

Should There Be an App for That?
An Analysis of Interactive Applications within Longform News Stories

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Abstract

The most-read story of 2014 on the website of *The New York Times* was an interactive news application called “How Y’all, Youse and You Guys Talk.” Interactive applications may provide value to the user experience of digital media, but they cost time and money to produce. In this study, we examined five multimedia news packages that include interactive applications as part of the story presentation and asked 18 millennial tablet computer users to evaluate them. Participants said the interactive applications that were most effective in attracting and retaining their interest maintained the flow of the narrative, provided a personalized or playful alternative to the representation of information in other media, and were produced by credible media organizations that designed their apps for use on mobile devices.

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Introduction

With the tagline “There’s an app for that,” Apple ushered in the Age of the App with its iPhone 3G commercial in 2009.¹ Since then, media and technology startups across the U.S. have invested in research and development, hoping to cash in on the next “killer app.”² More recently, news organizations have started to develop more complex applications, integrating them within their journalism.³ Examples range from the “How Y’all, Youse and You Guys Talk” language quiz, which was the most-viewed content on *The New York Times* website in 2014,⁴ to *ProPublica*’s “Losing Ground,” a longform multimedia story that users explore by zooming in and around maps of Louisiana to better understand climate change.⁵ Although it is hard to determine exactly when the first interactive news application was produced, one study of found an “interactive feature” category indexed in the nytimes.com search engine as early as 2000.⁶ A study of longform multimedia news packages showed that about 35 percent of them contained interactive infographics or “other” interactive features,⁷ suggesting that longform digital journalism may provide a feasible environment for interactive news applications.

This study defines news applications as software-driven elements within news stories that require some kind of user participation, either by clicking, entering data, or by other means.⁸ The reception of news audiences to interactive news applications remains “underexplored,”⁹ as most audience studies of news usage are concerned with “viewing, listening, or reading” instead of interacting, participating, or engaging with a news application.¹⁰ This study, therefore, seeks to fill that gap by examining five longform multimedia news packages that include Web applications as part of the story presentation and asking 18 millennial tablet computer users to evaluate them. Because interactive applications take time, specialized knowledge, and money to produce, media organizations may question when to invest limited resources into creating applications and whether investments will pay off by attracting new users or retaining existing ones. This study investigates this question by helping to determine which types of interactive designs may be most effective in attracting millennial audiences to longform news packages. For this study, we define millennials as individuals born between 1981 and 1996.

In our analysis, several themes emerge that news organizations might take into consideration when creating applications in conjunction with news stories, including issues related to the layout of the story and the flow of the narrative, the importance of creating apps that are personally relevant to the readers, and keys to motivating users to share content on social media. This paper begins by examining literature relevant to interactivity and linearity in digital media, the emergence of interactive applications in digital journalism, and digital news consumption by millennial audiences. After examining the study’s methodology, the researchers articulate major themes that emerged from interviews with millennial participants. The paper concludes with a discussion of implications for media organizations planning to create interactive applications for millennial audiences and how the presence of interactive applications may shift audience expectations of digital journalism.

Interactivity, Linearity and Engagement in Digital News

This study defines news applications as software-driven elements within news stories that require some kind of user participation, either by clicking, entering data or by other means. Underlying this definition is the concept of “interactivity,” a slippery term that has been debated and discussed since the advent of the web in the 1990s.¹¹ Steensen and others have criticized the inconsistent use of the terms “interactive” and “hypertext” when describing online journalism, although this is perhaps because these forms are still in early stages of their development.¹² Murray defines interactivity as a combination of two qualities: procedural, as in governed by rules or algorithms, and participatory, as in responsive to user input. She also characterizes the digital environment as enabling within narratives encyclopedic qualities, or the ability to present a subject in a comprehensive manner, and spatial characteristics, a concept related to way-finding and navigation.¹³

Several studies have investigated the value of “interactivity” in news website content. Goode suggested that news production and consumption are now structured like databases, “an endlessly shifting agglomeration of data to be navigated, reconfigured, customized and ‘mined’ in seemingly limitless permutation.”¹⁴ Another study found that greater levels of website interactivity may lead to more user engagement and more favorable attitudes toward web content, but may also reduce the recall and memory of information.¹⁵

