

THESIS

AN EXPERIMENT ANALYZING INFORMATION OVERLOAD AND ITS IMPACT ON
STUDENTS' CONSUMER KNOWLEDGE OF HIGH-DEFINITION TELEVISION

Submitted by

Anthony Taeyang Vigil

Department of Journalism and Technical Communication

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Spring 2011

Master's Committee:

Advisor: Peter B. Seel

Jamie S. Switzer
Patricia M. Vigil

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ABSTRACT

AN EXPERIMENT ANALYZING INFORMATION OVERLOAD AND ITS IMPACT ON STUDENTS' CONSUMER KNOWLEDGE OF HIGH-DEFINITION TELEVISION

This study examined college students' consumer knowledge and how information overload affect students' understanding of High-Definition Television (HDTV). It explored the possible contributing attributes that may lead to information overload. It examined students' knowledge of High-Definition Television, and how both experience and perception of HDTV can influence information intake.

When High-Definition TV was being touted to the world, broadcasters, manufacturers, and the government were rushing to inform the public of the transition and its impact. From \$40 coupons for conversion boxes to differences between Plasma and DLP, the consumer was inundated with information related to HDTV.

This study looks at the various constructs that create information overload allowing us to avoid useless, fragmented information that can hinder the decision making process. It provides insight into how consumers ingested this flow of information that can possibly save millions in information promotion and dispersion. Additionally, it provides important comprehensive substance to uncovering consumer behavior.

ACKNOWLEDGEMENTS

I am extremely grateful to my advisor Dr. Peter Seel for his guidance, support and patience. It has been a pleasure working under his supervision. I owe my deepest gratitude to Dr. Jamie Switzer and Dr. Patricia Vigil for their direction, counsel and encouragement. I am indebted to my lovely wife Cindy Vigil for her inspiration, patience and confidence in me. Most importantly I would like to thank my late mother Hyong Vigil for her love and motivation, to whom I dedicate this work.

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INTRODUCTION

Superior technology does not always win the adoption war when placed against an inferior technology (Mintz, 2010). This can be a monumental problem for manufacturers and investors of high-definition television (HDTV). Phasing out the National Television Systems Committee (NTSC) standard on June 12, 2009, the Advanced Television Systems Committee Digital Television (ATSC DTV) standard brought high resolution, CD-quality audio, and widescreen HDTV signals to the consumers (FCC, 2009). Advertisements and promotions are still touting this new product and service, and sales continue to increase steadily. As of January 2010, nearly two-thirds of US consumers own HDTV sets, according to a study conducted by Opinion Research (Infogroup, 2010).

Though this is a pivotal moment for investors, manufacturers, and consumers alike, the question surrounding HDTV today is much like the question faced by color television some 60 years ago: How long will it take for the technology to be fully adopted by society?

As consumers sort through the glut of information on HDTV, is the information helping or hurting their knowledge of HDTV? It is no secret that the ATSC DTV broadcast standard, as well as the receiver that displays this new medium, surpasses old NTSC standards and TV sets in quality. This new Digital Television (DTV) format is allowing production of movies, shows, and televised events to be recorded, edited and

viewed right away, thus eliminating some of the time-consuming production tasks as well as providing a higher quality product to consumers.

To make consumers aware of the technology, commercials, billboards, posters, Internet advertisements, and numerous other forms of information are being distributed in hopes of informing the public. This has the potential to give the consumer information overload. The question this study seeks to answer is: How do different levels of information overload influence the consumer's knowledge about HDTV?

To understand this general question three research questions are defined:

RQ1: Will those with higher levels of information overload retain less knowledge than those with a lower level of information overload?

RQ2: Will those with higher levels of information overload respond less accurately than those given lower levels of information overload?

RQ3: Will those with higher levels of information overload filter out information?

Consumer research is an important subject matter because of its relationship to economic growth and technology advancement. It helps us understand how the structure of information plays a significant role in the successful adoption of products into society. It is not enough to simply have the best technology on the market - consumers must adopt it as well. In order to do so, the right information must be provided to the consumer.

Comprehensive and persuasive information must be provided so consumers can make purchasing decisions not skewed by mistakes and errors. Ideally, advertising should focus more on the quality of the messages being communicated than the quantity. This study will provide insight to both increasing and decreasing information overload,

thus it will assist in improving consumer education and advertising tactics in promoting products.

HDTV is an investment costing the government, manufacturers, investors, and the American public billions of dollars. This study provides useful information that can potentially save millions of dollars in information promotion and advertising. It provides a means for creating accurate, concise information, allowing consumer knowledge to be less fragmented, and assisting in more insightful consumer purchasing decisions.

LITERATURE REVIEW

Information Overload

Information overload is a term that is synonymous with, and created by the information age (Akin, 1997). It is a concept that many believe causes confusion and may lead to unwise decisions. Information overload is a phenomenon many deem to be a plague in our world of easily accessible knowledge and information (Shenk, 1997).

