Information Recall of Internet News:
Does Design Make a Difference? A Pilot Study

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Abstract

This study looks at the effect of the design of online news presentation on content recall. One of four versions of a story was read online. Results of a post-test showed that recall was significantly higher after students read the text only or abbreviated text with photos and captions options over photos with captions and videos or animated graphics. Participants over age 21 had significantly better content recall after viewing the photos with captions and video prototype.

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Introduction

The current economic environment has ravaged the newspaper industry. Unable to deal with continuing advertising cutbacks, reduced circulation and ever increasing production costs, publishing companies are looking for ways to control their mounting financial losses. Earlier this year, E.W. Scripps Co. opted to shut down the Rocky Mountain News in Denver after 150 years.¹

Detroit News owner MediaNews Group and Detroit Free Press owner Gannett turned to a new business model, emphasizing digital news and providing home delivery for the print product only on Thursday, Friday, and Sunday.² Hearst Corp. closed down its 146-year-old Seattle Post-Intelligencer in favor of an entirely digital news product.³ The Newhouse family’s Advance Publications announced plans to close the 174-year-old Ann Arbor News in favor of a “web-focused news operation built from the ground up” (AnnArbor.com).⁴

Newspapers have long fostered a connection with the digital world. More than 25 years ago, the Columbus Dispatch became the first newspaper to go online with a CompuServe dial-up service.⁵ But it wasn’t until the 1990s that daily newspapers got serious about introducing digital versions of their paper products. As Riley, Keough, Christiansen, Meilich, and Pierson explained, 1996 marked the beginning of a two-year growth spurt, when the number of newspapers having an online version went from 154 to 3,600.⁶

Yet what was happening in 2009 was different. As the Seattle PI and Ann Arbor News illustrate, newspapers were looking to the online world for their future. But what forms should those products take? What is the most effective way of communicating to the public—and have the readers remember what they read?

This pilot study was designed to begin to try to answer those questions in an experiment testing four versions of an online news story for content recall.

Literature Review

Content recall has long been the focus of scholarly research. For six decades, researchers from a variety of disciplines have analyzed content recall of news, information, and messages provided by the media. As each new medium was introduced—and widely adopted by the American public—researchers revisited the issue of content recall.

In 1949 the focus was on radio, news listening, and memory. In a study by Harrell, Brown, and Schramm,⁷ the researchers became one of the first—although certainly not the last—to point out the shortcomings of radio news with regard to content recall. The three reported the low rate of information recall, regardless of news format or repetition. According to the study, participants remembered items dealing with human interest or “spectacular stories of crime and disaster” as opposed to more substantive public affairs.
The researchers equated this to sensational newspaper coverage, although newspapers were not included in their study.

Williams, Paul, and Ogilvie saw more promise in broadcast media in their study in 1957. In this experiment comparing television, radio, print, and “live” delivery of information, the researchers found participants exposed to television and radio scored the highest content recall—both short term and long term—compared to those exposed to print and/or “live” delivery of information. This experiment, however, did not deal with news reporting, nor did it include newspaper and/or magazine coverage. Nonetheless, the study seemed to keep the hope for broadcasting alive.

Tichenor, Donohue, and Olien held out that hope for television, too. In their ground-breaking work on the knowledge-gap theory and the mass media, the three found that the better educated retained more information from newspaper coverage of complex scientific topics than the less educated. The researchers were not sure if the findings could be extended to television. They speculated, “Since television use tends to be less correlated with education, there is a possibility that television may be a ‘knowledge leveler’ in some areas.”

Subsequent researchers have shown that Tichenor, Donohue, and Olien were overly optimistic. Katz, Adoni, and Parness’ work is especially on point. In their examination of recall of radio and television news, the researchers found television more effective in information recall than radio—or “seeing the news”—was more effective than merely hearing it. However, neither television nor radio scored impressive content recall results. Moreover, television was not found to be the panacea that Tichenor, Donogue, and Olien hoped. As Katz, Adoni, and Parness concluded, their findings were consistent “with the knowledge-gap hypothesis, and does little for our expectation that television news would contribute most to the least well-off, informationally speaking.”

Over the decades, researchers searched for an explanation for broadcasting’s information-recall shortcomings. Some suggested "contextual interference," or viewers doing other things while they watched television, the trivialization of news, and the characteristics of television news itself.