Another way that “interactivity” enters into the digital news story is through games or game-like structures. Two of the packages in this study, *Rebuilding Haiti* and *The Parable of the Polygons*, include game-inspired elements within the narrative. *Haiti* explores the challenges faced by organizations trying to help the country after the 2010 earthquake. At the end of each section, in a *Choose-Your-Own-Adventure*-style format, users are invited to select from a range of options to solve a problem facing Haiti. Each choice has consequences. The field of game studies includes “serious games,” or game-like presentations that are used to harness the public’s enjoyment of video games to ‘serious’ topics such as the news.¹⁶ Serious games are often simulations, aimed at reproducing real-world events¹⁷ and games may enable “process-oriented journalism,” a storytelling technique that lets the audience explore the dimensions of a news story without a pre-defined narrative by a journalist.¹⁸ This lets the audience glean understanding through their participation in the game, instead of passively consuming it as readers or viewers. In this study, for instance, *Polygons* invites users to move animated squares and triangles around a game board as a way to explore the difficulties of housing integration.

“Engagement” is a term that is often discussed in connection with interactivity in digital news, and some definitions of engagement reference interaction. Batsell defines engagement from the perspective of the journalism industry as “the degree to which a news organization actively considers and interacts with its audience for its journalistic and financial mission.”¹⁹ Chinn identifies five verbs of engagement that apply to the audience: “consuming, subscribing, contributing, amplifying, transacting.”²⁰ Two of Chinn’s terms are perhaps most relevant to this study: amplifying, which has to do with liking the content,

sharing or recommending the story; and contributing, which includes commenting, rating and interacting with a news package by clicking, playing or entering information. The Advertising Research Foundation outlined 25 definitions of engagement directly related to creating brand loyalty: “Engagement is turning on a prospect to a brand idea enhanced by the surrounding context.”²¹ In digital journalism, the “surrounding context” may be interpreted as the editorial product, which in this study is longform multimedia journalism, a format that sometimes includes interactive news applications.

Longform multimedia journalism as a storytelling form in digital news has increased since the publication of “Snow Fall,” a work that won the Pulitzer Prize for *The New York Times* in 2013.²² Jacobson, Marino, and Gutsche argue that “Snow Fall” helped revive the notion that there is a place for linear, “narrative” storytelling on the hypertextual web,²³ which has been theorized from its inception as providing a departure from linear presentation.²⁴ Other scholars suggest that multimedia and interactivity have the potential to both increase audience immersion in longform journalism and create distractions that might decrease story immersion.²⁵ In writing about “Snow Fall,” Dowling and Vogan described how digital longform stories are often enclosed in a “cognitive container,” usually a single vertically scrolling page designed to maintain the linear experience of storytelling without the distraction of links that take the reader from the main page of the story.²⁶

Dowling and Vogan’s “cognitive container” is directly related to layout, which Waller describes as “a nonlinear, holistic quality of text” that provides the “infrastructure for reading.”²⁷ Layout, according to Waller, gives readers cues about how to access a textual work through conventions such as headings, diagrams, and other visual elements. Indeed, other recent work describes the layout of single-page digital longform news packages like “Snow Fall” as reviving a more linear approach to narrative within the fragmented, hypertextual format of the web.²⁸

The Emergence of Interactive Applications

One emerging format for journalistic storytelling is the interactive application, which is defined here as one or more software-driven elements within news stories that require some kind of user participation, either by clicking, entering data, or by other means. News applications are more likely to be web-based applications embedded within news stories rather than native mobile apps that may be downloaded to smartphones or tablets. *Poynter* outlined the benefits of web-based applications compared to native mobile applications, finding that web apps work consistently across platforms and are easier to integrate into editorial content than native mobile apps.²⁹ Longform publisher *The Atavist*, like other media companies, eliminated its native mobile applications in 2015, citing, in part, the difficulty in raising awareness of mobile applications among subscribers, and the reluctance of subscribers to download native mobile applications.³⁰

