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# Impact of Format on Evaluations of Online News

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## **Impact of Format on Evaluations of Online News**

### **Abstract**

The emergence of online news offers journalists the opportunity to use a variety of formats to present news, including traditional text and video forms and emerging multimedia forms. This paper reports the results of a series of studies exploring these formats, two experiments and a survey. The first experiment compared three formats of video news delivery and found that format was related to time spent viewing a story, and time spent predicted recall of the story, but no direct relationship was observed between format and recall. The second experiment compared three different formats (text, text with pictures, and text with videos), finding less difference in time spent by format, but finding that time spent predicted recall. The third study used a survey of experts to predict the changes in the delivery of news over the next 20 years, projecting that the tablet will emerge as the primary delivery tool, but that the content of news will be little changed.

## **Impact of Format on Evaluations of Online News**

The earliest delivery of news over the Web resembled traditional formats, with newspapers typically uploading text and photos, and television stations uploading video. As news delivery over the Web has matured, these formats have evolved to take advantage of the multimedia capabilities of the Internet. Although news organizations have consistently monitored the success of these different formats, there has been little systematic research into the impacts of these emerging formats upon the audience.

This paper reports three related studies that attempt to address these impacts: two experiments and a survey of academic experts. The purpose of these research projects is to establish an understanding of the relative importance of text, images, and video elements that may be expected to be used in online news. In addition to measuring differences among types of content delivery, the project also used a survey of academic experts regarding the future of online news to guide the selection of treatments used in subsequent studies.

Following a review of the literature, the hypotheses, methods, and results of each of the three studies are presented sequentially. The results of these studies are then discussed as a group.

### **Studies on News and Interactivity**

The Internet continues to change the way news and information are packaged and disseminated to the audience, which in turn consumes that content in a variety of ways. In the past decade or so, it has become clear that newspapers and TV news reports cannot be identical

when posted online (Papper, RTDNA, 2010); the audience has different demands and expectations.

For example, Opgenhaffen and d'Haenens (2011) examined how multimedia, interactivity, and hypertext in Internet news reporting affected learning from news. Using recognition and cued recall as indicators, the investigators controlled for level of difficulty of news content as well as users' Web expertise (but here—note—they are assuming that salience of the content is not a factor). They found that experienced Web users benefit from online features only if the news content is difficult, whereas the presence of online features results in a drop in inexperienced users' knowledge. Inexperienced Internet users benefit most from online features when the news content is easy, whereas in the latter case the scores of expert users tend to fall. This finding demonstrates the diversity in consumption which has led to an emerging area of study regarding user control that combines information processing, modality of messages, and interactivity.

### **Information Processing.**

A central element in examining how individuals consume news in society is information processing. How, when, and why people actively seek out news (and with what effect) is of interest to scholars and practitioners alike. The multi-billion dollar news media continue to merge online and traditional platforms in order to maximize audiences, advertising, and profits. For decades, media researchers have assessed information processing and message effectiveness using recall or recognition measures (Katz, Adoni, and Parness, 1977; Graber, 1984; DeFleur, Davenport, Cronin, and DeFleur, 1992; Wanta and Remy, 1995; Lang, Newhagen, Reeves, 1996, Price and Czilli, 1996; Tewksbury and Althaus, 2000; Conway and Patterson, 2008; Pippis et al, 2009). Recall has been popularly employed because it continues to be a relatively stable

indicator of information processing that also reflects interest, cognitive effort, understanding, or engagement. Other studies have used eyetracking, skin conductance, or time spent reading a particular story to gauge interest, involvement, and salience of the story (Berry, 2001; Adam, Quinn, and Edmonds, 2007).

Despite its popularity, recall also has its weaknesses. A correct response can also reflect prior experience or exposure to a story or set of facts, or just a good guess. While some have successfully used aided recall items in the form of multiple choice (Pipps, Walter, Endres, and Tabatcher, 2009), others have preferred unaided recall items (Wanta and Remy, 1995).

Recall has been useful in theory-building. For example, it has been linked to habit in that increased recall should increase the likelihood of the individual developing a reliance upon a news source, leading in turn to an increased likelihood of returning to the website (DeFleur & Ball-Rokeach, 1989).

### **Modality of the message**

All messages take on certain characteristics in order to be processed or attended to by an individual. For example, news stories are commonly presented in text form via newspapers, and often include a still image (the news photo). In television, the packaged field report is common, as well as the VO and the VOSOT. Radio news employs natural sound and careful use of audio quotes or ‘actualities’ as well as being written in a way that takes advantage of the aural medium. Studies of recall for various modalities of news have produced a number of results.