After the introduction of Gannett’s colorful, graphically intensive USA Today on September 15, 1982, dailies shifted their designs, using more color and graphics. The Society of Newspaper Design found that from 1984 to 1988 the percentage of dailies with graphics capability grew from 40 to 90 percent. The greater use of maps, charts, and three-dimensional graphs caused some researchers to study the link between graphics and information recall. A number of researchers found that tables, graphs, and maps enhanced reader performance and recall.

The widespread use of the Internet brought researchers back to familiar recall territory, examining the new medium—the computer—and its effect. These studies again took a comparative approach, this time looking at newspapers, radio, television, and the
computer to ascertain content recall. These studies have tended to come to similar conclusions. Newspapers scored the highest level in content recall, followed by computer, television, and radio. Cultural media tradition may influence content recall results, however. Facorro and DeFleur found that a nation’s tradition of media use can influence content recall results. In Spain computer penetration is not as great as in America, and radio plays a greater role in informing the public. Thus, newspaper content recall was the highest for both American and Spanish groups. However, radio recall scored a close second for the Spanish group; television followed, and the computer scored a distant fourth.

As websites evolved, adding more multimedia elements, researchers returned to the issue of design and its influence on content recall. Researchers from the education discipline especially saw great benefits in interactive media and learning, emphasizing the deep comprehension for students working with interactive media and the benefits of student control of the speed of learning through computer-based instruction.

Researchers from the communication field have not been as enthusiastic in their findings the interactive media. In 2000 Berry reported on an experiment on Web-page design and content recall. Her study offered participants two options—text only and the other multimedia based. While the comprehension scores were low for both sites, Berry reported that the multimedia site had slightly better recall scores than the text-only site, but not statistically significant.

The Poynter Institute did the most comprehensive study dealing with the issue of design and recall to date. The “Eyetracking the News” report looked at how different print (newspaper) and online designs influenced information recall. The researchers offered the participants three different versions of the same story. These options ranged from traditional, text-heavy stories to a very visual, graphics-laden presentation. Researchers reported that newspaper/broadsheet readers across the board had better information recall than online participants. However, the best information recall for both print and online was the graphics-laden presentation.

Although eyetracking research has been used as a tool to help gauge usability of website designs, the research method has been largely ignored by the newspaper industry. The Poynter Institute has been the forerunner in using the eyetracking devices in researching how newspapers and Web pages are read. Technological advances have produced eyetracking paraphernalia that is less cumbersome, less obtrusive, and more accurate, but measurement problems exist. Salvucci and Golberg noted that although there was general agreement that visual and cognitive processing do occur during eye fixations, “it is less clear exactly when fixations start and when they end.”

There is also the inherent problem of interpreting eyetracking data. Jacob and Karn note that there is a “lack of standard terminology and definitions for even the most fundamental concepts used in eyetracking data interpretation.” Jacob and Karn also point
out, in discussing measurement, that using the eye as a computer input device can be a problem. “Moving one’s eyes is often an almost subconscious act…. it is relatively difficult to control eye position consciously and precisely at all times. The eyes continually dart from spot to spot even when its owners thinks he or she is looking steadily at a single object.”

Hypotheses

H1: Recall will be greater for respondents reading text-plus graphics version (Appendix B—a page with the edited story plus photos and captions and video) than text alone (Appendix A—the longest version of the story with no photos or video or graphics).

H2: Recall will be greater for respondents reading graphics-rich version with no text (Appendix C—no text, only photos and captions and video) than text-plus graphics (Appendix B) or text alone (Appendix A).

H3: Recall will be least effective for respondents reading text-only version (Appendix A) and viewing the animated graphics version (Appendix D—static graphic and animated graphic only, no text or photos or video).

Method

In order to test these hypotheses, the researchers developed four different versions of a story for online presentation that encompassed a variety of presentation alternatives. The four alternatives were:

1. Text only (see Appendix A).
2. Abbreviated text with photos and captions and video (see Appendix B).
3. Photos and captions and videos (no text) (see Appendix C).
4. Animated graphics (see Appendix D).

The materials provided in each of these versions were based on the series “Altered Oceans,” which appeared in the Los Angeles Times from July 30 to August 3, 2006. The researchers specifically used content from part one of that series, “A Primeval Tide of Toxins.”