“The news app,” writes Broussard, “is considered by news developers to be a work of journalism; the mobile app, when it is considered at all, is considered to be merely a delivery

mechanism.”³¹ Mobile apps are more likely to feature narrowly focused windows of task complexity due to the limited nature of mobile phone and tablet functionality when compared to desktops or laptops.³² Web-based interactive applications may be more complex. Jacobson, for example, found an evolution of the “interactive features” catalogued in the search engine of the website *nytimes.com*, noting that between 2000 and 2003 interactive features took the form of audio slideshows and interactive infographics, but from 2004 to 2008 expanded to include interactive timelines, interactive transcripts, quizzes, interactive maps, and other formats.³³ Scholars have described interactive applications as interfaces that create a space of shared agency between experts and the public.³⁴

Green-Barber refers to these emerging applications as “news interactives,” and considers them as “new storytelling methods, intended to take complicated data and make it accessible to media consumers.”³⁵ In addition to *The New York Times’* “How Y’all, Youse and You Guys Talk,” other media companies have had success in drawing audience with interactive applications. For example, *The Texas Tribune* credited a series of interactive data-driven projects with increasing traffic to their website.³⁶ However, scholars and professionals alike agree that such efforts are expensive and challenging to produce, particularly in terms of design and media workflow management.³⁷

Millennials and Digital Journalism

The most compelling reason for news producers to consider the value of interactive applications and longform digital journalism for millennial audiences is because this demographic cohort is growing twice as fast as the overall Internet audience growth.³⁸ While print magazine subscriptions have fallen, digital (including print and digital) subscriptions have risen.³⁹ “Half of the newspaper digital audience is composed of those who use only mobile devices (smartphones or tablets) for their newspaper digital content,” which means that media organizations may want to abandon digital-first strategies in favor of mobile-first.⁴⁰

Bonner and Roberts interviewed millennials about their preferences for reading magazines in print vs. digital formats, and found that while participants like the ease of access afforded by digital, they often felt “bombarded” by an overwhelming amount of online content.⁴¹ Perhaps due to the wealth of new media platforms, millennials consume news differently than previous generations. Meijer and Kormelink identified 16 verbs that millennials used to describe how they interacted with the news: “reading, watching, viewing, listening, checking, snacking, monitoring, scanning, searching, clicking, linking, sharing, liking, recommending, commenting and voting.”⁴² In Meijer and Kormelink’s analysis, the genre of longform journalism is most likely related to the practice of reading, as: “Reading is about depth: it is done individually, with great attention, and—when users have enough time—in longer sessions. Often, reading as a particular practice of news use is less about knowing that something occurred than about understanding a news event.”⁴³ Recent scholarship suggests that users find written text to be the most useful, credible and efficient form of news, with multimedia packages also scoring high in usefulness and credibility.⁴⁴

The rise of longform multimedia marks efforts by news organizations to build “prestige for a media outlet’s brand, which then reflects similar status on readers who share its work through social media.”⁴⁵ The interest of news organizations in both branding and sharing reflects a strategy to stimulate audience interest in quality journalism that matters to individuals. Millennials “rarely share news on Facebook, but when they do, it has a communicative function and plays a role in personal impression management.”⁴⁶

The importance of creating media products that readers want to share on social media is an essential component of news work, as scholars argue that journalism is now as much a social experience as a vehicle for satisfying information needs,⁴⁷ and recent studies underscore the importance of social sharing in building audience engagement among news consumers.⁴⁸ “If you hope to entice a real person to pass your story on to a friend, then reporting matters, writing matters, and design matters. As journalism and its distribution through the web evolve, the most meaningful distinction is turning out to be not short versus long but good versus bad,” journalist Bobbie Johnson writes in “Snowfallen,” a critique of longform journalism.⁴⁹

Therefore, to investigate under what circumstances news applications might add value to the news experience of millennial news consumers, the following research questions were asked:

RQ1: To what extent, if any, do interactive applications contribute to the news audience’s interest, attention, and appreciation of longform multimedia journalism?