Print versions produced higher recall than broadcast (DeFleur, Davenport, Cronin, and DeFleur, 1992) except when audio-video components were redundant, in which case broadcast produced higher recall (Grimes, 1991; Walma van der Molen and Klijn, 2004). Stories rich in graphics tend to produce higher recall than plain text (Adam, Quinn, and Edmonds, 2007).

There is evidence that neither the traditional newspaper story nor the traditional TV package is an effective news story form on the Web (Berry, 2001; Sundar, 2000), Online news stories need to be formatted differently from those distributed through print or broadcast platforms (Eveland and Dunwoody, 2002; Eveland, Seo, and Marton, 2002; Eveland, 2003). In addition, newsrooms are also experimenting with new story forms that have not been available in the more traditional platforms, for example, slide shows, photo galleries, and interactive presentations.

New forms of presenting information can result in confusing or even contradictory findings. For example, research by Pippis et al. (2009) tested four versions of an online story and found that text alone or text with photos produced better recall than photos with captions or video. This finding runs counter to those of the Poynter Eyetracking study noted above (Adam et al., 2007) even as it provides some direction for research. The Poynter study offered test subjects three prototypes online and on broadsheets including timelines, lists, and fact boxes. Recall was highest for the presentations laden with graphics. In a five-modality comparison study, Sundar (2000) found that text and text combined with images aided recognition and memory. However, the study also found that audio and/or video elements impeded the process.

### **Interactivity.**

A third aspect of news format research focuses on interactivity. As news organizations increasingly see news in terms of a flow and a conversation rather than a one-way process (Wilkinson, Grant, & Fisher, 2012), engaging the audience becomes important. Interactivity has been thought of in a number of ways. For example, Sundar (1998, 1999) noted the importance of interactivity--defined as linking--with online news. Sundar, Kalyanaraman, and Brown (2003) suggested that increased interactivity is associated with increased satisfaction, a greater sense of

self-efficacy, and higher memory, among other things (see Rafaeli, 1988, for a summary of these findings). In their review of the news literature, the authors also noted that a study by Rafaeli & Sudweeks, (1997) found interactive messages were significantly more humorous, less anonymous, and more likely to contain first-person plural pronouns in reference to members in the group. From this, the authors concluded that interactivity is associated with a higher sense of involvement and belonging. The authors experimented with low, medium, and high interactive Web stories of a political candidate. The results indicate that the medium level of website interactivity resulted in the most positive perceptions of the candidate as well as their levels of agreement with his policy positions.

Another dimension of interactivity is the ability of a user to navigate the elements of a story. Conway and Patterson (2008) explored the importance of navigation, reporting that the lack of salience cues on an index-style website lets users explore more information on the site as opposed to the linear presentation of traditional television. For traditional print and broadcast platforms, story location or place plus the amount of space or time allocated to it indicates the relative importance of that story. But when a story is posted online, the relative position and presentation is more fluid. Multiple stories can be accessed by a user simultaneously. Therefore, as the online format lends itself to choice, the individual chooses content that is of interest to him or herself.

From this literature, it seems that the format for news and information is a significant area for study. Also, recall is a reliable and stable measure of information processing. It is interpretable and useful for theory building on the ways that people seek and consume news and information. The various modalities by which information is presented must be considered. Text, image, audio, and video can each significantly shape the meaning, the impact, and the



desirability of the message content for the individual. Finally, the concept of interactivity must be considered. The notion of interactivity is expanding in that it is not only the specific ways the audience is engaged or encouraged to actively consume, but is also related to the larger notion of news becoming a dialogue and a flow.

### **Interactivity and User Control**

One of the most common explorations of the impact of user control over media content applies the concept of "locus of control" (LOC), a personality trait that reflects a person's perception of factors influencing his or her life (Rotter, 1966). The locus may be perceived to be primarily internal (reflecting self confidence and personal efficacy) or external (subject to outside influences). Studies have investigated how locus of control colors a person's view of media effects (Gunter, 1985; Rubin, 1993).