The researchers developed a pre-test of five questions, testing the respondent’s prior knowledge of the subject matter (see Appendix E). Those same five questions were asked after exposure to one of the versions. Demographic questions were also asked after the post-test (see Appendix F). The four versions, pre-test, post-test, and demographic material were stored on a central server. Access to the central server was password protected so participants were affiliated with The University of Akron and no student could participate in the experiment more than once.
Each participant was presented with a screen explaining the study and allowing him or her to opt out. By opting in, participants were presented with a pre-test. After the pre-test, each participant was randomly assigned one of the four versions (text only; abbreviated text with photos and captions; photos and captions and videos—no text; and animated graphics). One communication class of 16 students participated while in the classroom. The remainder of the participants viewed the stories outside of a classroom setting—wherever they were most comfortable or they had access to a computer.

Participation was voluntary in all instances. There was no time limit placed on how long a participant could spend reading, viewing or interacting with the content. Videos and animations could be replayed multiple times. However, the participants could not return to the version they had viewed once they began the post-test.

Participants in this study, students at The University of Akron, were enrolled in a range of classes across campus, including communication, women’s studies, and environmental studies, during the spring 2009 semester. In all, 146 college students—77 men and 69 women—participated in the study. Undergraduates and post-secondary students represented the largest number of participants (N=137); only eight graduate students participated, and one fit into neither category. Respondents were also asked their age; 66 were under 21, and 66 were over 21; four did not report an age. The largest number of the participants reported that they were arts majors, which included communication (N=87); followed by business majors (N=24), and those from the science technology, engineering, and mathematics disciplines (N=16).

Results

H1, H2, and H3 all hypothesized the relationship between the content versions and information recall. An ANOVA and Bonferroni post-hoc test statistics were obtained. Full results can be see in Tables 1, 2, and 3.

H1 argued recall would be greater for respondents reading text-plus graphics version than text alone. Results indicated that there is no significant difference in post-test scores for those who saw the text with photos and captions ($M = 3.70, SD = 1.311$) versus those who saw the text-only version ($M = 3.62, SD = 1.197$). These two versions, however, had the greatest rate of content recall of the four tested.

H2 hypothesized that recall would be greater for respondents reading the graphics-rich version with no text than text-plus graphics or text-alone versions. Surprisingly, the ANOVA results indicated that with the graphics-rich version—no text ($M = 2.58, SD = 1.232$), there was statistically significantly less content recall, $F(3, 121) = 7.362, p < .001$, than in the text alone ($M = 3.62, SD = 1.197$) or the text with photos and captions ($M = 3.70, SD = 1.311$) versions. There was no significant difference between the graphics-rich version with no text and the animated graphics ($M = 2.70, SD = 1.104$).
H3 hypothesized that recall would be least effective for respondents reading the text-only version and viewing the animated graphics version. Table 2 indicates that the most highly recalled mean occurred when the participants were given the text with photos and caption version ($M = 3.70, SD = 1.311$), followed by the all text version ($M = 3.62, SD = 1.197$). The less effective versions were the no text animated graphics prototype ($M = 2.70, SD = 1.311$) and the graphics rich with no text version ($M = 2.58, SD = 1.252$)

<table>
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<th>ANOVA Post-Test Score</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<td>7.362</td>
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<th>Mean</th>
<th>Standard Deviation</th>
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<tr>
<td>All text no video or photo</td>
<td>28</td>
<td>3.61</td>
<td>1.197</td>
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<tr>
<td>Text + three photos w/captions</td>
<td>33</td>
<td>3.70</td>
<td>1.311</td>
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<tr>
<td>8 photos w/captions + 3 videos</td>
<td>31</td>
<td>2.58</td>
<td>1.232</td>
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<tr>
<td>No text</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Animated graphics (3) No text</td>
<td>33</td>
<td>2.70</td>
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<tr>
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<td>125</td>
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Table 3
Post-hoc Bonferroni examination of the various methods of content delivery with content recall

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<th>(I) Method</th>
<th>(J) Method</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
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<td>Lower Bound</td>
<td>Upper Bound</td>
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* The mean difference is significant at the .05 level.
Discussion

The year 2009 may be remembered as the beginning of the shift of emphasis of the news industry from print to online. With the Seattle Post-Intelligencer leading the way as the largest circulation newspaper to become an online-only news product and the announcement of other newspapers planning to follow suit, questions about presentation of information arise. Where should resources go? Should news online veer more toward graphic presentation and away from the text heavy stories?

No one project can answer those important questions. Our research studied different formats as it relates specifically to information recall. It did not address the issue of preference—allowing the respondent to select the format—which might influence the amount of information that was recalled. There was the attempt to allow the participant to view the story in his or her natural setting, with all the distractions that are the norm. With this approach we were not able to keep all conditions constant as we would in an artificial setting and, therefore, cannot as confidently attribute the results to the differences in the versions of the story.

