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Interactive TV News: A New Delivery Method for Broadcast Television News

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Interactive TV News: A New Delivery Method for
Broadcast Television News

Trent Boulter

A selected project submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Arts

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ABSTRACT

Interactive News: A New Delivery Method for Broadcast Television News

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This project looks at the development and use of a new delivery system for broadcast television news and its relation to the Uses and Gratifications and Push/Pull Theories. An in-home study of interactive news was conducted for two weeks, allowing people access to three local and 5 national newscasts via one interactive newscast. Users were able to access the interactive newscast whenever and however they wanted via their television or computer, as long as they had an internet connection. The results of this study show how the system was used, what specific actions were taken, and where the potential lies for further research.

Keywords: interactive news, uses and gratifications, television news, push/pull theory, internet, BYU, computer science, prioritize, time shifting, interactive.

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Chapter 1: Introduction

Background Information

The world of media is continually changing and becoming more and more interactive. With the incorporation of cellular phones, Internet, and other hand-held devices as tools of constant communication, our fields of research and methods of communicating messages and ideas are continually broadening. With that expansion comes need to develop new ways of experiencing and using media. The Interactive Computing Everywhere (ICE) lab at Brigham Young University (BYU) is focused on developing those types of experiences. This project is focused on their development and use of Interactive News.

ICE has been working on developing this new form of media for the past few years, and with the incorporation of communications theories, some of the rising questions about this technology can be answered. One of the most critical questions that needs to be answered is how and why people use particular types of media. An important theory to help answer this question is Uses and Gratifications. This theory is extremely applicable to interactive communications because it is a theory that assumes a very active and conscious audience with an understanding of what they themselves need and want. (Palmgreen, Wenner, & Rayburn, 1980) One of the reasons that this theory is used so widely to explain motivations behind media selection is its flexibility to help make assumptions about individual preferences and interchangeability of communication in both traditional and convergent media (Ruggerio, 2000). The focus of uses and gratifications is on the individual and not the media itself. This allows for its constant application in multiple situations.

Media Dependency is a theory that was incorporated into the field of communications in order to help us explain why people seem to use the same media tools to meet certain needs (Ball-Rokeach & DeFleur, 1976). An obvious goal of the ICE lab is to have people rely on this

new media type to get their news information. With that focus, Media Dependency is uniquely situated to help us understand what steps need to be taken in order to gain the loyalty of Interactive News viewers. Because Media Dependency hasn't been used as widely as some other concepts, its unique scope and application are something that would truly help us understand how and why people use this new interactive media type.

Media consumption can be classified in many ways. One of those classifications is based on who requests the information originally. If it is requested by the producers of the media then it is considered push-based media, and if its original request comes from the consumer then it is seen as pull-based media (Acharya, Franklin, & Zdonik, 1997). With Interactive News the ICE lab is attempting to create a push-pull media type that incorporates the benefits of both.

Interactive media has come a long way and there are numerous studies that have been conducted to help us better understand how it works (Bezjian-Avery, Calder, & Iacobucci, 1998; Kennedy, 2008). The majority of these studies have been focused on video games and online newspapers, (Friedland & McLeod, 1999; Lowrey, 2003; Tezon, 2003) and all though they don't completely relate to what this project is trying to accomplish, those findings do inform what we are trying to do with interactive broadcasting.

Overview of Interactive News

Interactive News is a combination of traditional broadcast television news with the interactive capabilities of the internet. With the continual incorporation of the internet into every aspect of peoples' lives, there now exists the ability to influence the media consumed on an individual level. Interactive news allows the viewer the ability to get more information than they have ever been able to before. Now they have access to deeper information with full interviews

and press conferences, wider information with multiple perspectives of the same story with video feeds to multiple sources, and clearer information with historical background.

One of the most important features of Interactive News is that nothing is inherently changed if you don't want it to be. The traditional news delivery is still used, but with the added option to get more out of it.

Purpose of the Project

This project is being used to better assess how people will receive and use this new method of getting news information. It is an experimental deployment of Interactive News to a very limited number of people with the intent of getting user feedback and suggestions for continued development. The purpose of this project is to discover how and why people use it. Due to cooperation agreements with local news organizations, we have to limit our sample size to 100 households in order to avoid affecting their viewership and stay within the limitations of the laws of fair use (United States Code, 2010).

This project, in conjunction with previous research that has been done in this area, will allow ICE to move forward with a better understanding of the expectations, motives, and points of interest of their users. With this information they have a much better chance of producing a product that people will use and incorporate into their daily lives.

Qualifications

As a student of communications I have been involved with media production for five years. I have worked in the private sector with television and radio stations as a producer, reporter, and anchor. For a short period of time I also worked as the Broadcasting director for a non-profit organization where I helped to develop their branding and style guide. After that work was completed I was asked to work as an editor for a large video training project

undertaken by The Church of Jesus Christ of Latter-day Saints. While doing all of these other things I have continually helped the ICE lab with their efforts to further their technological studies, including the implementation of the first in-home trial for Interactive News. With this experience, I am uniquely qualified to help realize this project in order to gather the information they are hoping to use in the future.

Career Goals

As I have worked on this project I have recognized the progression of my ultimate career goals. I now have a strong desire to continue working in this area of media research focusing on interactive broadcasting. I want to help people understand how interacting with the media produced by others will eventually change the way that media is created and will ultimately change the way the world perceives itself.

Chapter 2: Literature Review

In this chapter I address the theoretical developments that surround the concepts of interactive television. In order to understand how and why people use a specific type of media for a specific reason, the best theory to examine is Uses and Gratifications Theory. Other potentially helpful theories include Push/Pull Theory, and a selection of interactive media studies that have already been performed. By examining all of these different areas, in conjunction with the organization and purpose of the ICE lab, we can more fully understand what interactive television is and where it is going in the future.

Uses and Gratifications

One of the main things that ICE is looking to understand about this new form of communication is why people make the selections they do with regard to the media. In order to understand those types of selections many researchers have turned to Uses and Gratifications Theory. This is a theory that is based on a theoretical framework that asserts that people choose the media they use according to their needs and wants. Applying this theory also helps researchers to describe, explain, and anticipate media uses and their consequences. Over the last 50 years there have been numerous findings and modifications made to the application of the Uses and Gratifications Theory, and with those applications we can better understand the numerous selections that are offered to the participants of this study.

In 1948 Harold D. Lasswell started to look at the uses of the media by disregarding the normal questions asked to describe communications which are: who, says what, in what channel, to whom, with what effect? By avoiding these categories of study, Lasswell was able to look at the communication process as a whole. He relied on his belief that a person has the ability to look at any process using one of two frames of reference, structure and function (Lasswell,

1948). This directly correlates to this study in the incorporation of a new structure and function to the news. The news structure is changed to provide the user the ability to control what they see as well as when they see it. This structure is used to incorporate the new functionality of being able to control the information that is consumed as well as the manner in which it is delivered.

In his 1948 study, Lasswell focused on the function of communication and found that there are three primary functions of mass media (Lasswell, 1948). First is the surveillance of the environment which is used to disclose threats and opportunities that affect the members of that environment. Second is the correlation of the different parts of society responding to their environment. Third is the transmission of a social inheritance. With interactive news each of these three functions is still met while being slightly altered. The first is slightly changed to allow people the opportunity to continue to survey their environment while insulating themselves from information that they don't want to be exposed to. In making decisions as to what they want to watch, members of society are actively responding to their environment and learning more about what surrounds them. The third of the primary functions of mass media remains relatively untouched with the exception that with greater activity comes a greater feeling of ownership and responsibility. This is how interactive news affects the transmission of social inheritance.

About 12 years after Lasswell's study was finished, Klapper continued on the same line of thought as he abandoned the accepted standards of communications research in order to reevaluate the power of media. Klapper (1960), in his book *The Effects of Mass Communication*, concludes that the mass media has less power over a person and their life than another individual does. He also asserted that the effects of media are minor in nature. The third conclusion

Klapper came to was that the actual process of media effects is far more complex, and has many more factors, than originally thought. This means that the effects of any message in mass media vary based on the psychological and social factors that influence the individual. While all of these statements are true, they are greatly affected by the development of interactivity. Giving people the ability to interact with the media increases the effects of the media on those people because they are guiding the message they receive. Because of its infancy in communications, the degree to which interactivity alters the effects of media is still uncertain, however, there is no doubt that media continues to have an effect on those that consume it.

Katz, Blumler, and Gurevitch (1974) took Uses and Gratifications and defined the theoretical foundation of perspective by claiming that it was based on needs, expectations, media exposure, and other unintended consequences. Interactive news, and the principles it is based on, emphasize the entirety of these findings. People make selections in the news based on each of those things and are given just what they request without the limitations that traditional news broadcasting encounters. That same year Rosengren (1974) explained that media behavior can be explained by looking at the basic interaction of needs with individual characteristics and society as a whole. By analyzing things in this way it is possible to anticipate possible problems and then predict the solutions needed to resolve them. Rosengren took these ideas and produced a model for the Uses and Gratifications paradigm to explain the connections and links between the different parts of the definition of perspective that Katz, Blumler, and Gurevitch (1974) provided in their research.

It wasn't until 1980 and Palmgreen, Wenner, and Rayburn that this theory was beginning to be related to television news programs. The researchers wanted to see if they could determine which of peoples' needs and gratifications were being met by the news. With the results from

their study they were able to develop the Gratifications Sought and Obtained approach. This was extremely significant because people no longer needed to focus their research solely on the results of media consumption. It was now possible to expand the scope of the research to the motivations that drive people to media and whether or not those expectations are met. With the incorporation of interactivity these things are not changed, but it is easier to see when the needs or expectations are met, or even abandoned.

