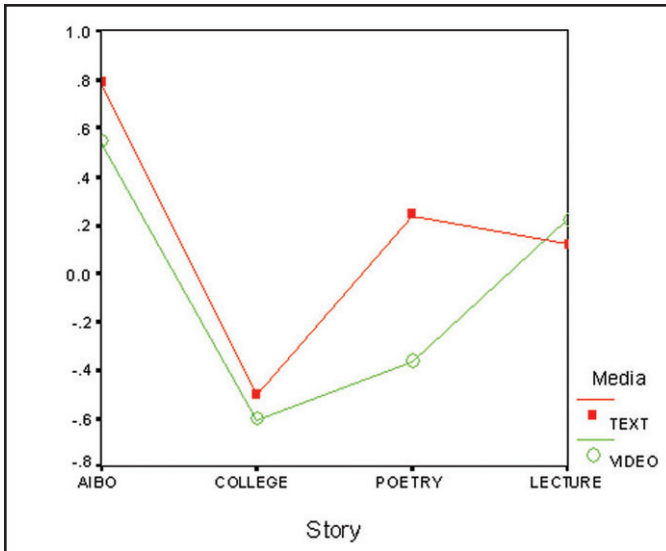


Figure 2. Graph of the estimated cell means for positive affect

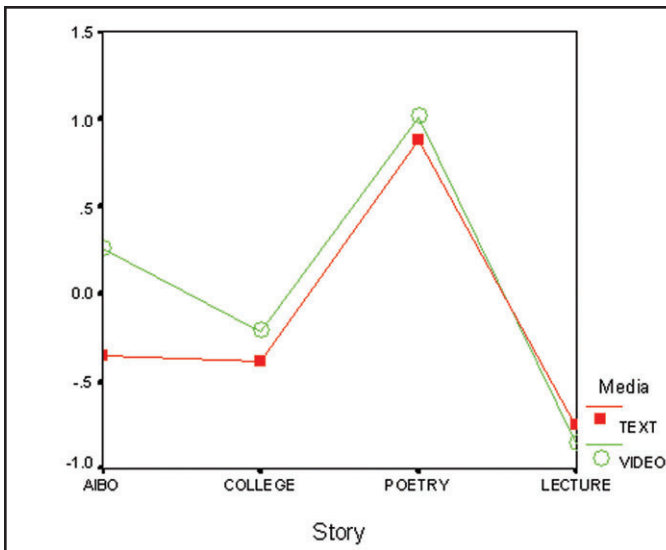


Figure 3. Graph of the estimated cell means for emotional engagement

Visual inspection of Figure 3 shows a difference between text and video in emotional engagement for AIBO, and little difference elsewhere. Nonetheless, this difference is large enough to suggest a statistically significant main effect for Media, $F(1, 245) = 4.28, p = .040, \eta^2 = .02$. There is not, however, a significant Media x Story interaction, $F(1, 245) = 1.47, p = .223, \eta^2 = .02$. This suggests that participants found the video to provide an added level of emotional engagement in the case of AIBO, but not in any of the other stories. It is worth noting that the video footage in AIBO was replete with shots of the elderly people interacting with a robotic dog, and was emotionally engaging in ways that might be hard to convey or accept in text.

Recall of information. Figure 4 depicts the estimated cell means for the ranked performances of recall by Story and Media condition. Note that because recalls were ranked within each story, each story has a mean rank of 42.5 (since there were $n=84$ participants), making comparisons between stories meaningless. There was no main effect for Media, $F(1, 245) = 1.24, p = .107, \eta^2 = .01$, but there was a significant interaction effect, $F(3, 245) = 3.71, p = .012, \eta^2 = .04$. This significant difference is due, in large part, to the differences suggested by POETRY, supported by the one-way ANOVA conducted on just the POETRY recall data by Media, $F(1, 82) = 6.48, p = .013, \eta^2 = .07$. However, this result is due exclusively to just one of the sub-questions: "This poem was dedicated to _____." Upon closer inspection, we realized that in our attempts to make sure that each group had access to the same information, we put the same title banner over the video version as was used in the text version, since the poet's name was not used in the video version, and we wanted to credit the work. However, our title banner also included the dedication information. So, in fact, participants receiving the video version had the dedication information in text and in video, whereas participants in the text condition only had access to the information in text. In retrospect, we can hardly call this a fairly designed media comparison study for this one sub-question.

Story Summaries

Recall performances were ranked within each story, making comparisons within each story meaningless. Analyses revealed no main effect for Media, $F(1, 245) = 2.71, p = .101, \eta^2 = .01$, nor was there a significant interaction effect, $F(3, 245) = 3.71, p = .061, \eta^2 = .03$. This is supported by an analysis of the multiple-choice question following AIBO and COLLEGE that asked participants to identify the main argument of the story.