Although research is not abundant concerning the format of news online and recall, studies on the subject are mixed. Berry gave participants only two options—text and multimedia—and her results showed no significant difference between the two options. The Poynter Institute’s Eyetrack studies have been the most comprehensive. The 2004 Eyetrack study found that recall was better for text information than for multimedia—audio with photo and caption. However, in the 2007 Eyetrack study, which looked at both print and online using three prototypes of news presentation, two of which relied on “text blocks and visual storytelling” and a third that “displayed no narrative, with the story told through an explanatory map, a Q&A, a numbers chart, and more” found that the graphic-intense information in both print and online provided the greatest recall.

The results of this study indicate, contrary to the latest Poynter study, that text alone or text with photos is best in presenting news online based on recall. The recall of news after reading the text version or reading the text version with photos and caption and video was significantly higher than the version with only photos and captions and video and the version with animated graphics only. Both recall means of the text and text with photos options were high (3.62 and 3.70 respectively out of 5). However, all the options we presented showed good recall of the information, highlighting the fact that people are acclimated to reading news online and remembering what they read. Obtaining the information through the multimedia version—photos with captions and video—scored worst on our recall (2.58 mean score) and was not significantly lower than the animated graphics version (2.70 mean score).
The difference between our results and Poynter’s may be related to the fact that our format differed markedly from any of the studies conducted thus far. We looked only at news online. Also, we presented four versions rather than two or three, with each of our prototypes distinctly different from the others. No other study has presented a graphics option without text. Both of Poynter’s print and online graphic presentations in the 2007 study did not include narrative, but the prototypes were text intensive. Their online versions provided no video or graphic-only scenario.

Further Research

There are many factors facing editors of news organizations in their decisions concerning how news should be delivered online. Providing information that enhances the understanding of a subject or issue is one of the objectives. This pilot study is the beginning of an approach we believe will ultimately help news organizations better judge how to deliver news. More study is planned that will not only expand the number of students responding and the disciplines of those students but will also include the general adult population. We need to look at the different educational and socioeconomic backgrounds of news readers in different parts of the country as a means of revisiting knowledge-gap research. Will the explosion of information online help narrow that gap or can presentation have an effect? We will also increase the number of questions in both the pre- and post-test. Related research should be initiated that looks at the way information is presented in graphics. Is animation better than graphics that utilize more text-heavy approach in the presentation?

Also, we have not addressed a reader’s preference in how news is presented. Although people might say they want to get their information through video or graphics, when the time comes to choose the format, will they return to a text-rich presentation? With these approaches we can come closer to identifying where resources should be used and understand the realities of online news readership.

Conclusion

These results could have an impact for news organizations writing stories for the Web. If, as the data suggest, text alone or text with photos or graphic elements combined are the best methods for presenting information, news organizations—which are looking at ways to trim resources yet provide information—should focus on what they do best—write news stories and provide photos and/or graphics that illustrate them. That has been the substance of the news industry for 200 years, and although more research is needed, this study suggests organizations should continue that course as they move resources to presenting news online.
Appendix A
Appendix B

Altered Oceans

A Primeval Tide of Toxins

MORERIO YAN, AUSTRALIA - The latest study imminent is now rising and spreading across the surface of the earth to uncover a potential health risk in our
When fisherman caught their sildes in the morning, their skin blistered, and peeled. Their eyes turned cloudy and swelled. The air that spilt from the sea spread the information to the logs and trunks.

When they spoke up about their condition, authorities described their complaints - a}>{attachment} of the inflamed fish of the massifie. Ibnat as the University of Queensland's marine bio lab.

Samples placed in a dry oven gave off huge stores of the primary phylacteries and students from the bonding ancient in the series, cleaning and digesting.

Sediment Judith Nielson (of the tin sample) was stored in a refrigerator and passed the institutional benefit. Consulting a biological reference, the fish was identified as a ratio of anoxobacter, an ancestor of modern-day bacteria and algae that flourished 2.7 billion years ago.

Often, a biological convergence was far faster with these ancient life forms, but had never been this particular kid before. What was it doing in Australian seas? Why was it so toxic? Why was it growing so fast?

The venomous mud, known to scientists as Lyngbya majuscula, has appeared in at least a dozen other places around the globe. It is one of many symptoms of a massive warming in the world’s oceans.