Alan Rubin was one of the first people to start thinking about taking the Uses and Gratifications model from mass communications in general to content specific. He started to act on those ideas when he did his study on “60 Minutes.” Rubin conducted a qualitative study where he held 534 interviews with people to discover their motivations for watching the prime-time news program. He found that there were four different motivating factors associated with watching the program: substitution, information seeking, entertainment, and time consumption (Rubin, 1981). With the information from this study the producers from “60 Minutes” were better able to understand their viewers and cater their message to them. One of the important lessons learned during this study was by the producers of the program itself. Understanding their audience better helped them meet needs and expectations of their viewership going into the future. Interactive news provides exactly that type of information to news organizations, but in real time. As people make choices you better understand what their needs and expectations are. With that information news organizations can adjust their practices and methods to better gratify their viewers and what they need.

Although Rubin found that uses and gratification theory could be applied to specific content, the study of Lichtenstein and Rosenfeld (1983) showed that the gratifications experienced through media are not necessarily specific to that medium. People meet their needs

through a variety of ways and at numerous times. People aren't always willing to do the same thing at the same time to meet a specific need. There are too many uncontrollable variables that influence how things affect someone in their daily lives. As a response, Rubin conducted another study where he was actually able to name nine recurring motives for watching television: relaxation, companionship, entertainment, social interaction, information, habit, arousal, and escape (Rubin, 1983). Interactive news wasn't developed to meet each of the needs discovered by Rubin, but the sheer ability of people to determine the needs and expectations that they have for the news, and then manipulate the content in order to meet those, is why this form of communications is growing so rapidly.

In 1984 the Uses and Gratifications theory was further developed when Palmgreen categorized it into six main areas. He labeled the first area as gratification and media consumption. The second was social psychological origins of gratification. Third, gratification and media effects. Fourth, gratification sought and obtained. Fifth, expectancy-value approaches to uses and gratifications. And finally, audience activity (Palmgreen, 1984). Obviously the sixth and final area is where this study intends to focus. However, through interacting with media, each of the others is affected in some way. For example, in 1987 Rubin and Pearse (1987a) looked at the category of audience activity that Palmgreen created, and decided to use it as the basis of their study. They conducted their study on college students and their viewing habits of soap operas. After having the participants complete a survey, the authors used the sample of 328 people that claimed that they watched daytime television soap operas. They found that when people use media they naturally progress from their expectations about the media, to the gratifications that they are seeking from the media. Once that process is complete, the next step

is the behavioral intention which leads to exposure to a certain media type. As a result of the process the attention to and involvement with the media content increase.

This was not the only time that audience activity was used to understand Uses and Gratifications associate with television news consumption. In order to test these ideas again Rubin and Pearse (1987b) conducted a study looking at the specific gratifications that come from viewing television news. Pearse eventually broke off and conducted her own study in 1992 in order to understand how people use local news content. The study was intended to show the correlation of how people use local news content with Uses and Gratifications Theory. Pearse recruited college students to collect her data by offering extra credit to those who would conduct qualitative interviews. The interviews were conducted with adults, not enrolled in college, that watch local news at least once a week. The study found that the motivation for watching local news programming was directly linked with specific parts of the newscast. It also found that motivations for that interest were based in psychological needs. When looking at this study through the lens of potentially having the ability to interact with the media, it would be interesting to know if people would have jumped straight to the part of the newscast that gratified their needs. That is one of the things that we hope to be able shed some light on during this study.

Rubin furthered the study of media uses and effects in 1994 with his 5 contemporary assumptions. The first is that communication behavior, including the use and selection of media, is motivated, purposive, and goal-driven. The second assumption is that people take initiative in satisfying their needs and desires by using and selecting a specific vehicle of communication. Third is that a host of social and psychological factors influence the people and their communication behavior. Fourth, media is constantly competing with all other forms of

communication vehicles for attention, selection and use in order to gratify the needs and want of the individual. Fifth is the assumption that people are generally more influential than media in relationships, but not always. This study intends to take these assumptions and generally reinforce them while providing a more evidence for them through the choices and selections made by those viewing interactive news.

With the development of the Internet as a source of news, a completely new avenue of research is opening up. Not only that, but a completely new choice has to be made about how to gather news information. Althaus and Tewksbury (2000) were two of the first to start looking at online news sources in research. They looked at students enrolled in a university because of the automatic need for these students to use and understand the Internet. It is so interwoven into the lives of college and university students that the campus where the study took places was recognized as one of the five most “wired” campuses in the country (Althaus & Tewksbury, 2000). The study was conducted through a self-administered questionnaire. Althaus and Tewksbury found that students use the Internet first for entertainment and second as a news source. They also found that the use of the Internet as a news source closely corresponds to newspaper readers, but not television viewers. These finding are significant to interactive news because it shows that people who gather their news from television still prefer to do so, even with the opportunity provided by the Internet. That means that the ability to interact with information that the Internet provides needs to be incorporated into the traditional broadcast news delivery system somehow.

With the continuing advancements in communications theory many people ask if Uses and Gratifications should continue to get the attention that it has since its conception. Ruggiero (2000) in his review of Uses and Gratifications through the 21st century argues that the use of

this theory is a benefit to the field of communications research. He touches on all of the research that has been done since the 1940's and concludes that the future development of communications research needs to include the theory of Uses and Gratifications because of its ability to help in the initial stages of each new mass communications medium, especially the Internet. That is no less significant with Interactive News.

In applying the importance of Uses and Gratifications to the Internet as discussed, Ruggiero, Charney and Greenberg (2002) looked at a survey that had been conducted in 1996 and found eight dimensions to the Uses and Gratifications theory as it applies to the Internet. The most dominant of these dimensions is the idea of keeping informed. The others included: diversion/entertainment, peer identity, good feelings, communications, sights and sounds, career, and coolness. These dimensions just add to the question of how the Internet competes with traditional media. Dimmick, Chen, and Li addressed this issue with their research in 2004. They start their article talking about the popularity growth of the internet and then introduce how they did their research. They conducted a telephone survey where 211 people responded from the Columbus, Ohio metropolitan area. One person from the home, 18 years or older, was selected to answer the eight questions from the survey. The results found that the Internet has a bigger effect on television viewers than it does on newspaper readers. It also shows that information on the Internet does compete with traditional news media when it comes to daily news. De Waal, Schoenbach, and Lauf (2006) were able to support those numbers with their study as well. They found that online newspapers were used in a complementary way. The only negative impact that could be seen between the amounts of time spent reading online news and traditional media was in television. The more time spent online, the less time spent in front of the television.

Schoenbach, de Waal, and Lauf (2005) also found that reading the newspaper online does not increase the amount of knowledge that a person get from reading the printed newspaper. The purpose that the online version serves is to update information already received.

Uses and Gratifications Theory has a lot to teach us about interactive news and the effects that it has on those that use it.

Push/Pull Theory

Traditional television, according to Zhao (2003), would be seen as a push-based media type because what the media consumer receives is determined by the choices of the producer. They decide what they want to create and then send it out over the airwaves to those who choose to consume. On the other hand, it would be determined that the internet is very much a pull-based media type (Zhao, 2003). The media consumer has the power to search and retrieve the information that they want to consume.

In the past, many people assumed that, because of the delivery system, and the push model is more effective at reaching a large audience. However, just a few years ago a study was conducted using an experimental prototype that showed pull-based systems outperformed push-based ones (Aksoy & Leung, 2004).

For years researchers have been looking to combine the two styles effectively. In 1997 Acharya, Franklin, and Zdonik took a broadcast system and added a backchannel to allow people to send requests for specific information to the data server. Zhao, in his thesis, suggests two such combinations. The first is called the Hybrid push-pull Model. In this situation the producer creates media, but it isn't delivered to the consumer until they "pull", request, it. The Second combination is called the Hybrid pull-push Model. This is realized when both the producers and

the consumers are passive. The media itself gathers information about the consumers and then provides it to the producers.

Interactive Media Studies

In 1998 a study was conducted to look at interactive advertising with the focus of the dialogue between the manufacturer and the consumer. In this study people were able to interact and move through advertising with relative ease. Because the consumer was given so much control they were able to bypass the intention of the manufacturer which was to persuade the purchase of a product (Bezjian-Avery, Calder, & Iacobucci, 1998). From this research the authors concluded that interactive isn't always the best way to go, but I suggest that it isn't the interactivity, but the lack of structure. One of the great things about traditional broadcast television is the exposure of the audience to new ideas and concepts. With pure interactivity the news consumer could avoid being introduced to the overall content of the news. However, with a more structured delivery system, exposure would be preserved while allowing for the individualistic control of interactivity.

Ten years later, Helen Kennedy wrote an article in conjunction with a study that looked at the attempts of Project @pple to create an experience that was completely personalized. Project @pple is a cross-disciplinary initiative that focuses on helping people with learning disabilities use the internet. She found, because of the lack of a structured system, it was difficult for the group to deliver the amount of content needed to have things run smoothly (Kennedy, 2008).

A large number of interactive media studies have focused on the use of online newspapers for their research (Friedland & McLeod, 1999; Lowrey, 2003; Tezon, 2003). However, some authors have pointed out that when discussing interactivity it is important to distinguish between medium interactivity and human interactivity (Lee, 2000; Stromer-Galley,

2000). Their research points to medium interactivity as the interaction between a user and the system/document or content that is produced. This is the type of interactive technology that ICE has focused on in their work.

Organizational Overview

This research is being performed on behalf of a research lab in the computer science department of Brigham Young University (BYU). The name of the lab is closely associated with its objective, Interactive Computing Everywhere. The lab is run and directed by Professor Dan Olsen, a member of the board of Utah Science, Technology and Research (USTAR) as well as the Vice President of Publications for ACM SIGCHI – Special Interest Group on Computer-Human Interaction (icie.cs.byu.edu/dan.html). Olsen works at BYU as a professor of computer science. The purpose of his lab is to assist in the discovery of new means of “(pushing) human computer interaction into all of the situations where people work, live, and play” (<http://icie.cs.byu.edu/>).