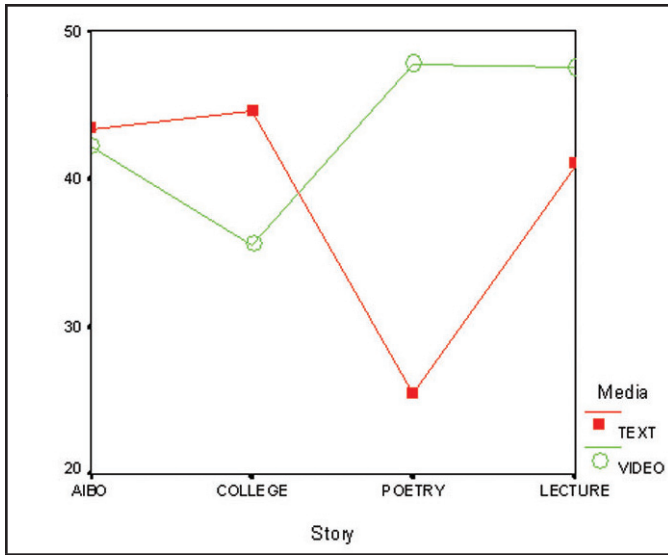


Figure 4. Estimated cell means for ranked recall of information scores

Results indicate that Media was not a factor in participants' ability to identify the main argument, $F(1, 81) = 0.52, p = .820, \eta^2 < .01$, nor did Media interact with Story on this item (AIBO or COLLEGE), $F(1, 81) = 2.41, p = .124, \eta^2 = .03$.

Story-Specific Findings (Opinion and Quality Judgments)

AIBO. Before and after experiencing AIBO, participants were asked to agree or disagree with "I think a robotic dog could make a good companion (pet)" using a 5-point Likert-type scale. We were interested to see if media could play a role in helping change participants' minds about this issue. Pre/post changes on this question were analyzed using a one-way ANOVA with Media as the factor, revealing no significant difference, $F(1, 82) = .27, p = .608, \eta^2 = .00$. Nor was there any difference by Media in participants' agreement with "The elderly people in the report genuinely bonded with the robotic dog," $F(1, 82) = .00, p = .973, \eta^2 = .00$.

Media did play a role in how participants viewed the quality of the report. The video version of the story led to higher ratings on the question asking participants to rate the factual accuracy of the report, $F(1, 82) = 21.62, p < .001, \eta^2 = .21$. The video condition was better at helping participants to

feel as if they had “learned a lot about the issues in this story,” $F(1, 82) = 10.21, p = .002, \eta^2 = .11$. However, they were not more likely to want to “share this story with a friend,” $F(1, 82) = 1.84, p = .179, \eta^2 = .02$. In summary, the video version of AIBO led participants to believe that they had access to better information (which was helpful in learning more) compared to readers of the text version of the story.

COLLEGE. Three questions gauging participants’ viewpoints about the problems of college drinking were asked before and after participants experienced the story. Specifically, participants were asked the extent to which they agreed with the following statements: “Excessive drinking at colleges is a serious problem”; “There is very little to be done about the problem of college drinking—it’s a part of the college culture”; and “Colleges need to aggressively combat the problem of student drinking.” Pre/post changes on each question were analyzed using a one-way ANOVA with Media as the factor. There were no significant differences for changes for any of the three questions: $F(1, 82) = 1.84, p = .178, \eta^2 = .02$; $F(1, 82) = 0.30, p = .589, \eta^2 = .00$; and $F(1, 82) = 1.15, p = .287, \eta^2 = .01$, respectively.

There were differences by media condition on the extent to which participants wanted “to share this story with a friend,” $F(1, 82) = 9.17, p = .003, \eta^2 = .10$. It’s not clear, however, why the viewers of video were more likely to want to share the story—there were no differences by Media on how much they felt they learned ($F[1, 82] = .03, p = .866, \eta^2 = .00$) or how factually accurate they found the story to be ($F[1, 82] = .27, p = .606, \eta^2 = .00$).

POETRY. Similar to the previous two stories, there were three questions about participants’ opinions about poetry that were given before and after the poem. There were no differences in pre/post changes in opinion by Media on any of the three questions: (a) “I like to read poetry,” $F(1, 82) = .05, p = .828, \eta^2 < .01$; (b) “I could be a poet if I wanted to,” $F(1, 82) = .04, p = .847, \eta^2 < .01$; and (c) “Poetry can be quite moving,” $F(1, 82) = .39, p = .535, \eta^2 = .01$. That is, neither medium was better for changing participants’ views about poetry in general. Nor did either medium impact participants’ enjoyment of the poem, (e.g., “I really liked the poem I just read”), $F[1, 82] = .99, p = .323, \eta^2 = .01$.