RQ2: What specific characteristics of interactive applications, if any, contribute to the news audience’s interest, attention, and appreciation of longform multimedia journalism?

RQ3: How much relative value do journalism audiences place on applications when compared to other storytelling elements, such as video, photos, and narrative text?

Method

For this study, 18 millennials, born between 1981 and 1996, used an iPad to review longform news packages that included interactive applications within the story. Each participant reviewed one or two packages selected from a menu of five possible stories (see Table 1).

Table 1. Details of packages selected for study.

TITLE	PUBLISHER & YEAR	DESCRIPTON & URL	IN-TEXT REFERENCE
Colleges Flush with Cash Saddle Poorest Students with Debt	ProPublica, 2015	In-depth reporting on how college debt impacts poorer students. Includes a database of US schools that shows amount of debt from each college. https://www.propublica.org/article/colleges-flush-with-cash-saddle-poorest-students-with-debt	<i>Colleges</i>
Losing Ground	ProPublica, 2014	Interactive map showing impact of sea level rise on Southern Louisiana. Includes timelines and photos. https://projects.propublica.org/louisiana	<i>Losing Ground</i>
Miami Beach at 100: The Sea Is Rising, and So Are the Condos	Fusion, 2015	Story, map and infographic that shows what Miami Beach is doing about sea level rise. http://fusion.net/story/109661/miami-beach-at-100-the-sea-is-rising-and-so-are-the-condos-somethings-gotta-give-right/	<i>Sea Level Rise</i>
The Parable of the Polygons	Vi Hart and Nicky Case, 2014	Story and interactive game boards that invite users to move animated squares and triangles to demonstrate the difficulties of housing integration http://ncase.me/polygons/	<i>Polygons</i>
Rebuilding Haiti	Produced by journalists funded by the European Journalism Centre and published on Rue 89 (France), 2014	A multi-chapter work about the challenges involved in rebuilding Haiti after the earthquake of 2010. Includes a “Choose-Your-Own-Adventure”-style feature, where the user is invited to select from a range of choices. http://apps.rue89.com/haiti/en/	<i>Haiti</i>

These packages all included interactive applications integrated within longform narratives. As news stories, these packages range from features (*Haiti*) to investigative reports (*Colleges*) and time-sensitive news stories (*Sea Level Rise*). To select packages for analysis, we referred to lists of longform multimedia journalism identified by popular websites dedicated to discussing online journalism, like longform.org, and a crowdsourced list of longform multimedia packages called “Snowfallen” by technology journalist Bobbie Johnson.⁵⁰ For the purposes of this article we relied on previous scholarship to characterize longform journalism as consisting of in-depth reporting that results in at least 2,000 words on a specific topic.⁵¹

Study participants were recruited from a large university campus in the U.S. and from a nearby co-working facility. Participants were 18-34 years old; used tablet computers to access news at least once a week; consisted of 10 females, 8 males; 7 undergraduate

students and 11 working adults. Participants selected a story that they wished to view from a menu of pre-selected packages (see Table 1). They had a few minutes to read and interact with the content on an iPad while the researchers viewed their actions on a larger screen connected to the tablet. Participants were invited to “think aloud” while they interacted with the works, stating what they liked or did not like about the work, or sharing any other thoughts or ideas that came to them while interacting with the piece. After viewing the story, each participant spoke with researchers in a semi-structured interview format

The think-aloud protocol asks subjects to verbalize the actions they are taking and the choices they are making while interacting with a media or technology presentation or product. The purpose of the think aloud method is to make observable at least some proportion of the information processing that takes place during a given task.⁵² The think-aloud protocol is a technique that is sometimes used in conjunction with semi-structured interviews, particularly when researchers are investigating audience response to media and technology presentations and products.⁵³ Previous research into media products and processes has relied on semi-structured interviews for data collection, incorporating as few as seven to as many as 36 participants.⁵⁴ These “conversations with a purpose” are then coded and grouped into categories so that researchers may identify themes and patterns of experiences and behavior and then expound upon them.⁵⁵ While the combination of the think-aloud protocol and semi-structured interviews may give researchers an impression of the participants’ thought processes about and evaluations of the longform news packages they viewed, it is important to point out that the sample size of this project is small, and the stimuli consisted of packages pre-selected by the researchers, not chosen willfully by the participants themselves. A more comprehensive study with more participants and a greater degree of freedom of stimuli choice might return different or broader results. We believe, however, that the themes which emerged from this study would be useful for crafting larger studies, which we discuss in greater detail in the conclusion of this paper.