As Olsen works to fulfill this purpose the lab is structured with him as the supervising professor for, on average, five to six graduate students. Each of the students are working on different projects that help meet the directive of the lab and Computer Science Department of BYU. Each week Olsen has a one on one meeting with every member of his lab to ensure that goals are being met and objectives achieved. Some of the other products that have come out of the lab include Time Warp Sports, Wireless Pixels, Light Widgets, and Spilling just to name a few (icie.byu.edu). In addition to creating and developing these technologies, Olsen looks to file patents with the US government for the advances he and his students are making. After those patents are filed and approved, he is more than willing to entertain offers from outside sources to purchase them, thus benefitting his lab as well as the university it represents.

The development of Interactive News is an expansion of Olsen's focus on interactive television; one more way he is attempting to influence the way people interact with computers in their everyday life. In 2009 Olsen oversaw the first in-home trial of Interactive News his lab conducted. That study was done by taking a five o'clock local news broadcast and changing the delivery method of that newscast to allow for the viewer to access additional information. The news was produced and delivered to 10 homes that were selected in the greater Provo, Utah. The small sample was determined by physical equipment as well as needs to limit the geographical area allowing for easy technical assistance. Each of the homes involved in the study was equipped with a small computer that was connected to the internet and their homes' primary television. Personal instruction was given to each participant, and tutorial videos were always available for retention purposes. Every action taken by the participants was tracked and logged by students in the lab, and following the study, a survey was conducted with each family in order to gather feedback as to the use, effectiveness, interest, suggestions for improvement (Bunn, 2010).

The purpose of this project is to expand the understanding received during that first Interactive News trial. During the first study the students used content from one news source exclusively. They gathered video of complete interviews and press conferences to gauge the interest of individuals to get more information than producers and reporters chose to include in their stories. This project looks to gauge the interest of people to compare the same report from multiple sources as well as the option of getting historical context on the information being produced. Once this project is done the technology can be altered to reflect the findings of both studies in order to create the most user-friendly product possible for Interactive News viewing.

Preliminary Work

Using the tracking results and feedback received from the individual participants of the first in-home trial, students in the lab, under the direction of Dr. Olsen, worked to improve the technology and change the scope of the delivery system. There were changes made to the video player, editing software, and production tools, as well as the methods used to convert the video into usable formats for delivery. After those adjustments were made, it was necessary to rebuild the historical content that would be available to the system. Weeks were spent recording the daily five o'clock newscast of the local broadcast television stations, and then that video was annotated and produced into a daily interactive newscast.

The process that was undertaken to convert the recorded video into an interactive experience starts with chopping the source video into individual stories and teases. After that is completed for the duration of the video, the producer creates a new newscast in the video annotator, creates a new story for each of the video pieces that have been cataloged, and then links the video pieces to their corresponding stories in the newscast. Once this is completed each of the stories is assigned a subject and a category, which allows for better organization and search capabilities inside the program. After the subject and category are associated with a specific story the producer then determines which associated stories to make available as alternate view points or historical context to each. Having assigned all of the extra material, the producer is ready to publish that newscast for that day.

One of the main responsibilities that I had in preparing for this project was to make contact with the local news organizations in order to seek their cooperation in this research. Although the laws in the US Code that refer to "fair use" (2010) allow for research to be conducted under certain parameters without consent from the original producers of content, we felt it to be important to have their cooperation. We also are hoping to be able to share our

findings with those organizations after the research has been conducted. I made a phone call and received verbal confirmation from each of the three local news stations with regards to their willingness to cooperate with us in this project.

The next responsibility that I had was to start building Interactive News, using the recreated tools, in order to verify that it would be functional for use in the project. I created over 25 newscasts in order to provide historical context as well as gain familiarity with the production tools that would be used during the in-home trial.

Meetings with the research team were held on a regular basis in order to make sure that goals were continually being met and progress towards the project was made.

In order to find people willing to participate in the project, I also helped in distributing a survey (Appendix 1) via social media and email in order to find a sample size of 100 households that are heavy news consumers, over the age of 18, and within a specific geographic area in order to facilitate technical assistance when needed. The purpose of this survey is solely focused in the locating and selecting of volunteers that are willing to help us throughout this project.

Chapter 3: Logistics

This project, for the students in the ICE lab, was a very long commitment with a narrow focus. For other participants in the research it was relatively quick. Following the last in-home trial, the computer science students spent months updating and refocusing the software needed for this project to be carried out. It was also necessary to record and classify month's worth of stories from local newscasts in order to provide historical content.

Because the participants were selected previously, the project itself only took four weeks to complete. The first two weeks were used for the technical runs of the interactive newscast to ensure that the production delivery was reliable and efficient for the duration of the study. While the technical runs were being conducted, ten households were selected and allowed the researchers access to their homes in order to install hardware in their homes giving them access to the Interactive News via their television rather than their computer.

After the technical runs were completed the ICE Lab students addressed all of the necessary issues that while the student producers continued to accumulate and edit relevant news stories as historical information for the actual project launch.

The next two weeks of the study involved four editors producing the Interactive News during the hours of 4:30-7:30 pm each night during the week from Monday to Friday. Olsen and a few of the computer science students were on hand in case of software issues or program malfunctions. Each of the study participants was able to access the Interactive News after eight o'clock in the evening on the day it was originally produced. They were also reminded to watch the Interactive News on a daily basis via an email sent out directly after the newscast is made available.

After two weeks of daily Interactive News had been produced, the research staff retrieved the hardware from the ten households, and analyzed the data retrieved from the individual participants in the study.

The actual newscast produced was ultimately a compilation of three local newscasts and five national news programs in order to give the user a wide variety of options from which to choose their information. We were unaware exactly how people would use the technology provided for them. That was the purpose of this project, to discover how and why people use it and what needs they might feel it gratifies. Based on conversations held with local news providers, as well as considerations for fair use law, we had to limit our sample size to 100 households in order to avoid affecting the overall market share of each news organizations that were cooperating with us in this project.

Budget

In order to conduct this research, the ICE lab needed to secure funding to be spent in a variety of ways. (Table 1)

Table 1: Costs of Production for Interactive News

• Salary for two computer science research assistants	\$12/hr.
• 2 Desktop Computers	\$4000
• 7 Dell Studio Hybrids	\$2800
• 4 Mac Mini Computers	\$1600
• Salary for four student producers	\$800
• 11 Gyration Air Mice	\$770
• Cloud Server Access	\$400
• 5 Copies of Expression Studio Software	\$350

- 5 TV Tuners\$250
- Ethernet/HDMI/RCA Cables\$250

Each of these financial obligations was met by the ICE lab itself, and all of the participants involved in the project are strictly volunteers, so no other expenses were incurred.

Personal Responsibilities

My responsibilities were found in a variety of categories. The first was to continually monitor the editing performed by the four student producers. Because of my experience working as an editor and my foreknowledge of this project and its technology, I was uniquely qualified to do this. My next responsibility was in maintaining the relationships established with the local news organizations that had agreed to cooperate with us on this project. I was also responsible for the assembly of the actual Interactive News every night for the duration of the project. I had to take all of the work that had been done by the student producers and combine it into one interactive newscast experience. From the beginning, I had served the ICE lab as a communications consultant by helping them to understand how the production tools should work in the professional world as I give feedback, suggestions, and pose questions to those helping to create the tools that were used. Another of my responsibilities was to use my personal social network to find the people who will be willing to participate in the project. After the research had been completed, I was also asked to help give presentations on our findings to the local news organizations so that we could help them learn more about their audience and what they would like to see.

Chapter 4: Methods

The scope of this project dictated that we have a purposive sample for multiple reasons. The first reason is that in order to be in compliance with laws of fair use we had to take into consideration “the effect of the use upon the potential market for or value of the copyrighted work” (United States Code, 2010). In other words, we couldn’t potentially jeopardize the market share of any of the news organizations that had agreed to cooperate with us in this project. Therefore we limited our sample size to 100 households.

The second motivation for the use of a purposive sample was based on the results we were trying to find. Because of our limitations in regards to the number of households that could participate, we needed to be ensured that the participants selected truly consume news on a regular basis, thus giving us a true picture of how people, that actually watch the news, would change their current viewing habits in order to allow for the incorporation of interactivity.

As the project began, the ICE lab recorded the 5:00 pm local and 5:30 pm national newscasts for NBC, CBS, and ABC. While each of the newscasts was being recorded the student producers began to build an interactive newscast for that specific broadcast using the News Annotator program the computer science student built for this project. For each story that was presented by the anchors of the respective stations, the producer created a story with the appropriate subject and category necessary for its use in the interactive newscast later on.

After the newscast had been created by the producer, the recorded video had to be converted to the proper file type and then uploaded to the ICE server. Once the video was on the server, the producer started to edit the video into the small pieces that correspond with the stories they created for their newscasts. Having the video edited down into the individual stories, they were then able to link the video to the individual stories in their newscast.

My daily responsibilities in the project began with the recording of mid-day national newscasts. FOX News was recorded at 11:00 am followed by CNN at 1:00 pm. The delay between the broadcasts allowed me the time necessary to follow the same steps as the student producers in creating the interactive version of each station's content.

After the students had finished their work with the local and national newscasts for their assigned stations, it was my responsibility to take one of those newscasts and use it as the backbone/foundation for the Interactive News. The foundational newscast was selected by Olsen based upon previous cooperation from one of the local stations and that station was consistent throughout the study. In order to create the Interactive News I went through each individual story and first linked all of the other stations' reports of that same story. Once that was done I looked through all of the stories in the system that had the same "subject" and "category" so I could link that specific story to the historical and thematic background that was deemed to be related. Having linked all of the appropriate information to the individual stories, I published the newscast to the site that was used by the viewers to watch Interactive News. This process was repeated every day for two weeks, after which I was in charge of putting the analysis of our results into a coherent presentation. That presentation was given to local news organizations for their review and consideration moving forward.