LECTURE. Three pre/post questions on participants’ opinions of the lecture on language focused on perceptions about the field of psychology, the field of linguistics, and how well the use of language is understood. There were no differences by Media for any of the following three questions: (a) “I think the field of psychology is interesting,” $F(1, 82) < .01, p = .932, \eta^2 < .01$; (b) “I think the field of linguistics is interesting,” $F(1, 82) = .04, p = .846, \eta^2 < .01$; and (c) “How people learn and use language is pretty well understood by the experts,” $F(1, 82) = .04, p = .839, \eta^2 < .01$.

The medium of presentation did influence how people judged the credibility of Dr. Marvin Minsky and his ideas about language and linguistics. The statement, “The author/speaker knows what he is talking about” elicited an average agreement of 4.25 for viewers of the video compared to an average of 3.56 for readers of the text, $F(1, 82) = 10.27, p = .002, \eta^2 = .11$. Similarly, participants who saw the video were likely to agree with the claim that “the author/speaker has a good idea for thinking about how people use language” (an average of 3.80 compared to 3.52). However, this result is not statistically significant, $F(1, 82) = 1.83, p = .180, \eta^2 = .02$. It appears that the video format somehow imparted a sense of credibility to the speaker that the text could not.

DISCUSSION

As expected, the results from this study reveal that the effects of video are not ubiquitous—a benefit for video (or for text) depends very much on the context of the story that it renders. Despite the widely held belief that video is an inherently more engaging format for educational material (e.g., Cognition and Technology Group at Vanderbilt [CTGV], 1990; Koehler, 2002), the data in this study show that the connection between engagement and medium is more complicated. There was an engagement benefit for video in COLLEGE and AIBO, but not for POETRY and LECTURE. There may be a couple of reasons why this is so. One possibility is that video is a source of engagement for only certain types of stories, mainly news stories, and not for artistic performances, or strict information presentation. Another may have to do with the degree of professionalism in the production of the video. Both AIBO and COLLEGE were taken from a major network news show, in which the video was highly polished and well-produced. Although the sources for LECTURE and POETRY were also professionally produced, they are far less sophisticated in their visual repertoire—each consists entirely of a single shot of a person standing before a neutral background and speaking to the camera. Perhaps participants, especially given our population (undergraduate students) are biased toward a rhetoric of visually appealing video.

A related third explanation provides the most promise: how video is used is most important to understanding its cognitive impact. That is, in both AIBO and COLLEGE, graphic overlays were used to highlight certain information, and shots in the background (e.g., elderly people interacting with robots) provided additional information not in the text version of the story or on the audio soundtrack of the equivalent video version. This

additional information, the way in which it is presented, and the additional visual stimulus provided by video produced this way, potentially gives participants more avenues to engage their interest. In contrast, the video in POETRY and LECTURE is used in a relatively “low-bandwidth” way to provide “talking head” video. In terms of Paivio’s (1990) dual channel theory, video produced in this manner makes sensible use of the two channels (verbal and visual). However, whatever other learning effects (e.g., recall) solely presenting redundant information in the video channel might have, it does little to increase engagement.

Somewhat of a surprise was the finding that mood and affect were only influenced by medium of presentation in POETRY: participants who saw the video were significantly more likely to report feelings of sadness or unfriendliness. It is worth noting that in this case, the findings point to a benefit for video, because the poem in question is somewhat sad and regretful, indicating that the video was helpful in conveying the tone of the poem. It is likely that the video adds this tone in both the verbal channel (i.e., soundtrack) and visual channels: along with the author’s expressive reading and interpretation of his own poem, his body language also helps to crystallize the mood. That is, we see that in the video version of the poetry reading, the auditory and visual channels are being used to provide additional cues not present in the text version. In the case of AIBO, we expected to see an affect benefit for video as well, since the visual sequence in the story had many shots of elderly patients cheerfully interacting with the robotic dog (information that was less readily available in the text version). It would be interesting to re-test this hypothesis in AIBO and similar human-interest stories in future studies.

The video format of AIBO did lead to higher levels of emotional engagement, but this finding was not apparent in any other story context. We can only surmise that the footage showing people emotionally interacting with the robotic dog (laughing and smiling, caring for it, and responding to its noises) provided the cues needed for the participants watching the video to become emotionally engaged with the people in the story. Again, we hypothesize that, in terms of dual channel theory, the additional information in the visual channel (shots of people interacting with the dog) were the key pieces of information in the participants’ differential cognitive processing. In the other stories, the video footage of people was primarily just of people talking (especially in POETRY and LECTURE). In a few sequences during COLLEGE, people are shown interacting with other people, but the footage is always brief, and the characters are constantly changing, so much so that perhaps participants could not make the personal connections they were able to make in the AIBO video.