Participants’ “think-aloud” comments and answers to the interviewers’ questions were recorded, transcribed, and coded for recurring themes using NVivo software. The researchers employed a grounded theory approach to the analysis, generating the list of themes inductively, “by which themes and categories emerge from the data through the researcher’s careful examination and constant comparison.”⁵⁶ We coded for categories, then larger codes, then themes. For example, our participants commented on whether or not some of the interactive applications were easy to identify as “interactive,” based on where they were positioned in the story. We initially coded these comments under “visibility of features,” and later merged them into the theme of “flow,” which is more broadly related to structure and layout. We began with 31 codes that were condensed into 6 larger themes. A codebook was created from these themes, and tested for inter-coder reliability. A researcher unconnected to the project used the broader themes to recode 5 of the 33 sessions, or 15.15%, achieving 88.57% average agreement. See Table 2 for the themes and more frequently occurring sub-codes.

THEME	SELECT SUB-CODES	DEFINITION
Flow	<ul style="list-style-type: none"> —Page layout —Narrative Structure —Reading/readability —Visibility of features 	The structure of the narrative and of the layout, and interaction between the two.
Personal Relevance	<ul style="list-style-type: none"> —Personalization —Sharing —Personal meaning 	Story topics with heightened meaning or importance to the participant or to the participant's social network.
Engagement	<ul style="list-style-type: none"> —Human interest —Fun —Payoff and value 	Narrative, structural, visual, or other elements that hold a high degree of interest in or attention for the participant
Interactivity	<ul style="list-style-type: none"> —Game play —Clicking —Functionality 	An umbrella term that covers choices and actions that participants make while engaging with interactive applications.
Solutions Journalism	<ul style="list-style-type: none"> —Call to Action —Resolution (or lack of) 	Resolutions that the story offers to difficult problems, or opportunities for the participant to take action on an issue or a problem
Credibility	<ul style="list-style-type: none"> —Cited sources —Statistical backup —Mobile-friendly and glitch free 	The participant's view of the reliability of the news organization, the consistent use of identifying sources, and a lack of technical problems within the package.

Table 2. Six major themes and select sub-codes.

Participants often talked about one or more of these themes in the same sentence and made connections between the relevance and importance of each theme in terms of their engagement with the packages. Grounded theory is sometimes used to analyze consumer or press discussions of new products⁵⁷ or to develop a vocabulary for analyzing an interdisciplinary field.⁵⁸ The analysis of interactive applications embedded within news stories may fall into both of those categories, and these themes may provide at least an initial framework for analyzing interactive applications that accompany longform news stories.

Results

Below is a discussion of the themes that emerged most frequently from think-aloud comments and statements participants made to the researchers during follow-up interviews.

Flow

Participants commented most frequently on flow, a concept that encompasses the structure of the narrative and the on-screen page layout of the story. Participants said that they were more likely to interact with applications embedded directly within the layout of the story page, rather than clicking on a button or a link that might take them to another page. They expressed anxiety about whether the links might remove them from the context of the story they were reading. “I’m worried if I click that it will take me to a completely different topic,” Participant 1 said of the many interface options in *Losing Ground*. Participant 7 liked the interactive elements embedded within the page of *Sea Level Rise*: “I liked the interaction. It’s quick. I’m glad it didn’t take me to another site.” Other participants stated a preference for reading the text first before exploring extras, such as links and news applications. “My instinct was to go for the read and mess with everything else later,” Participant 11 stated.