User control over content has also been explored in studies of the use and impact of remote control devices for television viewing. Studies indicate that users with remote controls watch a greater variety of channels than those without (Cornwell et al., 1993; Kaye & Sapolsky, 1997). This finding suggests that, given more control, a user will consume a wider range of content. On the other hand, Ferguson (1992) found that remote control use does not lead to a consistent increase in the number of channels used consistently, but rather that boredom, curiosity and avoiding advertising are the reasons people change channels often. Perse et al. (1994) found that more control, operationalized as frequent channel changing, was related to less attentive use of television. In a study of engagement strategies in video games, Dickey (2005) suggested that interactive design should lead to more effective and engaged learning.

## **User Control and Web News**

There are a number of factors that influence the consumption of Web news. Some are content specific while other factors are more about how the Web is perceived (Deuze, 2003; Choi, Watt, & Lynch, 2006; Chung and Nah, 2009). Sturgil, Pierce, and Wang (2010) found that pictures and slideshows were preferred over video, but the biggest factor reflecting how much college students liked a news website was not interactivity, but variety and user control.

Therefore, a series of studies were conceived to systematically analyze news content by modality as well as user control. These studies were tentatively titled “Jigsaw” (short for jigsaw puzzle) to reflect the various components of news accounts. The ‘pieces’ are included or omitted in a variety of ways and submitted to users in such a way that the respective influence on the experience can be measured. In summary, the three studies are labeled Jigsaw 1, Jigsaw 2, and Jigsaw 3.

### **Jigsaw 1**

Building upon this literature, the first project in this series (Karlis, Guerrazzi, & Grant, 2012) examined the effectiveness of different formats of online video news using a two-by-three experimental design. This design explored the relationships among video format, time spent, and recall for online news. Test subjects viewed two different stories, random selection of one of three different formats: a traditional, broadcast-type news “package,” a disassembled package (identified as the “jigsaw” treatment), or raw video with text. (It should be noted that the term “Jigsaw” was adopted from this study as the name of the research efforts that followed.) These treatments were selected to provide three distinctly different formats of video news. The package treatment is the most commonly used format for video online today. The jigsaw format was

created to maximize the opportunity for interactivity and user control. Finally, the raw video format represented a third format with the greatest difference from the first two treatments.

### **Jigsaw 1 Method**

A prototype website purportedly containing news for college students was created for this study. A two-by-three experiment studied the relationships among video format, time spent, and recall for online news. Test subjects viewed a traditional, broadcast-type news “package,” a disassembled package, and raw video with text. Because the treatment was to be administered on two campuses over a one month period, two “evergreen” stories that were expected to be of interest to the college student subjects were selected: a story on the legalization of marijuana and a story about protests against a doughnut shop.

Undergraduate subjects were recruited in dorm areas with pizza and soft drinks as incentives. Subjects were randomly assigned to one of six laptops, with each laptop containing a different combination of treatments for the two stories. The treatments were embedded in a website that was introduced to the subjects as a new website for college students. Subjects were asked to navigate the website and were told that they would be asked a series of questions about the site at the conclusion of their visit. User navigation was recorded using Camtasia screen capture software that was later used to measure time spent on each story. Recall was measured using an online survey (linked to at the conclusion of the viewing of the site) that included four multiple-choice recall items for each story.

### **Jigsaw 1 Hypotheses/Research Questions**

H1: The amount of time a user spends on a story will be positively related to recall.

H2: Users will spend significantly more time on the jigsaw treatment than the package treatment.

H3: Users will spend significantly more time on the raw treatment than the package treatment.

H4: Users' recall of the jigsaw treatment will be significantly greater than the recall of the package treatment.

H5: Users' recall of the raw treatment will be significantly greater than the recall of the package treatment.

R1: What is the relationship between time spent on the raw treatment and the jigsaw treatment?

R2: What is the relationship between recall of the raw treatment and the jigsaw treatment?

### **Jigsaw 1 Results**

Hypothesis 1, which predicted a positive relationship between recall and time, was supported for both treatments (marijuana— $r=.369$ ,  $p=.000$ ,  $N=83$ ; donut— $r=.353$ ,  $p=.001$ ,  $N=83$ ).

Hypothesis 2, which predicted that users would spend more time on the jigsaw treatment than on the package treatment, was not supported; there was no significant difference in the amount of time spent on these two treatments.

Hypothesis 3, which predicted that users would spend more time on the raw treatment than on the package treatment, was supported (marijuana—mean time for package=170 seconds; mean time for raw=297 seconds;  $T=-4.2$ ,  $df=54$ ,  $p=.000$ ; donut—mean time for package=105 seconds; mean time for raw=264 seconds;  $T=-3.96$ ,  $df=51$ ,  $p=.000$ ).