Because of the experimental nature of the project, it was difficult to gauge the effectiveness of Interactive News itself. Even the information regarding what people didn't like about the product is considered helpful. Everything that people do while watching the Interactive News was tracked and monitored, showing us what information they pulled, and what information they allowed to be pushed to them. Having this information allows us to see, based in Uses and Gratifications Theory, how and why people were using this technology.

Project Objectives

One of the things that we were concerned about with this project was lack of daily participation from the households chosen to participate. Unfortunately the nature of using volunteers as participants in a research project isn't as reliable as conducting other types of research such as an ethnography or case analysis. However, regardless of the limitations in this project, the project objectives remain the same.

PO1: Gather the source news material for adaptation into an interactive platform.

PO2: Deliver interactive news content over the internet.

PO3: Track and analyze the specific actions taken to gather feedback

Chapter 5: Results

PO1: Gather the source news material for adaptation into an interactive platform.

The first variables that needed to be tracked and reported in this study related to the information that was received from the local and national news sources. An hour of daily newscasts from ABC, NBC, CBS, CNN, and Fox News were recorded for four weeks. ABC, NBC, and CBS each had two newscasts lasting approximately 30 minutes, one local (ABC 4, KSL 5, KUTV2) and one national (ABC World, CBS Evening, NBC Nightly). CNN and Fox News were each hour long news programs that were nationally based. Due to the change in programming from weekends to weekdays, the study focused on the news delivered Monday through Friday of each week. The first two weeks of recordings were used as a trial run in order to make sure that the process of delivery was working correctly. Over the second two weeks the interactive news was available to the participants of the study for consumption.

As you can see in the table below, (Table 2) the running time of the source newscasts, after extracting the commercials, differed slightly from day to day and when comparing the different networks.

Table 2: Length of source newscasts after removal of commercials

Newscast Length (minutes)	Min	Max	Average	StdDev
ABC 4	14.5	23.8	17.9	2.61
ABC World	14.8	26.8	18.8	3.05
CBS Evening	18.5	19.3	19.0	0.27
CNN	19.1	43.6	32.7	6.71
Fox News	27.5	36.5	34.1	3.10
KSL 5	17.1	25.3	20.2	2.08
KUTV2	16.1	19.6	17.9	1.04
NBC Nightly	16.2	21.6	18.9	1.33
All Stations	14.5	43.6	22.2	6.88

For the purposes of this study, we extracted the commercials from each of the newscasts in order to gain a better understanding of how people interacted with the news free from influence of variables not produced by the study itself.

Each of the newscasts was broken down into stories that could then be combined and manipulated in order to give the viewer/participant the ability to interact with the news in a way that made sense to them. During the two weeks of the trial run, and before, over 1000 stories were produced and recorded for use as historical content. This was done in order to give the viewer the ability to familiarize themselves with the story if the current piece was a follow-up to something that had been produced previously. Having access to this information was also a quick way to refresh their memory of information if they had seen it before. The two weeks of the actual study produced 978 stories over the 10 days and eight newscasts per day. Table 3 has the breakdown of the number of stories found in each newscast.

Table 3: Number of stories per newscast

Number of Stories	Min	Max	Average	StdDev
ABC 4	13	21	16.5	2.51
ABC World	7	11	9.2	1.14
CBS Evening	8	13	10.4	1.51
CNN	4	21	15.8	5.12
Fox News	8	13	10.1	1.54
KSL 5	14	22	17.1	2.47
KUTV2	8	13	10.1	1.45
NBC Nightly	9	14	11.2	1.87
All Stations	4	22	12.5	3.90

Table 4: Average story length broken down by newscast

Story Length (seconds)	Min	Max	Average	StdDev
ABC 4	14	266	72	59.63
ABC World	19	607	123	86.01
CBS Evening	11	331	110	79.34
CNN	15	1815	124	170.76
Fox News	15	622	202	142.05
KSL 5	13	399	71	57.44
KUTV2	20	221	106	52.01
NBC Nightly	11	263	101	70.88
All Stations	11	1815	108	104.35

The table above (Table 4) lists the average story length for each of the different newscasts. In all there were just over 2000 stories created for use with this interactive system.

To make things easier to categorize and allow for more accurate access to historical information one of the steps that was taken by the producers of the interactive news was the assignment of a subject to each story. There were 82 subjects created in preparation for the study and during that two week period another 206 were added for a total of 288 subjects.

PO2: Deliver interactive news content over the internet.

After gathering the news content from our eight source newscasts the information was reassembled into one daily interactive newscast and made available by 8:00 pm every night. Under ICE lab direction the KSL 5 newscast served as the foundation for the interactive news. Over the course of the two weeks there were ten interactive newscasts created. The length of these newscasts varied depending on the elements of the source news that were left out. (Table 5) These elements included commercials, headlines, and teases going into a commercial break.

Table 5: Statistics of the 10 interactive newscasts

Newscast Statistics	Min	Max	Average	StdDev
Newscast Length (minutes)	17	25	20	2.08
Number of Stories per Newscast	14	22	17.1	2.47
Number of Headlines per Newscast	2	5	3.5	0.85
Number of Pitches per Newscast	2	10	6.4	2.37

Each of the newscasts started with a small number of introductory video pieces that highlighted stories from the newscast. Viewers were able to indicate whether or not they wanted to see that particular story as part of their newscast. Once that selection was made the system would reorder the stories to reflect the preferences expressed without ever deleting information or available stories. Twenty percent of the available stories had an introductory piece referred to as a headline (Table 5). Because of the inability of the ICE lab to produce its own video pieces, the selection of which videos received headlines was based solely on what was delivered by the source news organization.

Another element of interactivity created for the use with the interactive newscast was the inclusion of direct invitations to watch extra material. 50% of the stories had extra content associated with them and that content was introduced in one of two ways. The first was a visual and audible piece of video directly after a story that mentioned a few pieces of video that might be of interest. This invitation is called a “pitch”. 37% of the stories in the interactive newscast had a pitch associated with them in order to entice participants to view extra material (Table 5).

The second direct invitation created was a bar graphic over the top of the screen that informed the viewer of content that might be of interest. This graphic is referred to as a “prompt”. While the structure of the interactive news only allowed for a possibility of one pitch per story, the number of prompts is only determined by the amount of extra content the a producer would wish to highlight. 27% of the stories in the newscast had prompts associated with them.

The extra content available through the interactive newscast was divided into three different classifications. However, only two of them were introduced by these direct invitations. The first is and “alternate viewpoint”. This means that the extra material is a story from a different station, possibly giving a different perspective, of the same event or subject. The second classification was “related story”. In other words the extra material was based on the same topic but wasn’t based on the same story. For example if two different stations produced stories about the same missing girl they would be considered “alternate viewpoint” stories. However if a stations produced a piece on how to protect children from abduction, that would be considered a “related story”.

The third classification for extra content was “historical content”. Every story that shared the same subject would automatically populate the historical content menu in reverse chronological order based on when the story was produced. Due to the ease of the system in providing this information to the viewer, 92% of the stories in the interactive newscasts had historical content associated with them. Over the course of the two week study 72 subjects were used to classify historical content for the newscasts.

171 stories were created for the ten interactive newscasts. They varied in length, but the average was 71 seconds (Table 6). Not all of the stories had extra content associated with them,

but 95 % of them did. There were 201 pieces of extra content excluding those that would be classified as historical content; 125 alternate viewpoints and 76 related stories. Table 7 shows information about the length of those pieces as well as where they came from. The exclusion of KSL 5 from the list is because all of that footage was original content being shown as the interactive newscast, and old footage from KSL 5 would be classified as historical content.

Table 6: Story statistics from 10 Interactive newscasts

Story Statistics	Min	Max	Average	StdDev
Length (seconds)	13	399	71	57.44
Number of Prompts per Story	0	4	0.40	0.74
Number of Extra Content per Story	0	7	1.18	1.62
Number of Historical Content per Story	0	138	25.26	34.26

Table 7: Length of extra content included in study broken up by station

Extra Content Lengths (seconds)	Min	Max	Average	StdDev
ABC 4	14	293	70	59.90
ABC World	25	266	114	77.14
CBS Evening	15	331	114	90.77
CNN	21	1815	210	382.52
Fox News	25	505	218	145.76
KUTV 2	27	218	106	54.80
NBC Nightly	11	214	115	63.22
All Extra Content	11	1814	124	173.02

In selecting participants for the interactive news study, an on-line survey addressing questions of news interest, internet availability, willingness to participate, and other demographic issues was taken by 377 people in the Salt Lake City, Utah area. Because of the use of Utah news for the study, it was important that the news delivered would be of interest to those watching. Of those surveyed, the number of people, over the age of 18, willing to participate was 128 (Tables 8-11).

Table 8: What is your age?

Age	# Responses	%
18-24	35	27
25-34	65	51
35-44	10	8
45-54	12	9
55-64	5	4
65+	1	1

Table 9: What is your sex?

Sex	# Responses	%
Male	60	47
Female	65	51
No Response	3	2

Table 10: What type of news consumer would you consider yourself?

Type of News Consumer	# Responses	%
Light (0-2 hours a week)	38	30
Average (2-6 hours a week)	57	45
Heavy (6+ hours a week)	32	25
No Response	1	1

Table 11: What time of day do you consume most of your news information?