The packages’ flow and the role of news applications to provide logical and comfortable context to the narratives were also influenced largely by the users’ desire to see long passages of text broken up by images, video and interactive elements. “If I read an article and they have it just like block after block after block I probably won’t finish it, or I’ll skip through it,” Participant 17 said. Several participants skipped over the link to the database in *College Debt* because they thought it looked like an ad.

Participants were also concerned that the games embedded within *Polygons* might interfere with the flow of the story. “It might be confusing” for those “who weren’t looking to play a game in the news,” Participant 6 said. Participant 3 said the multiple little games embedded within *Polygons* distracted from the story text, but found that the games were relevant to the narrative because they exemplified the points the story was making. Removing them “would reduce a lot of the narrative impact of introducing them step-by-step. And fundamentally that’s what I’m here for—the narrative, not the simulation.”

Personal Relevance

Overall, participants said that they were more likely to select, read, and share news stories and news applications that were personally relevant to them and their friends. Several participants said they would share the *College Debt* story for that reason: “I know a lot of people that are going through this... during school,” Participant 2 said. Participant 9 commented about the value of the interactive map in *Sea Level Rise*, which lets users enter a street address to view the potential impact of sea level rise in that area. “It’s very important to be able to put in your own personal information,” she said, because “it makes it relatable.”

Engagement and Interactivity

Participants frequently used the terms “engagement” and “interactivity” interchangeably when describing their experiences with interactive applications. Chinn’s characterization of user engagement as “amplifying” and “contributing” and Murray’s definition of interactivity as a combination of procedural rules and participation through

receptiveness to user choices are particularly descriptive of *Polygons* and *Haiti*, two packages that incorporated game-like qualities.⁵⁹

Several participants found *Polygons* engaging because of the way it took a difficult subject and made it accessible: “It’s a way to convey a lesson in a fun way that will get a point across,” Participant 5 said. *Polygons*’ topic of housing integration was very complex, but the friendly gaming pieces were inviting, and since users moved squares and triangles instead of people of different ethnicities, the level of abstraction made it easier to work with. Participant 4 said: “This particular presentation shows how individual bias effects a collective which is something that you can’t just from looking at flat data. We know, for example, that neighborhoods are super segregated and this is really a great explanation to why that happens.” Participant 6 said: “The thing that I really like about this is that it uses a lot of interesting game design principles. They’re using shapes but they give them little faces, and so it’s easy to sort of identify, like we’re human so we look for that stuff.”

Participant 2 found the *Choose Your Own Adventure* quality of *Haiti* engaging: “I think that it plays into your emotions as a person. Because when I go to make a decision like this... [I] put myself in these people’s shoes. Like if I were there, would I prefer them to give healthcare to everybody? Rebuild schools? Fix the drinking water? What would I find essential if I was placed in that situation.” However, Participant 5 found the dense text and the multiple chapters a little off-putting. “I like long reads from time to time, but for a lot of people if they see six different sections on something, unless they’re invested in it you’re not going to go and read all of it. So the gamification portion of it might not even reach them... They might not even get that far.” Several participants suggested that the *Haiti* piece might be better designed with the game feature at the beginning of each section, instead of the end.

Participants described *Losing Ground* as interactive because they could explore a map showing the changing coastline of Louisiana, exemplifying Murray’s idea of spatial exploration as a component of interactivity. *Losing Ground* was recognized as a beautiful design, but participants were split on its effectiveness. Two-thirds said it was too complex, while the other third really liked the ability to explore the map while reading the story. “It’s confusing. Because it has a lot of things going on and you get lost,” Participant 1 said.

While interactivity was generally viewed as a positive characteristic, participants expressed a desire for guidance in navigating the packages. “I have a short attention span, which most people do nowadays, and I’m just going to click on all these little boxes to try to figure something out,” Participant 13 said. “If they don’t give me too many options...I think it could be a little bit better.” Participant 16 described an animated infographic in *Sea Level Rise* as “interactive,” even though it does not contain any clickable elements: “It does all the work for you...without you having to click it.”