In many places — the waters of the Pacific, the Atlantic waters of the English Channel, the waters of Nara — some of the most advanced forms of ocean life are struggling to survive while the most primitive are thriving and spreading. Fish, shellfish and marine invertebrates are dying, while algae, bacteria and phytoplankton are growing unbridled. Where this pattern is most pronounced, scientists expect to see a domino effect on marine life, threatening to the potential loss of hundreds of millions of years ago.

At the same time, overfishing and destruction of seafloor habitats have diminished the comping works life and natural buffers that once held the microbes and weeds in check.

The fish, used to deposit into a “nutrient soup.”

Jellyfish are flourishing in the soup, demonstrating their ability to adapt to worsening changes — including the growing human appetite for them. Jellyfish have been recorded, after all, at least 500 million years. Longer than most marine animals.

Pacific Rim predicts that future generations will see nothing old or unimagining about a placid of these glorious animals.

In Florida, the fish washes off sugar cane fields, livestock compounds and chicken farms into the sea. The warm water, leaves and farm runoff into its longer and other sources were released into the seas and tides. Jellyfish go in other waters clover, rearward grow fat and deadly.

It was a total for how many struggling crops, delicate animals that evolved to thrive in base, nutrient-rich environments. So many have been lost that biologists at the sea added what once the two most dominant types — silicon and copper conics — to the list of species threatened with extinction. Of fish, estimates lose 6% of these oceans.

Sewage and farm runoff kill soaks in various ways.

Algae/these carry their sunlight essential for their survival.

The nutrients in sewage and fertilizer make in the growth of algae, also crops, consuming oxygen and suffocating the animals within.

The ancient sea contained large areas with no one oxygen — water and hypoxic zones that could never have supported sea life as we know it. It was a time when bacteria and phytoplankton roared.

On research ships of the Louisiana coast, Nancy Hallock, executive director of the Louisiana State University Marine Conservation, has seen century white-bottomed and the seabed. The suffocating smell of rotten eggs, a gas produced by the microbes, has seeped into the brine. The bottom is lit up with the grayish algal bloom of dead oysters, sea clams and other animals.

The cause of death is denaturing algae. Polluted by millions of tons of fertilizer, human and animal wastes, and other farm runoff washing down the Mississippi River, they make huge plant food, and the dead to drift off. Bacteria that take over, they suck the oxygen out of seawater, leaving little or none for fish or other marine life.

Years ago, Ribbons proposed a time to the bottomless of the Louisiana coast the "dead zone." In fact, dead zones aren't really dead. We are learning with fish — most of the bacteria and other aquatic creatures that evolved in an oxygen-free environment and that need little to survive.
Appendix C

Content Recall

Altered Oceans
A Primordial Title of Toxins

Introduction to fish decline in Box Elder.

Lab Data: This video includes audio. Please click play for video in a computer tab.

Instructions to play the video: Click to play video in a computer tab.

A Marla edge grows a soft coral in the Florida Keys and begins to encroach of the sunlight independent of the coral form. This form of encroachment has been documented by marine biologists for years. This is one of the many coral reef edge forms that have become more abundant after the 1998 El Nino event.

Lab Data: This video includes audio. Please click play for video in a computer tab.

Instructions to play the video: Click to play video in a computer tab.

A Trichoderma bloom off the coast of Australia. Marine Bay Marine Park managers are often concerned with the rapid growth of algae in their estuaries. This form of growth can severely impact the local ecosystem.

Lab Data: This video includes audio. Please click play for video in a computer tab.

Instructions to play the video: Click to play video in a computer tab.

Algal bloom of green's Paracoccus in Discovery Bay, where remote areas have been deforested by a single invasion of harmful algae.

Lab Data: This video includes audio. Please click play for video in a computer tab.

Instructions to play the video: Click to play video in a computer tab.

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Appendix E
Pre-test

Content Recall

Pretest

Select the option that best answers each question.

1. The oceans:
   - A. are in trouble
   - B. are thriving with hundreds of species of fish
   - C. might be in trouble in a few years, but fish that are healthy today are not having problems.