When	# Responses	%
12 am – 6 am	5	4
6 am – 9 am	33	26
9 am – 12 pm	19	15
12 pm – 4 pm	19	15
4 pm – 6 pm	7	5
6 pm – 7 pm	9	7
7 pm – 8 pm	5	4
8 pm – 9 pm	4	3
9 pm – 10 pm	14	11
10 pm – 11 pm	10	8
11 pm – 12 am	2	2
No Response	1	1

Ten of the 128 volunteers allowed for a small computer to be set up in their home giving them direct access to the interactive news via their television. These ten homes were chosen based on criteria provided by the ICE Lab for ease in technical support and internet speed. Each of the small computers was hard-coded to distinguish their actions from other users.

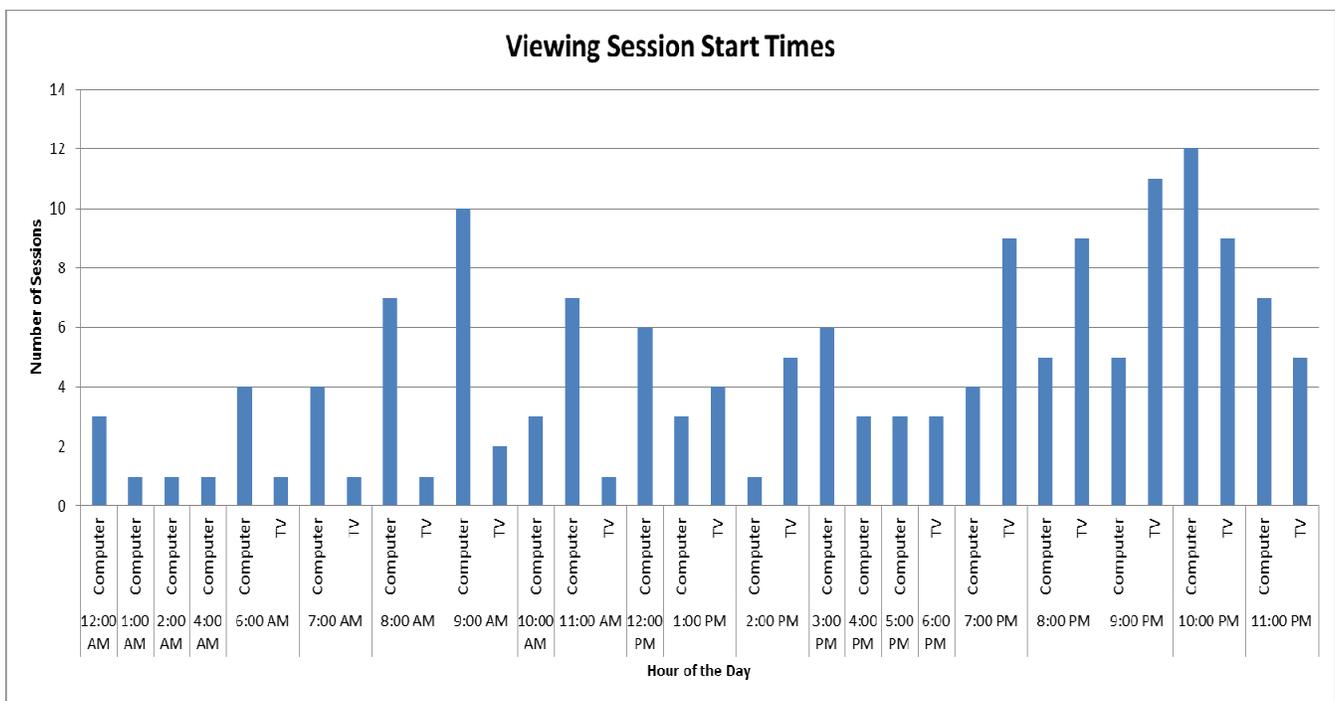
Every night during the two week study an e-mail was sent out to those 128 volunteers with a link to the interactive newscast as well as a reminder about what the study was trying to accomplish. Besides the 10 television users, there were 36 participants who watched the interactive newscast via their computer. Due to the nature of the system it was impossible for us to determine which of the 128 volunteers were included in the group of 46 that actually participated in the study.

PO3: Track and analyze the specific actions taken to gather feedback.

For the purposes of this study we defined the period of time from the initiation of a newscast until it was exited as a “session”. That means that as long as someone is making selections and interacting with the available content there is no limit to the length of time that a session can last. Participants even have the options of starting one session right after another if they choose to watch multiple newscasts in succession. It was important to automatically track all of the actions taken by the participants, because asking participants to remember everything that was done and the amount of time spent in a newscast would be unreliable at best. Over the two week study 157 sessions were created.

One of the basic functions of the interactive newscast is the ability people have to watch it whenever they want. This applies to time of day as much as it does to day of the week. We can see the number of sessions started during every hour of the day in Figure 1. People accessed the computer version of the interactive newscast pretty consistently through the day while the traditional television users were more active in the evening.

Figure 1: Session start times throughout the day



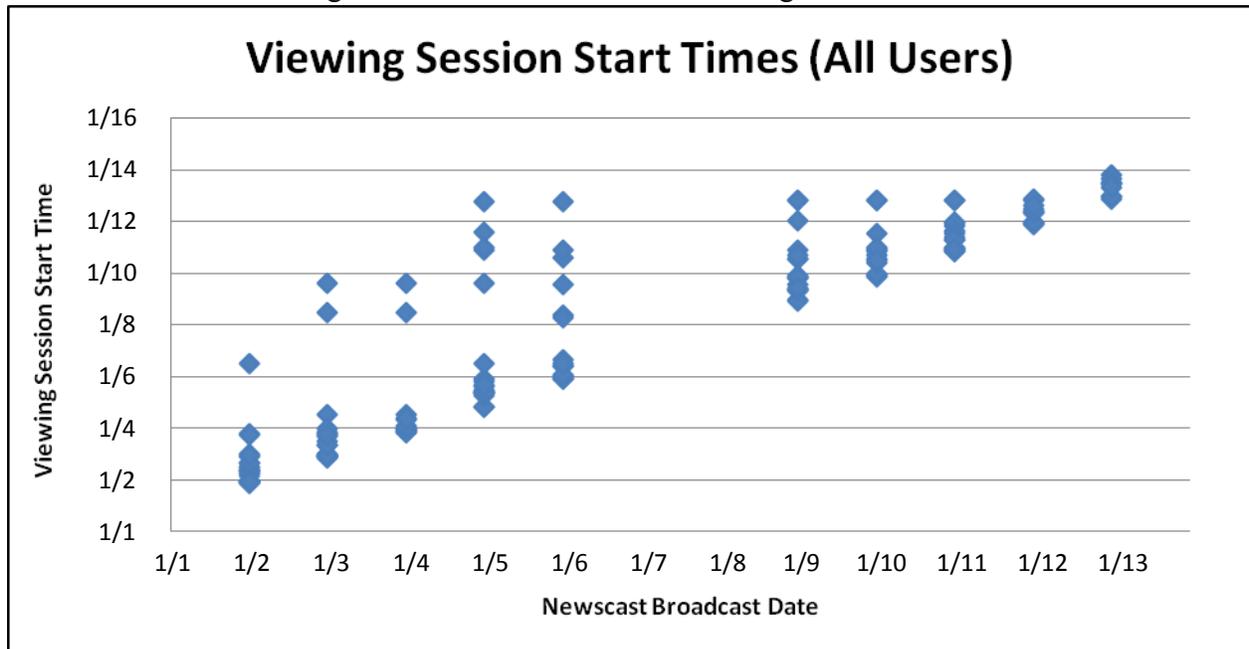
While this information is interesting, it is also important to note that people also delayed the viewing of the interactive newscast until a day or two later based on convenience. Table 12 shows that delay to be more substantial than originally expected. 59% of sessions viewed on television were started within first 24 hrs of their availability while 76% of the computer sessions were started in the same window.

Table 12: Session time delay before viewing (hours)

	Min	Max	Average	StdDev
TV	0.06	190.92	35.19	48.26
Computer	0.03	161.65	23.69	31.33

The delay in different newscasts can be seen a little more clearly in Figure 2.

Figure 2: Session start times according to newscast



The gap seen on 1/7 - 1/8 is due to the fact that an interactive newscast wasn't created during the weekend between the two weeks of the study. Figures 3 and 4 show the number of sessions on both the computer and television.