Solutions Journalism

Most of the longform packages covered difficult topics, ranging from college debt to the problems with rebuilding Haiti. Several subjects said they wanted to see solutions to problems presented, or a call to action to let them know what to do about a particular

situation. “To a millennial you think about, ‘alright it’s a problem. What can we do about it? Is there anything I can do?’” Subject 7 told us.

But sharing information and solutions about sea level rise with friends might be difficult, others said, especially when there is no guaranteed outcome. Participant 16 said of *Sea Level Rise*, “It will scare people because some people don’t want to deal with the fact that this is happening.”

Several participants were frustrated with the *Haiti* package: “This is very eye opening in a sense that it sort of tricks you into obviously choosing what you think is correct, but it also negates that and kind of shows you like yeah well that’s a great idea, but that’s not necessarily what happens or what is reachable,” Participant 2 told us. “This is a game I cannot win,” Participant 6 said.

Credibility

Credibility was an important consideration for the study participants, who expected news packages to provide both statistical evidence and first-person accounts in support of the claims of a story. They noticed when sources were not cited within story text, infographics or interactive elements. “There’s certain writing that articles seem to have where they don’t put a citation,” Participant 10 said. “Where it says, ‘scientists now say,’ scientists - they make it sound like all scientists together, decided. It should be more like citation to certain studies or something like that.” Participants found news organizations they were familiar with to be more credible than organizations they did not know.

Participants found technical glitches in some of the packages, and said that when things did not work they were more likely to abandon a story or an application. Some of the interactive applications were not optimized for mobile delivery, and the participants noticed. These technical issues, although they have nothing to do with the content, also speak to the issue of credibility because they suggest that the news organizations may not understand how to present their content on mobile devices, and therefore may not be targeted to audiences using smartphones and tablets (i.e.: millennials).

Discussion: Should There be an App for That?

Millennials are much more likely to get their news from smartphones and tablets, mobile devices that are fertile ground for interactive applications.⁶⁰ There are six broad themes about storytelling and interactive applications that emerged from our interviews with millennial tablet users that news organizations may consider when producing news applications. These themes—flow, personal relevance, engagement, interactivity, solutions journalism, and credibility—are interpreted here within the digital environment, but are also factors in print media, although the context is different. For example, millennial readers might find personal relevance a desirable quality in print products, but might not find value in sharing a print article with a friend, unless an electronic version was available and could be

shared via social media. Some magazines combine print and digital subscriptions, and the relationship between the two media among subscribers would be a fruitful area for further research.

Flow—Maintaining Context in a Hypertextual Environment

Flow, which encompasses the graphic layout of elements on the screen and the structure of the narrative itself, is perhaps the most important theme that emerged from the analysis of our participants' comments about the longform multimedia packages and the interactive applications embedded within them. Our millennial subjects appreciated long passages of text broken up by photos, videos, and interactive applications, and they were more likely to click on applications embedded directly within the layout of the story page, rather than clicking on a button or a link that might take them to another page. Some of our subjects expressed anxiety about being taken out of the context of the story they were reading, and others stated a preference for reading the text first, then exploring extras like news applications after reading. This belies the idea of hypertextual structures that allow users to smoothly navigate links and Goode's notion of a shifting agglomeration of data. The web may enable a hypertextual media format, but readers may not take advantage of it, preferring to stay within Dowling and Vogon's "cognitive container," an indication that web-based applications embedded within stories may be a better format choice than native mobile applications for media organizations.

The Relationship Between Engagement and Interactivity

The six themes that emerged from interviews with millennial participants overlap, but engagement and interactivity are intertwined to such an extent that our participants frequently discussed them together. Based on our results, engagement is perhaps necessary for a positive experience with interactivity, but too many choices can reduce engagement.

For example, participants praised the games in the *Polygons* presentation as conveying a difficult topic in a fun way while still maintaining the narrative. But more choices did not always translate directly to increased engagement with interactive applications for our millennial subjects. Several participants said they would have liked more guidance in navigating some of the more complex applications, and one participant described an animated infographic, which did not require any user input, as "interactive," because it "does all the work for you." Our results suggest that there is a delicate balance between the number of options users may select and keeping readers immersed in the narrative.