Prior studies have suggested that while text may lead to better recall of information (DeFleur et al., 1992; Robinson & Davis, 1990), video may lead to better *delayed* recall of information (e.g., Cowen, 1984; Baggett, 1979; Dirken et al., 2005). In this study, recall was only tested immediately afterward, and not after a period of several days or weeks. Results indicate, with the exception of the anomaly of the dedication presented two ways in the POETRY conditions (previously discussed), that the medium of story presentation had no effect on the immediate recall of information. It is interesting to note that the stories varied in their strategies for presenting information, ranging from COLLEGE, which used graphic overlays to reinforce key facts, to LECTURE, which used only the spoken word to present information. Yet, despite these differences, video did not disadvantage participants when it came time to recall information, regardless of the story they viewed.

Similarly, we did not find that medium of presentation led to any differences in participants' ability to summarize the stories they experienced. It would be interesting, however, to conduct further studies to determine if some of the affordances of video for delayed recall of information translate to a delayed ability to summarize main points or to recall "gist" information.

In each of the three informational stories (AIBO, COLLEGE, and LECTURE), there was evidence that the video version did somehow enhance participants' perception of the quality of the material. For example, in the case of AIBO, the video condition led to higher ratings of factual accuracy and self-reported learning. In the case of COLLEGE, the video participants were more likely to want to share the story with a friend. And, in the case of the linguistics LECTURE, the participants who viewed the video saw Dr. Minsky and his ideas as more credible than their counterparts who read text. Perhaps this is a phenomenon of "seeing is believing," or a fascination with the television age, but for this sample (and perhaps this population), putting a report in a video format lends credibility to the story and its principal characters.

Now we turn to the question suggested by the title: what is video good for? The data we have examined here suggest a few potential uses, contextualized in terms of rhetorical purpose and story-genre (Table 3).

Conversely, a reasonable question to ask is "what is video not good for?" In most cases, we found that video did little "harm," with some benefits depending on the story and/or purpose of the video (see Table 3). There are three notable exceptions to this. First, our study revealed no real learning benefit in terms of recall of factual information when video was used. However, it is important to point out that studies showing a recall effect for video have used a measure of delayed recall (Cowen, 1984; Baggett, 1979; Koehler et al., in press).

Table 3
Summary of Potential Benefits for Video in Context

What video is good for?	How? Under what conditions?	Findings suggested by?
Engaging Interest	When the video adds something to the material not present in the text or audio channels	AIBO, COLLEGE
Increasing Credibility	Putting informational stories in video may increase the perception that the information is credible, and that the speakers are credible	AIBO, COLLEGE, LECTURE
Engaging Interest in People	For human-interest stories, footage of people interacting may help make those people more personable	AIBO
Enhancing Affect or Mood	When the audio or video channel adds information about mood or tone not easily available (or interpretable) in text	POETRY

Second, in none of the stories was the video effective at changing participants' opinions about the main points (e.g., college drinking is a problem); text and video it seems are equally well-suited in this regard. Finally, video may represent an inefficient form of communication when compared to text for the type of stories we examined here. In all cases, the average time for participants to view the video was 25% longer (on POETRY) to 105% longer (on LECTURE) than the average time for participants to read the respective text versions.

CONCLUSION

Consider Clark's (1983) words that media are "mere vehicles that deliver instruction but do not influence student achievement." In a narrow sense, the results from this study support that claim. In all instances both the text and video formats of the four stories we used in the study led to equivalent levels of information recall and summarization of main ideas (i.e., traditional measures of achievement). However, in a broader sense, we must disagree with the claim that visual media do "not influence student achievement." Our results show that on measures of engagement, affective change, and participants' impressions of the quality of a piece of information, an idea, or a speaker, video does influence viewers' responses in ways that reading an equivalent text does not. These findings are not without educational signifi-

cance. Promoting student engagement, for example, clearly has important educational value, if not in terms of immediate payoffs on traditional measures of cognitive achievement, then certainly in terms of cumulative affective experiences that may impact one's interest and continued engagement with curricula.

This is not to say that we believe that understanding media effects (or applying the lessons learned from studies such as these) is a straightforward enterprise. Instead, we have argued that when a benefit of video does arise, such as engagement, it is the result of a complex interaction of the content, its presentation, and the type of story being presented. Dual coding theory (Paivio, 1990) provides one account for many of the results we have presented. When the video version of a story can provide additional information not present in the text version, dual coding theory provides a mechanism to explain how there might be a difference between the way participants process the information. We now return to the question with which we began this study: what is video good for? Video appears to be good for promoting certain affective responses to information that could have more long-term impacts on students' orientation toward a given domain than are measurable on simple assessments of short-term information recall. However, such effects are not likely an inherent property of video. In contrast to McLuhan's (1964) often quoted observation that "the medium is the message" (p. 7), our results indicate that whatever message learners derive from a particular presentation of information depends far more on an interaction between the content and style of the presentation than on the medium itself.

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