Figure 3: Number of sessions per day for computer users

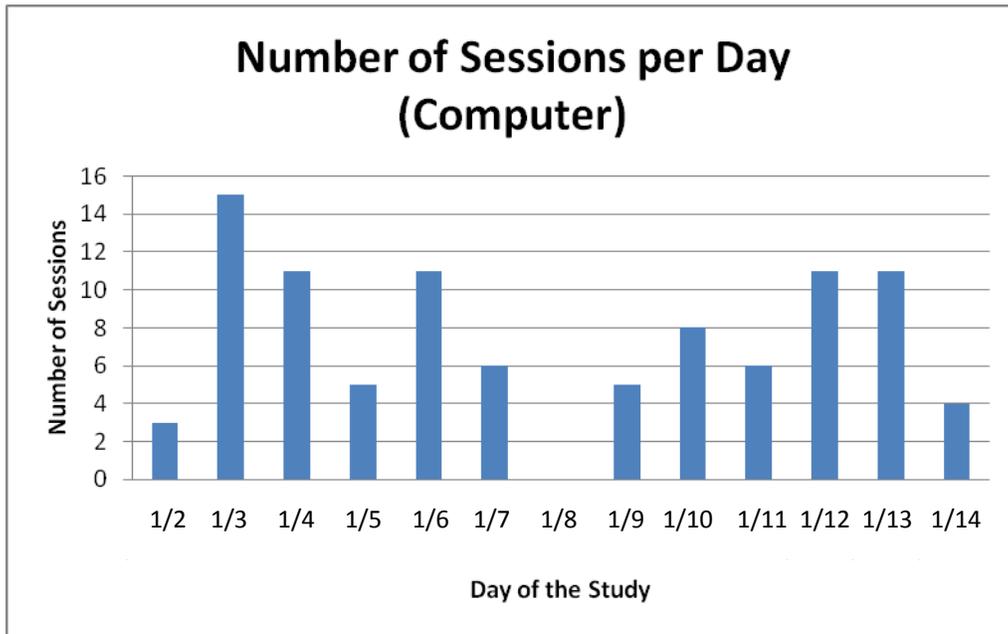
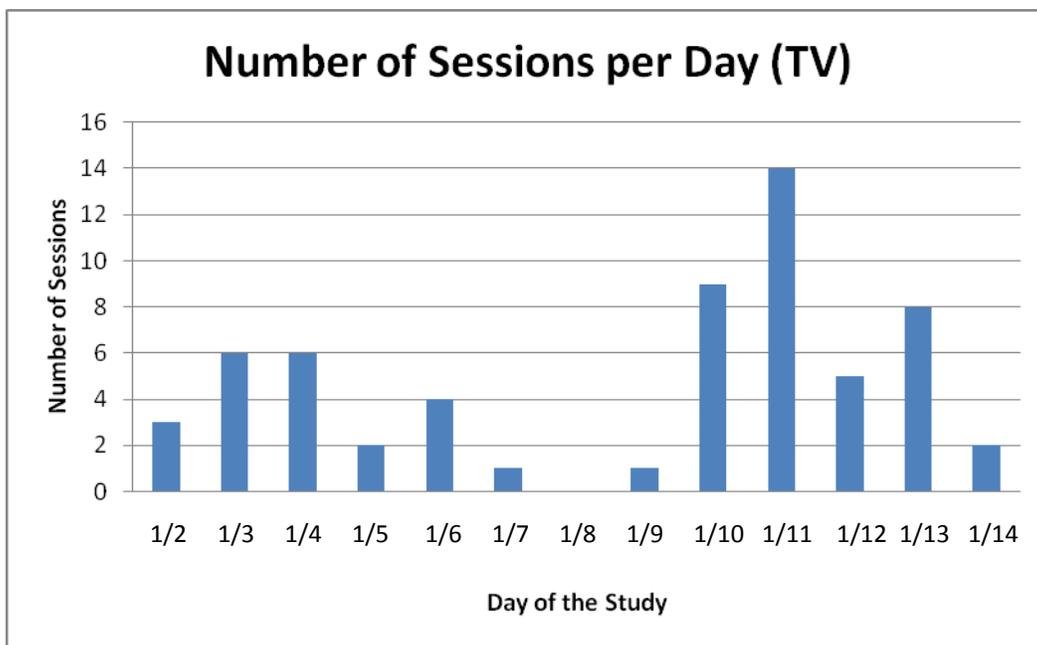


Figure 4: Number of sessions per day for television users



With the structure of a session being what it is, each user was able to view the content in a personal way. However, over the course of the study, participants actively watched 40% of the

base newscast in every session. When you include the viewing of extra content, the percentage of time spent watching the interactive news increases 3-7% based on the medium used to view the session. In Table 13 is listed the average of the different content and how that compares to the length of the base interactive newscast as a whole.

Table 13: Averages of content used per session

Per Session Averages		Week 1	Week 2	Overall
Base Story Content Watched (minutes)	TV	9.44	8.92	9.11
	Computer	7.03	8.32	7.64
Ratio of Base Story Content Watched to Newscast Length	TV	50%	43%	45%
	Computer	36%	40%	38%
Extra Content Watched (minutes)	TV	1.84	1.16	1.41
	Computer	0.37	0.69	0.52
Total Content Watched (minutes)	TV	11.28	10.09	10.52
	Computer	7.40	9.01	8.16
Ratio of Total Content Watched to Newscast Length	TV	59%	48%	52%
	Computer	38%	43%	41%
Session Length (minutes)	TV	13.46	12.00	12.53
	Computer	9.73	11.55	10.58
Ratio of Session Length to Newscast Length	TV	71%	58%	63%
	Computer	50%	55%	53%

Keeping in mind that each interactive newscast had an average of 17.5 stories, it was discovered that participants in the study, on average, started 13 of them, and only finished 6. That means that 45% of the stories available were watched to completion. If the stories that were viewed for less than five seconds are excluded, the completion percentage increases to 52-58%. Extra content completion percentages were around 45%, with the exception of computer users which saw an increase to 51% (See Tables 14 and 15).

Table 14: Story completion averages

Per Session Averages		Week 1	Week 2	Overall
Base Stories Started	TV	14.21	12.95	13.75
	Computer	11.94	12.11	12.02
Base Stories Completed	TV	6.55	6.59	6.57
	Computer	4.49	5.89	5.15
Percent Base Stories Completed	TV	49%	46%	47%
	Computer	37%	50%	43%
Extra Content Started	TV	2.55	1.41	1.82
	Computer	0.47	1.07	0.75
Extra Content Completed	TV	1.41	0.49	0.82
	Computer	0.22	0.64	0.42
Percent Extra Content Completed	TV	60%	34%	45%
	Computer	42%	61%	51%

Table 15: Loss of interest averages

Per Session Averages		Week 1	Week 2	Overall
Average Time Before Exiting Story per Session (seconds)	TV	45.58	37.76	40.63
	Computer	41.00	48.94	44.63
Average Ratio of Exit Time to Story Length	TV	64%	61%	62%
	Computer	53%	64%	58%
Average Time Before Exiting Extra Content per Session (seconds)	TV	43.28	57.03	51.19
	Computer	49.03	40.93	44.87
Average Ratio of Exit Time to Extra Content Length per Session	TV	74%	59%	65%
	Computer	63%	70%	67%

When it comes to the special features of newscast the participants all had different preferences to how they would interact with the content. First were the headlines and selecting whether or not to watch a story based on that introduction. 55 % of the headlines that were available received a positive or negative rating. As you can see in Table 16, television viewers tended to be more positive than negative while computer users were the opposite.

Table 16: Story headline ratings

Story Ratings		Week 1	Week 2	Overall
Rated Positively	TV	43%	35%	38%
	Computer	19%	25%	22%
Rated Negatively	TV	23%	14%	17%
	Computer	36%	31%	33%
No Rating	TV	34%	51%	45%
	Computer	45%	44%	45%

Once viewers watched the headlines and were viewing the actual newscast, they were very active in how they watched the news and consumed the information available. Whenever there was a change in content, with computer users, 92% of the time it was due to a choice that was made. Television users, on the other hand, were even more active making a conscious choice to change content 100% of the time (See Table 17).

Table 17: Percentage of decisions made actively after newscast headlines

		Week 1	Week 2	Overall
Actively Makes Content Choices in Session	TV	100%	100%	100%
	Computer	94%	89%	92%

With that type of consistency it is easy to understand that, on average, there was a choice selection being made more than once a minute (See Table 18).

Table 18: Average time between content choices (in seconds)

		Week 1	Week 2	Overall
Average Time between Content Choices	TV	63	54	57
	Computer	45	59	52

Because of that frequency, the next question to be answered was what actions were being used to make those choices. The “play next” function was used about 70% of the time (Table 19). This feature allows the user to jump directly to the next story in the newscast.

Table 19: Method used to change the current story playing

Method of Interaction		Week 1	Week 2	Overall
Play Next	TV	77%	72%	74%
	Computer	71%	60%	66%
Play Previous	TV	55%	33%	41%
	Computer	75%	60%	68%
Play from Menu	TV	59%	46%	51%
	Computer	22%	36%	28%

Understanding how people navigated through the base newscast, it was then necessary to discover how they accessed the extra content available. 30% of the television users and 55% of computer users didn’t access any of the extra content. However, with the three options of how to

view extra content, it is interesting to note that most people choose one method of access and stuck with it. Very few used two means of watching extra content, and by the end of the second week, no one was using all three (See Table 20).

Table 20: Number of sources individuals used to access extra content

Number of Extra Content Sources		Week 1	Week 2	Overall
No Extra Content	TV	18%	36%	30%
	Computer	59%	51%	55%
1 Extra Content Source	TV	55%	54%	54%
	Computer	35%	47%	41%
2 Extra Content Sources	TV	18%	10%	13%
	Computer	6%	2%	4%
3 Extra Content Sources	TV	9%	0%	3%
	Computer	0%	0%	0%

127 pieces of extra content were viewed over the course of the two week study. Of the three sources for that extra content, both television and computer users gravitated more to the pitches than the prompts and menu options (Table 21).

Table 21: Methods of how extra content was accessed

Extra Content Source		Week 1	Week 2	Overall
Pitch	TV	50%	46%	48%
	Computer	25%	24%	25%
Prompt	TV	36%	15%	23%
	Computer	6%	7%	6%
Menu	TV	32%	13%	20%
	Computer	16%	20%	17%

Knowing that the pitch invitations were more effective in enticing people to watch extra content than the other two methods, the logical question to follow is how often were they effective? Table 22 gives us a clear view of the percentage of invitations that were actually accepted.

Table 22: Percentage of direct invitations taken

Per Session Averages		Week 1	Week 2	Overall
% of Pitches Taken	TV	31%	32%	32%
	Computer	22%	12%	17%
% of Prompts Taken	TV	20%	3%	9%
	Computer	2%	1%	1%

Chapter 6: Discussion

Now that we have the numbers, the big question is “So what?” “What does it all mean?” Well, the results gathered from this study tell a very intriguing story about how people would view news if given the opportunity to control it themselves.

While looking at the results found during this study it is important to understand the definition of a few key ideas such as interactivity and engagement. In 1992, Steuer defined interactivity as the scope of the users’ ability to participate in the modification of the format and content of a specific media message (Steuer, 1992). However, Liu and Shrum expanded on Steuer’s definition by stating that interactivity is the “degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized (Liu & Shrum, 2002). Interactive news fits these definitions of interactivity by allowing the user to change the order, length, scope, and even availability of a story based on their personal preferences. They also shed light onto the classification of this medium as in interactive style of communication.