Hypothesis 4, which predicted that users would have greater recall for the jigsaw treatment than for the package treatment, was not supported; there was no difference in recall between the two treatments.

Hypothesis 5, which predicted that users would have greater recall for the raw treatment than for the package treatment, was not supported; there was no difference in recall between the two treatments.

In a related finding pertaining to Research Question 1, users also spent more time on the raw video than the jigsaw for both the marijuana story (raw mean=297 seconds; jigsaw mean=151 seconds;  $T=3.47$ ,  $df=48$ ,  $p=.001$ ) and the donut story (raw mean=264 seconds; jigsaw mean=105 seconds;  $T=4.29$ ,  $df=57$ ,  $p=.000$ ).

Research question 2 was answered with independent samples T-tests; results indicated no significant difference between recall for the jigsaw and the raw treatments for either story.

Given the strong, positive correlation observed between time spent viewing a story and recall of the story in the test of Hypothesis 1, but the lack of any direct relationship between format and recall, post-hoc analysis was conducted to simultaneously test the relationships among format, time spent, and recall. An ANOVA test of the impact of format upon recall, with time spent as a covariate, found a significant effect for the covariate (marijuana time spent;  $F(3,82)=10.6$ ,  $p=.002$ ; donut time spent;  $F(3,82)=16.5$ ,  $p=.000$ ), but no significant main effect of format upon recall for either story.

A model was proposed for further research in which format predicts time spent, and time spent predicts recall, with no direct relationship between format and recall (see Figure 1).

## Jigsaw 2

The second experiment in the series (Guerrazzi, Grant, & Wilkinson, 2013) duplicated the format of the first experiment, using a 2x3 design to test three different treatments of two different stories. In addition to measuring recall and time spent as dependent variables, this study also created three subjective measures: perceived appearance, perceived cognitive impact, and perceived value to ascertain user reactions to the different formats.

### Jigsaw 2 Method

To maximize comparability, an identical, 2x3 factorial design was used for this study. Because the experiment was administered over a one-month time period in two locations, two "evergreen" stories were selected. The first story (Story A) explored press freedom for journalists in the United Arab Emirates. The second story (Story B) reported on living conditions for immigrants in the UAE. For each story, three versions were created: A text-only version, a text version with captioned photos, and a text version with subheads and video. These story forms were arranged to control for order effects, resulting in six different paired treatments.

Applying the neuropsychological theory discussed above, two sets of dependent variables were identified, attitudes toward the content and behaviors related to the content. Attitudes toward the content included three measures; *appearance of the content*, *value of the content*, and *cognitive impact of the content*. Perceived quality of appearance involved professional packaging and completeness of the information. Perceived value was judgments about the utility of the story to the individual, and perceived cognitive impact of the content involved judgments about the salience and engagement of the story. Behaviors measured included total time spent on the individual story components (reflecting attention) and recall of story elements (reflecting information processing). Other dependent variables included the same dependent variables from

the first study: time spent with the story (measured by timing actual time spent on individual stories using recordings of screen captures during exposure to the stories, and recall of elements of the story, using a four-item multiple choice quiz for each story.

Because the study utilized two stories and three conditions for each story, a total of six treatments were created, with each treatment loaded on a different laptop computer. Each treatment included both stories, with a different version of each story. Subjects were randomly assigned to one of the six treatments and asked to browse the website. They were instructed when finished to click a link to a questionnaire that evaluated the website. In addition to masking questions about the general nature of the website, the questionnaire included four fact-based questions to evaluate recall and a set of questions for each story to evaluate perceived appearance, perceived value, and perceived cognitive impact of the story. Time spent with each story was determined by recording the screen activity for each session using Debut screen-capture software and then measuring the total amount of time spent on each individual story.

### **Jigsaw 2 Hypotheses**

The first set of hypotheses addressed the relationships among the subjective variables.

H1a: Perceived appearance will be positively correlated with perceived cognitive impact

H1b: Perceived appearance will be positively correlated with perceived value.

The second set of hypotheses presumes that perceived cognitive impact increases with the richness of media content:

H2a: Perceived cognitive impact of the video version will be greater than for the photo version.

H2b: Perceived cognitive impact of the video version will be greater than for the text version.

The third set of hypotheses relate perceived value with time and recall:

H3: Time will be positively correlated with perceived value.

H4: Recall will be positively correlated with perceived value.