2. Excessive harmful algae and bacteria are growing in our oceans because:
   - A. there is an abundance of nutrients being dumped into the oceans
   - B. there are fewer jellyfish species that feed off of algae and bacteria
   - C. raw sewage is being dumped into the oceans and is killing fish

3. The algae and bacteria are:
   - A. helping to wipe out coral, which makes up reefs around the world
   - B. consuming oxygen and suffocating animals that live in the oceans
   - C. neither a nor b
   - D. both a and b

4. The so-called "dead zones" in our oceans are:
   - A. really alive with fish and other sea animals
   - B. really alive with bacteria and other creatures such as jellyfish
   - C. completely devoid of any organism

5. An ancient form of water plant, Lyngbya majuscula, is appearing around the world and it is:
   - A. a toxic plant that caused fishermen to break out in welts when they touched it.
   - B. a benign plant that is found near many of the world’s coral reefs.
   - C. a plant that is provided much-needed nutrients for the dwindling populations of sea turtles and certain types of fish.
   - D. being harvested for use in fish farms around the world.
## Content Recall

### Posttest

Select the option that best answers each question.

1. The sentence:
   A. are in trouble
   B. are being caught by species of sea
   C. might be in trouble in a few years, but fish that are trouble today are not having problems;
   D. excessive harmful algae and bacteria are growing in our oceans because
   E. is an indication of excessive number of species being adapted into the oceans
   F. We are having trouble with the oceans and it is killing fish.

2. The algae and bacteria are:
   A. growing in our oceans, which washes up on beaches, the world
   B. consuming oxygen and destroying species that live in the oceans.
   C. harmful and dangerous because it is killing all organisms.
   D. full in fish and
   E. the section that has been about all plankton, insects respectively, and it is growing around the world.

3. The author's main points are:
   A. that fish that cause problems to be solved in the world when they touch it
   B. a forest plant that causes harm to the world's population
   C. a forest plant that causes harm to the world's population
   D. being harmful for use in all farms around the world.

4. Please indicate the best of your answers in the blanks.

- Printed 
- Online 
- E-mail

5. Please indicate how useful you felt the information in this article was.

- Very useful
- Quite useful
- Only a little useful
- Of no use

6. **Demographics**

    While the data is from our previous study, please be assured that all the information we are collecting is held in confidence. The information collected or this form is completely for statistical and research purposes. In aggregate or summarised form, it will be used to the public or in any unrecognised form.

   a. What is your gender?
   - Male
   - Female

   b. What is your age?

   c. Which category best describes your current educational status?
   - A. University degree
   - B. Graduate degree
   - C. Technical degree
   - D. Other
   - E. No degree

   d. If you are currently enrolled in college, which of the following categories best describes your current plan?
   - A. Business Administration
   - B. Accounting
   - C. Math
   - D. English

   e. Which of the following categories best describes your current plan?
   - A. Business Administration
   - B. Accounting
   - C. Math
   - D. English

   f. What is the highest economic degree that you have completed?
   - A. High school
   - B. Bachelor's degree
   - C. Master's degree
   - D. PhD

   g. Which of the following categories best describes your current plan?
   - A. Business Administration
   - B. Accounting
   - C. Math
   - D. English

   h. What is your current marital status?
   - A. Single, never married
   - B. Married
   - C. Separated/Divorced
   - D. Widow/Widower

   i. Which of the following categories best describes how you took this test?
   - A. In class
   - B. Outside of class, at home
   - C. Outside of class, not at home
   - D. Online
   - E. Other

   j. Do you regularly read the newspaper?
   - Yes
   - No

   k. Do you regularly read newspapers online or print? 
   - Yes
   - No

   l. Do you regularly watch television or internet news?
   - Yes
   - No

Next | Continue
References


11 Tichenor, Donohue, and Olien, “Mass Media Flow,” 170


14 Katz, Adonis, and Parness, “Remembering the News,” 239.

15 Ibid.


Ibid.

For one of the best overviews of research on interactive media and learning, see David J. Ayersman, “Reviewing the Research on Hypermedia-Based Learning,” *Journal of Research in Computing in Education 28* (Summer 1996), 500-525.

See, for example, Lawrence Najjar, “Multimedia Information and Learning,” *Journal of Educational Multimedia and Hypermedia 5* (1996), 129-150.


Adam, Quinn, and Edmonds, *Eyetracking the News*, 81


Jacob and Karn, “Eye Tracking,” 584.

This option offered animation with machine interaction (mouse rollovers) but no text.
This series, written by Kenneth R. Weiss and Usha Lee McFarling with photos and video by Rick Loomis, went on to win the George Polk Award and the Pulitzer Prize for explanatory journalism. The series was used with permission from the Los Angeles Times. The full series appears online at http://www.latimes.com/news/local/oceans/la-oceans-series,0,7842752.special.

Results were stored in a secure online database that kept the participants’ responses anonymous.

Other respondents included the following fields: education (N=10); humanities (N=1); social sciences (N=1), and other (N=5).