Using these two definitions we can see that there is still a lot that we don’t know about interactivity on a specific medium level. When it comes to new technologies like interactive news, part of the excitement is the way in which definitions and boundaries are challenged. With interactive news the element of interactivity described in these two articles is definitely there. But the question remains, is the percentage of interactivity expressed in this study a result of the medium itself, or are users truly engaged in the content they are consuming? When discussing the definition of “engagement”, it is said to be a collection of experiences that involve the subject or topic being considered (Mersey, Malthouse, & Calder, 2010). Engagement is not a singular event or moment in time. It is influenced by the overall knowledge and perspective that an individual has of a specific concept. Therefore, based on the definition of Mersey, Malthouse,

and Calder, it is difficult, if not impossible, to measure the true level of engagement experienced by a study participant. However, one can assume that level of interactivity recorded is, in part, related to whether or not the user was engaged with the content being presented.

Looking at interactive news through the scope of its history helps us to see why and how it was developed into what it is now. In the attempt of journalists to tell stories, there are two major questions that interactive news helps us to address. The first is the balance between convenient and accurate information. News producers want to make information available when people want it, but they want the information that is available to be complete and accurate. In modern times we have made significant technological advances with communication mediums towards both of these expectations. Newspapers gave people the ability to pick up the news and read it anywhere and anytime they wanted. It wasn't instantaneous or immediate, but it was convenient. People also knew that the information they were reading was limited in its accuracy due to the amount of time required to print and circulate it. With newspapers readers didn't have to get their news information at a specific time or based on proximity to a certain device. Later came the development of radio and television broadcasts and with them a faster way to get the news and information being sought. Watching or listening to those broadcasts, the audience knew that they were getting the most current and complete information available at that moment. However, due to the rigged structure of programming, the aspect of convenience was sacrificed. That is, until the VCR (television) and podcasts (radio) introduced the concept of "time-shifting". Time-shifting, or the recording of a broadcast for viewing later (Levy, 1981), allowed people the ability to get the immediacy of a broadcast with the convenience of a newspaper. Although this was a good solution for the time, based on the amount of delay between production and consumption, some of the accuracy of the information being reported wasn't as

current as it could have been had the information been provided precisely when the consumer wanted it. Now, with the incorporation of the internet, one of the benefits to gathering news information is that it is being constantly updated. This gives the producers the ability to maintain the accuracy of their information while being convenient for the user to access at any time.

The second of the questions addressed by interactive news is the balance between giving people information that they are interested in and continuing to introduce them to new ideas and topics they might not have been exposed to. Websites, blogs, chat rooms, and even cable television channels are generally geared towards a specific idea, topic, or audience. This allows people to find information that they know will be of interest to them with relative ease. However, using these communication methods to introduce new ideas or concepts to those audiences can be difficult. On the other hand, traditional broadcast channels, including the news, vary their content in order to appeal to a larger audience by having something for everyone.

In an attempt to solve this issue, some services on the internet have tried to use contextual advertising. They run computer programs on the internet that look for key words on the website you're visiting in order to place more enticing content in view. However, one of the downsides to contextual advertising is the sheer fact that it's advertising. Its motive is to get you to think or act a certain way. It is not meant to educate or expose the viewer to new information. With television or cable, each station generally targets a specific demographic and tries to assume what content or advertising might spark their interest. These approaches might address the problem, but the focus of interactive news is to introduce new information to the viewers on an objective and factual basis, while allowing people to avoid information that they already know they don't want receive.

Answering these two questions helps us to see the potential of interactive news. One of the most intriguing discoveries of this project was that on average people didn't watch the newscast until 24 hours later on the computer and 35 hours later on television. That means, with the newscast being available at 8:00 pm each night, television viewers, on average, were waiting to watch it until two days after the news was produced. Study participants also took the opportunity to watch older newscasts in order to catch up on what they had missed since the last time they had watched the interactive news. It was also found that computer users watched the newscast at all times of day, while television watchers views the interactive newscast predominantly in the evening. This finding directly challenges one of the basic newsroom philosophies that state that people want their news as instantaneously as possible. In addition, the 2011 article of Wonneberger, Shoenback, and VanMeurs supports the findings of this study. They said that the situational factors surrounding news consumption are seven times more influential than motivational factors when determining the amount of news consumed on a regular basis (Wonneberger, Shoenback, & VanMeurs, 2011). This explanation helps us to understand that convenience is more important than immediacy.

When considering the implementation of interactive news, a large fear of news producers, in giving the power to the viewer to skip things they're not interested in, is that viewers won't watch as much news programming in the long run. This is a very valid concern. Especially considering that the ad revenue news organizations receive is based on the amount of time viewers spend watching their program. During the study, it was found that participants only viewed about 45% of the base newscast content. Even when a viewer found a story they were interested in, they finished it less than 50% of the time, generally exiting the story about 60% of the way through. This information probably isn't the most comforting for news producers.

However when considering the extra content available as well, viewers spent the equivalent of 60% of the time they would have spent watching the original news consuming content that they were specifically interested in. This is a promising statistic, especially when it's coupled with the fact that the interactivity level was extremely high; 100% for television users and 92% for computer users. Instead of questioning whether or not the audience is even watching the programming that is being broadcast, producers can now see that users are making selections, on average, every 55 seconds during that session.

The study findings regarding the headlines were also surprising. Study participants weren't as negative as anticipated. They only rated 25% of the stories negatively, while rating 30% positively and keeping an open mind by not rating the rest. There is a great opportunity to introduce new ideas and concepts in that final 45%. It shows that the viewers aren't restricting themselves to their interest groups. They are open to being educated on things they aren't familiar with.

When approaching the extra content available in the interactive newscast, the individualistic preferences of the viewers were visible as they generally gravitated to using only one method to access the content, even though three methods were provided. 80-95% of the time, depending on whether the viewer was using the computer or television, extra content was viewed by means of one or fewer methods. This helps us to understand that while every person is different, and a wide variety of choices is necessary to cover all types of viewers, people generally stick with what they know and understand.

The way that news is delivered is going to be drastically different in the future. With interactive news, no longer do we need to stick to a broadcast schedule that determines when people get their information. They can access it at will. Even the hardware that has been

necessary to deliver the news to the individual will change. While the interactive news is now only in the conceptual stages, eventually it will be available for people to see it on their laptop, smart phone, tablet, game console, and, with the incorporation of Wi-Fi and Ethernet into televisions, traditional TV. With the growing use of streaming services on the internet, slowly the traditional world of broadcasting is changing. From April 2008 to April 2009, Hulu, one of these streaming services, streamed 373 million videos; a growth of 490 percent (Shields, 2009). People want to be able to watch what they want, when they want, without the restrictions of programming. The delivery of this type of system would only be limited by an internet connection.

Making the news available in a traditional broadcast format at any time scares a lot of people. They assume that the workload would be substantially increased and that the cost associated with it would be financially irresponsible, but that isn't true. Based on the process of producing Interactive News, the majority of the work to produce a newscast is already being done. All of the work to gather the content is already assumed by the reporter. They will do the interviews, write their story, and edit the video together as a package regardless of the enhancement to interactivity. Producers still have to structure the newscast and track the progress of their reporters while writing additional news stories for the anchors. The anchors still have to read everything that is put in front of them for the news to be understood. And the video editors and technical directors still have to do their work in order for the traditional broadcast to be created. The additional work required to produce an interactive newscast consists of the reporter asking a few more questions in the interviews, the video editor preparing one or two more pieces of video per story, and the producer linking all of it together in an interactive format using the ICE tools. While this does require some time and money to produce

and may be seen as a burden, there are other parts of the news delivery process that would change as a result of the incorporation of interactivity.

Delivering the news over the internet would alleviate the need for a costly television transmitter, as well as the engineer to ensure it is functioning properly, as well as the license required to operate it legally. Also, because the interactive news product is based on individual stories and not the newscast as a whole, eventually the high paid anchors could be phased out of the newsroom. With the money saved from those costs, a news organization would be free to employ additional reporters in order to increase the number of events/stories reported on.

Now that we know how people used the system, the larger question to be answered here is why did people behave this way? Why did they choose to make the selections they did inside the interactive newscast? Is it the content being produced? Is it the specific viewer preferences? Is it the quality of the information? Perhaps it's even a statement about the quality of the journalism being presented. Regardless of the answer to these questions, this information leads us to reconsider whether or not certain things that we have always deemed necessary are really that important. It's time that we look at the assumed need for a relationship between the news team and the viewers. We should also look at the types of stories produced. With interactivity we can gather story specific feedback about what viewers want to see and the information that they deem important. These are just a few questions that can be addressed with the incorporation of interactivity.

As with any new technology, the potential that the interactive news possesses is only limited by the minds of those who choose to use it. As the creators of interactive news its use has been envisioned to being something specific, however, the evolution of interactive news application is limitless. At this moment, no one can know what interactive news will look like in the future,

but this development has helped communication take a large step in that direction. There is a lot of research that still needs to be conducted on this topic, but change is sure.

Chapter 7: Conclusion

The focus and goal of the ICE Lab is to assist in the discovery of new means of “(pushing) human computer interaction into all of the situations where people work, live, and play” (<http://icie.cs.byu.edu/>). This project did precisely that. Interaction is becoming more and more a fact of everyday life. With the incorporation of the internet, Wi-Fi, smart phones, tablets, and other devices, the ability to influence the information that we receive is an ever-growing topic of conversation.