Perceived appearance (professionalism in packaging) will vary with format, but reflect consumer expectations of visual components such that:

H5a: Stories with photos will have higher perceived appearance scores than text-only stories.

H5b: Stories with video will have higher perceived appearance scores than text-only stories.

Note: There was no expected difference between appearance scores for photo and video versions.

## **Jigsaw 2 Results**

To validate the subjective measures, the internal consistency (coefficient alpha) of each of the three, four-item scales for each story was computed; all alphas exceeded .72 which suggests enough internal consistency to proceed with further analyses. The first hypotheses address the relationships among the subjective variables.

H1a: Perceived appearance will be positively correlated with perceived cognitive impact

Hypothesis 1a was supported with strong correlations observed in each of the conditions (Story A:  $r=.615$ ;  $p=.000$ ; Story B:  $r=.640$ ;  $p=.000$ ).

H1b: Perceived appearance will be positively correlated with perceived value.

Hypothesis 1b was also supported, again with strong correlations observed in each of the conditions; (Story A:  $r=.423$ ,  $p=.000$ ; Story B:  $r= .529$ ;  $p=.000$ ).



The second set of hypotheses predicted that perceived cognitive impact would increase with the richness of media content.

H2a: Perceived cognitive impact of the video version will be greater than for the photo version.

Hypothesis 2a received mixed support. The mean cognitive impact of the video version (14.8) was greater than the photo version (13.9) for Story A ( $t=-1.9$ ;  $p=.03$ ). For Story B the hypothesis was not supported; instead the photo version (14.8) had a greater cognitive impact than the video version (13.6;  $t=2.22$ ;  $p=.015$ ).

H2b: Perceived cognitive impact of the video version will be greater than for the text version.

Hypothesis 2b was also supported for Story A (video version mean=14.8; text version=13.6;  $t=-2.37$ ;  $p=.01$ ), but no difference was observed between the video version and the text version for Story B.

H3: Total time spent viewing a story will be positively correlated with perceived value of the story.

No relationship was observed in either condition between the amount of time spent viewing the story and the perceived value of the story.

H4: Recall will be positively correlated with perceived value.

As with Hypothesis 2, Hypothesis 4 was supported for Story A: ( $r=.171$ ;  $p=.02$ ); but was not supported for Story B.

H5a: Stories with photos will have higher perceived appearance scores than text-only stories.

H5b: Stories with video will have higher perceived appearance scores than text-only stories.

Neither Hypothesis 5a nor Hypothesis 5b was supported in either condition, with no significant difference observed in perceived appearance scores in any of the treatments.

H6a: Format will be a significant predictor of time spent viewing a story.

H6b: Time spent viewing a story will be positively correlated with recall of the story.

The last two hypotheses were based on the Karlis et al. (2012) study of online video formats. Unlike the previous study, reported above, there was no relationship between format and time spent viewing a story, so Hypothesis 6a was not supported. But Hypothesis 6b was supported, with a strong relationship between time spent viewing a story and recall of the story (Story A:  $r=.489$ ,  $p=.000$ ; Story B:  $r=.460$ ;  $p=.000$ .)

### **Jigsaw 3**

A third phase in the research series explored the range of formats that should be considered in future research (Karlis, Grant, & Guerrazzi, 2011). This study phase used an abbreviated Delphi technique to obtain input from a group of academics who teach and conduct research on next-generation journalism practices. The goal of this study was to prompt these academics to think beyond the limits of today's media to create their vision of the formats that could be in use to distribute news in 2030, thereby helping to guide the selection of formats to be tested in later experiments.

#### **Jigsaw 3 Method**

The subjects for this study were all presenters at the 2011 Convergence and Society conference at the University of South Carolina (N=40). Respondents sent an invitation (with one follow-up request) to complete an online questionnaire about the future of news. The instrument

first asked an open-ended question to elicit their top-of-mind predictions about online news in 20 years. They were then asked a second, open-ended question about the devices that will be used to consume news and how those devices will affect the formats of online news. Next, they were given a list of content types and asked what percentage of online content they expected to be made of up each type (text, photos, video, audio, interactive, user-generated, and database). The following question asked for similar percentages regarding the type of news (local, hyperlocal/neighborhood, state/regional, national, and international). The final quantitative question asked what percentage of news would fall into a second set of categories (breaking, enterprise reporting, feature, and other). Finally, they were asked another open-ended question allowing them to reflect on a range of other factors that might impact news and whether anything on that list would change the answer to the first question. Eleven responses were received (28%).