Social Sharing, Personal Relevance and Solutions Journalism

With about 41 percent of news traffic coming from social media,⁶¹ the importance of social sharing among the news audience cannot be overstated. Most of the 18 subjects said that they were more likely to select, to read and to share news stories and applications that were personally relevant to themselves and their friends. For example, while two of our subjects found *Losing Ground*, the story about coastal Louisiana, to be engaging, they would

not share this package because it's not a location that they are familiar with. On the other hand, many of the subjects were current college students or recent college grads, and would share the *College Debt* story because it was relevant to them and their friends.

Our participants said they were less likely to share stories that were less positive in tone, but they also said they enjoyed stories that presented difficult issues or social problems, provided the story included solutions or a call to action to address the issues and problems raised in the story. They were disappointed when these elements were absent, most notably in the *Haiti* story, which, as one subject said, presented “a game I cannot win.” Our millennial subjects wanted to “win,” or at least see “rigorous reporting about how people are responding to problems,”⁶² echoing the Solutions Journalism Network's definition of solutions journalism.

Credibility and Usability

Several participants linked technical glitches and a lack of mobile-ready features with a reduction in the perceived credibility of the longform packages and their level of engagement with the packages, even though these issues had nothing to do with the quality of the content itself. Technical glitches speak to the condition of usability. Nielsen, a pioneer of user experience design, defines usability as encompassing “whether the system is easy to learn, efficient to use, pleasant, and so forth,” and lists learnability, efficiency, memorability, errors and satisfaction as the five “quality components” of usability.⁶³ For example, *Polygons* sometimes had problems loading, and *Haiti* did not allow users to go beyond the current section until they had played the *Choose Your Own Adventure* game. Our subjects commented negatively on these aspects of both packages.

Conclusion

Millennials are much more likely to get their news from smartphones and tablets, mobile environments rich in interactive applications. Some media organizations have seen increased Web traffic from interactive applications (for example, *The New York Times* and the *Texas Tribune*). Interactive applications have evolved from the simple audio slideshows and interactive infographics published on nytimes.com in the 2000s to include interactive game elements, interactive maps, and comprehensive databases, like the packages in this study.

According to the participants in this study, interactive applications contribute to the audience's interest, attention, and appreciation of longform digital journalism when they are embedded within the story and provide quick bursts of interaction that maintain the context of the narrative—characteristics related to the concept of “flow” in this study. Interactive applications may be used to break up long passages of text, and may provide a personalized or playful alternative to direct reporting and representation of information in other media. Stories that include news applications should be optimized for use on mobile devices, and free of technical glitches. Participants said that they would be most likely to share interactive

applications that are both engaging and relevant to the interests of their social networks, an important consideration for news organizations when a significant portion of adult news readership is driven by social media.

The results of this study reveal some of the elements that may make the design of interactive applications within longform stories more effective for millennial news audiences. However, the sample size is small and the stimuli were pre-selected. This study did not include as a control stimulus longform news packages without interactive applications, and thus left unanswered the perhaps more fundamental question of whether interactive applications, by themselves, add value to longform news stories. Future studies might use the six themes identified here—flow, personal relevance, engagement, interactivity, solutions journalism, and credibility—to test a larger audience with a greater number of stimuli selected by the participants rather than the researchers.

Testing a larger audience requires more time and resources, but testing with a greater number of stimuli drawn from the participants' own preferences requires some creativity. We thought of two ways to accomplish this: First, participants might give researchers access to the news stories they shared with their friends on social media over a fixed period of time. Second, for a broader selection of potential stories, participants could give researchers access to the history of their mobile phone browsers. Both of these methods would reveal the news stories participants read of their own volition, some which may include interactive applications, and researchers could ask the participants to revisit these stories, using the think-aloud protocol and semi-structured interview techniques outlined here.

Although this study has limitations, the six themes that emerged from this research—flow, personal relevance, engagement, interactivity, solutions journalism, and credibility—may provide a solid starting point for future studies of audience reception to digital news formats.

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Notes

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