Interactive news has shown that people want that capability when it comes to broadcast television news. Each person may use the technology differently, and to meet a specific need, however, it is the universal desire for control and influence that links everyone. Viewers don't want to see everything that is now being produced on their behalf. They want what they want and nothing more. Time is the commodity that people value and they don't want to waste it on things that are not of interest to them. Interactivity gives them the ability to sift through everything to find what they want, but learning to provide those things is still something that is being discovered by news organizations and producers. More research is needed in order to adapt and change current practices into what viewers want to see.

Effect on Theory

Regardless of the level of interactivity used during the study, the existence of that option emphasizes the importance of Uses and Gratifications theory in media consumption. In 1948 Lasswell stated that there are two frames of reference when looking at any process; structure and function. He goes on to explain that the three primary functions of communication are surveillance, correlation, and the transmission of social inheritance. This study builds upon Laswell's findings by allowing the viewer the opportunity to enhance the functionality of the communication as they manipulate the structure. No longer are news viewers restricted to

gathering information in the rigid form the producer selects, but they have the option of expanding/contracting the structure based on the needs and desires they feel will help them gain the knowledge they are seeking. This allows the viewer to survey and correlate the parts of the newscast that they are interested in while the control that interactivity provides gives them a sense of ownership strengthening the transmission of social inheritance.

Another area in which interactivity helps strengthen Uses and Gratifications Theory is in the consideration of the Gratifications Sought and Obtained model developed by Palmgreen, Wenner, and Rayburn (1980). This model was created in order to help understand the motivations/needs that drive people to consume different types of media. Now, with the incorporation of interactivity, we know the precise moment when people stop watching a particular story. When this happens we can assume that the viewer's motives have either been met or abandoned. With the tracked statistics we can see precisely when people lose interest in any given story, regardless of the reason.

When afforded the opportunity to interact with content, viewers, at a very high level, want to be able to have control over tailoring the information to fit their needs and wants, uses and gratifications. As they do this, it provides important feedback information to the content producers at an individualistic level. This is extremely helpful because, as Rubin showed in his study on "60 Minutes" (1981), when content producers gain insight to the preferences of their viewership, the overall focus and quality of that content improves as the producers attempt to meet the expectations of their viewers.

As people watch the news, they generally have a specific reason/motive for doing so. In 1992 Pearse was able to link some of those motives to a particular part of the newscast. One of the serious questions that was asked going into this study was whether or not people would skip

directly to the part of the newscast that met their needs and then terminate their interactive news session. While this study did not focus on the individualistic choices made by the study participants, it does provide a significant foundation for future research looking at more in-depth motivations in relation to broadcast news media. Based on the results of this study, viewers, on average, watched 60% of the material offered. When comparing this statistic to the way people approached the information at the beginning of the newscast (Table 16), viewers were open to the possibility that 45% of the material might provide some gratification or need that they were unaware of.

Interactive news, and the way it was used in this study, is a very strong support to the ideals and concepts found in push/pull theory. Although this theory isn't regularly used in connection with communications, it is something that has a lot of potential for growth. One of the large areas that is influenced by this theory is in computing. With interactive news being a new form of broadcasting that is supported by computer technology, it is only logical that a theory with this focus would be used to help us understand that effects and potential of new medium.

In approaching interactive news it is impossible to completely abandon the push-based (Zhao, 2003) style of traditional television. News organizations are used to having the control over their content choices rest with their producers. Without having a large body of research to support an interactive delivery system on a large scale, it is extremely difficult for a news production company to take the risk necessary to change their practices by switching to a pull-based system. However, there is a large push for the development of what Zhao defines as pull-based technology (2003).

With the large demand for products like TIVO, Hulu, DVR, and Netflix, it is also impossible to ignore the need to develop pull-based systems of delivery for broadcast content. Not only are consumers more interested in having control over what they see, it has been discovered that pull-based systems are also more effective in their delivery (Aksoy & Leung, 2004).

During this study a hybrid push-pull model was utilized in order to better understand where the focus and emphasis would be in gathering information with this news presentation. The interactive news primarily pushes the news to the viewer by utilizing the traditional newscast style. However, with the traditional push delivery present, the pull-based aspects of the interactive news are found in the extra content. The viewer had the ability to pull additional information regarding anything of interest to them. All content produced was originally pushed towards the audience through traditional broadcast form or invitations: headlines, pitches, prompts, etc. After an invitation was made it was up to the discretion of the viewer to pull the information of interest to them.

While the amount of activity recorded during the consumption of the news was extremely high, pointing to a very pull oriented audience, 45% of the stories that were highlighted with a headline invitation at the beginning of the newscast were left without a rating. This shows us that the viewer had yet to make a decision with regards to nearly half of the content proposed to them. This type of action simply allows the incorporation of a push oriented approach to interactive newscast. The continuing development of interactive news is an educational step in understanding the marriage between push and pull technologies in communications.

This technology helps solidify the importance of looking into the hybrid models of push/pull theory in the future. It also shows the relevance of push/pull theory for communications technology moving forward.

Limitations

The largest limitation facing this study was the size of the sample. Due to budget restraints of the ICE Lab only ten homes could be outfitted with television systems. Those systems had to be within certain proximity of BYU in order to receive the necessary tech support to ensure that the study could be conducted without serious problems. In trying to combat this restriction, we adjusted the project to include computer users as well as the 10 television users. Unfortunately, dealing with an ongoing study like this one, it is difficult to ensure the consistent participation of all volunteers. These challenges did limit the number of participants in the study; however, due to the individualistic nature of the project, the results are still beneficial to the progress of broadcast television news.

A second limitation was in designing the study to last only two weeks. Had the budget been larger it would have been possible to extend the delivery of the interactive news with the purpose of understanding better whether motivations in using the system were based in curiosity or some other cause.

Not having been able to produce the news specifically for an interactive format is one more limitation that could be seen. It was, at times, obvious to study participants that the content wasn't made for this type of format. There were people looking off camera, video pieces from one story continuing on into another, and even the occasional invitation to watch a later newscast for more information that was never available. Having the ability to produce specifically interactive news would greatly help with consistency, fluidity, and complete delivery of

information. However, until a system like this is adopted on a large scale that production will be difficult to simulate.

Future Research

There are plenty of questions still to be answered about the role of interactive news in the future of society. People will continue to desire information that is relevant to them, but they will want to receive it according to their preferences and time schedule and free from extra content they deem irrelevant. The internet is playing a greater and greater role in broadcast television, and that will not change. Research in this area could focus on multiple things; when people want the news, what type of content to deliver as part of the base newscast, what types of extra content are most effective and beneficial, instantaneous feedback and how to analyze it, and how this new delivery system would affect the newsroom both technologically and for personnel. These are just a few potential ideas about how the development of this form of communication could impact research in the future. Regardless of the direction taken, there is a lot to learn about what interactivity means and how it affects society and its tools.

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Appendix 1

Interactive News In-home Trial

Q1 What is your name?

Q2 What is your age?

- 0-17 yrs
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+ yrs

Q3 What is your sex?

- Male
- Female

Q4 What is your address?

Q5 What is your ethnicity?

- African American
- Asian
- Hispanic
- White
- Other

Q6 How many people live in your home?

- 1
- 2
- 3
- 4
- 5
- 6+

Q7 What type of news consumer would you consider yourself?

- light consumer (0-2 hours a week)
- average consumer (2-6 hours a week)
- heavy consumer (6+ hours a week)

Q8 How interested are you in these types of news information?

Local News	<input type="radio"/>				
National News	<input type="radio"/>				
World News	<input type="radio"/>				
Political News	<input type="radio"/>				
Business News	<input type="radio"/>				
Sports News	<input type="radio"/>				
Weather	<input type="radio"/>				

Q9 How much of your news information do you get from these different media types?

Television	<input type="radio"/>				
Radio	<input type="radio"/>				
Newspaper	<input type="radio"/>				
Internet	<input type="radio"/>				

Q10 Where are you when you consume your news information?

Home	<input type="radio"/>				
Work	<input type="radio"/>				
School	<input type="radio"/>				
Car	<input type="radio"/>				

Q11 What time of day do you consume most of your news information?

- 12 am - 6 am
- 6 am - 9 am
- 9 am - 12 pm
- 12 pm - 4 pm
- 4 pm - 6 pm
- 6 pm - 7 pm
- 7 pm - 8 pm
- 8 pm - 9 pm
- 9 pm - 10 pm
- 10 pm - 11 pm
- 11 pm - 12 am

Q12 What motivates you to consume news information?

Education	<input type="radio"/>				
Social Awareness	<input type="radio"/>				
Curiosity	<input type="radio"/>				
Entertainment	<input type="radio"/>				
Escape	<input type="radio"/>				
Boredom	<input type="radio"/>				

Q13 What do you expect from your news information?

Fair	<input type="radio"/>	<input type="radio"/>
Honest	<input type="radio"/>	<input type="radio"/>
Complete	<input type="radio"/>	<input type="radio"/>
Transparent	<input type="radio"/>	<input type="radio"/>
Entertaining	<input type="radio"/>	<input type="radio"/>
Factual	<input type="radio"/>	<input type="radio"/>

Q14 For the past two years we have been developing a new internet technology that makes television news broadcasts interactive. Now we would like to know if you would be interested in using this new technology to participate in a 2 week study free of charge?

- Yes
- No

Q15 What is your email address?

Q16 What is your phone number?

Q17 What is your internet speed?

- 0 - 1.5 Mbps
- 1.5 - 3 Mbps
- 3 - 6 Mbps
- 6+ Mbps

Q18 Who is your Internet Service Provider

- Comcast
- CenturyLink
- Qwest
- Vonage
- Xfinity
- Other

Q19



Q20 Which of the three connections above do you have in the back of your television?

- 1
- 2
- 3

Q21 How close is your television to an ethernet connection or computer modem?

- 0-20 feet
- 21-40 feet
- 41-60 feet
- 60+ feet