### **Jigsaw 3 Results**

The top-of-mind expectations reflected that these respondents expected significant changes in news over the next 20 years. Across the group, the general expectation was that online news would be more mobile, “layered” (e.g. hyperlocal to international), more organized with bullets and headings, and more specialized). The device the majority expected to dominate news consumption was the tablet. Figure 2 reports the mean forecasts for the format of content, with interactive (50% of stories) dominating, followed by user-generated (38%) and text (33.5%). The least used categories by percentage were expected to be database (19%) and video (23%). Figure 3 reports the mean percentages by type of content, with local (25.5%) and national (24.5%) making up the greatest percentage of news and international (15%) the least. Figure 4 reports the mean percentages by content, with breaking news (41%) dominating and enterprise reporting (11.5%) lagging all other types of content (Karlis et al., 2011).

## Discussion

Taken together, these three studies provide indications that the manner in which online news is presented makes a significant difference in how that content is perceived and retained. It is incumbent on scholars to continue to explore existing formats, experiment with new formats, and identify the most appropriate dependent variables that will help us to understand the impacts of these changes.

These projects have tested the interrelationship among online news format, time spent with a news story, and recall. The results clearly indicate that recall is a direct function of the amount of time spent with a story, and that time spent differs significantly across some formats. The study has potential significance for all types of news organizations seeking to enhance the online component of their operations. Much more research is needed to sort out the impact of different formats upon both time spent and recall; the treatments included in the two quantitative studies are only a fraction of the number of formats available to journalists. The guiding principle remains to define the most effective formats for the presentation of online news. In attempting to isolate effective formats, researchers over the years have produced contradictory results.

As technology develops, additional studies should examine the effectiveness of formats on newer media delivery systems. If the majority of academic respondents to Jigsaw 3 prove to be correct, and tablets become the dominant vehicle for news consumption in 20 years, news organizations will want to focus on formats that are especially effective on various-sized mobile devices. The tablet 20 years from now may offer additional features that we currently cannot imagine.

If news is increasingly becoming a dialogue and a flow, from touch-screen maps to opinionated feedback, future studies should include also explore the relationship between immediacy and interactivity in the perceived value of news stories and (at a greater level), news websites. While studies have shown that a medium amount of interactivity is desirable in political websites (Sundar et al., 2003), it would be interesting to examine how the timeliness of Web news updates, allowing for fresh audience interactivity, affects audience participation. Features such as instant polls and real-time citizen journalist participation could be studied to see how quick turnarounds affect audience use and satisfaction.

Future studies should also explore the issue of salience, which may be a critical variable affecting recall, time spent, and other variables. If stories of greater relevance to the subjects were presented (such as college loans or employment forecasts for the college student subjects used in the experiments reported herein), an experiment might more effectively isolate presentation-style variables. The goal of researchers, and ultimately of news organizations, is to pinpoint the factors that lead consumers to selectively expose themselves to news content, developing the loyal following that news organizations desire.

The two experiments reported herein have a number of limitations. The student subjects, while convenient and ensuring homogeneity of subjects, may be systematically different from other cohorts, especially those that use different patterns of media for news, including print and traditional broadcasting. The use of feature stories ignores the emerging literature identifying most news, including breaking news, as a flow, with consumers following stories across media as the story develops and new information is available (Wilkinson et al, 2012).

Since the emergence of the Internet as a distribution medium for news, both practitioners and academics have studied how the behavior of news organizations and consumers has changed

to adapt to convergent journalism (Grant & Wilkinson, 2009). As online media mature, a new wave of media organizations will emerge that may focus exclusively on online delivery of news. With the differences in time, place, and modality afforded by online media, it is critical to continue the thread of investigations reported herein.

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**Figure 1**

**Jigsaw 1 Observed Model**



**Figure 2: Expected Format Distribution in 20 Years**

<b>Format</b>	<b>Percentage</b>
Interactive	50.0%
User-Generated	38.0%
Text	33.5%
Photos	25.5%
Audio	24.5%
Video	23.0%
Database	19.0%

**Figure 3: Types of News Content in 20 Years**

Type	Percentage
Local	25.50%
National	24.50%
State/Regional	18.50%
Hyperlocal (Neighborhood)	16.50%
International	15%

**Figure 4: Content**

<b>Format</b>	<b>Percentage</b>
Breaking news	41.0%
Features	17.50%
Other	12.50%
Enterprise Reporting	11.50%