Drucker (1988) explains that information is data that has been organized for a particular purpose. Overload affects a subject's ability to successfully perform and/or complete a task (Evaristo, 1993).

Combining these two terms, information and overload, has created a plethora of ideas and definitions. One could say that the term information overload is ironically a victim of its own name. The information overload phenomenon has been "studied from many different perspectives, which have their roots in different disciplines and modes of investigation" (Kock, 1999, p. 314), creating numerous ways of defining information overload.

There are several traditional models of conceptualizing information overload. Sheridan & Ferrell (1981) defines it as information immersed at a speed too fast for a person to understand. Miller found the "span of absolute judgment and the span of immediate memory impose severe limitation on the amount of information that we are able to receive, process and remember" (Miller, 1956, p.95). Evaristo (1993) believes the amount or volume of information a subject is given that is more than the individual can handle can cause information overload.

Several disciplines of academia have tried to analyze and define information overload as it “appears in many different fields, leading to various constructs, synonyms and related terms” (Kerren et al., 2007 p. 24).

Though there are many different definitions of information overload, what is known as the inverted U curve became one of the first collectively confirmed definitions of information overload (Eppler & Mengis, 2003). Developed by Schroder, Driver and Streufert (1967), it explains that as both information load and decision accuracy increase, at some point information overload will cause decision accuracy to decrease.

Decision-making and reasoning performance for an individual correlates positively with the amount of information he or she receives, up to a certain point. If the amount of information supersedes this point there will be a rapid decline in the individual’s performance (Chewning & Harrell, 1990). High levels of information overload will confuse the individual, affecting their ability to set priorities, or make prior information harder to recall (Schick et al., 1990). In other words, when a subject is presented with an overabundant amount of information at one time the result can be that information is lost or that it is decoded incorrectly.

Bettman, Johnson & Payne’s (1990) synthesis explained that there was no time constraint by the experimenter, and as a result the subjects were in control of the information input rate. Meaning that time is a significant part of information overload. When information is self-paced by which the person can control the amount of information they ingest, there will be a higher response rate due to the short-term memory not being as severely limited (Sheridan & Ferrell, 1981). Time alone does not create information overload, there are several other variables that form this concept.

As summarized by Eppler & Mengis (2003) the following five categories can cause information overload: The subject receiving the information and their personal traits; the characteristics of the information such as quantity, frequency or intensity, ambiguity, its diversity; task & process parameters as in the state the information is given; organizational design, how information flows and how its organized; and information technology, the technology used to get the information to you.

The subjects experiences (Owen, 1992), education, information load capacity (Schroder, Driver and Streufert, 1967), self-confidence and attitudes (Muller, 1984) and various other traits can influence a consumers overload capacity (Brucks, 1985; Owen, 1992; Troye & Selnes, 1989). Because individuals always try to stay in control over the amount of information acquired (Dholakia & Bagozzi, 2001), to cope with overload individuals tend to recode, filter or omit information to “increase the amount of information that we can deal with” (Miller, 1956 p. 95).

Information ambiguity can have different consumers seeing the same information yet interpreting it in different ways (Sparrow, 1998). To help avoid ambiguity, repetitive information is provided. However, the volume of information available can create information overload (Jacoby, Speller & Berning, 1974). The slightest of changes in the amount of information could cause momentary information overload, and the severity depends on the total number of changes (Potter, 2000). This relationship between the items of information provided, the level of information understanding, and information overload is much like (Schroder, Driver & Streufert, 1967) inverse U-curve (Eppler & Mengis, 2003).

An additional attribute to information overload is task complexity (Daft & Weick, 1984). The more complex the task, the more likely a higher level of information overload is probable. As pointed out above, the amount of time available can also impact the information load and can cause information overload (Bettman, Johnson & Payne, 1990). When the amount of time available does not equal the time needed to complete a task, adjustments will be made to accommodate the lack of time resulting in inaccuracies (Evaristo, 1993).

Organizational design can help regulate information flow to the consumer (Schneider, 1987). It can influence consistency and continuity from one subject to another. The organization of information can reduce information overload and aid in processing more information (Schick et al., 1990; Tushman & Nadler, 1978). To create organization, coordination of information must be placed strategically in a coherent manner so the consumer can absorb the information or message more accurately (Galbraith, 2005).

Electronic, print, and broadcast forms of information promotion (i.e. the Internet, newspapers, and television) are technologies that promote information overload (Bawden, 2001). However, the quantity of information is not the only factor that causes information overload (Schneider, 1987). The more one relays specific information to a subject, the faster they can retrieve the information. However, this also increases the likelihood of giving some useless information on the subject (Edmunds & Morris, 2000). The speed at which one receives the information also can increase or decrease overload (Sparrow, 1998).

Consumer Knowledge

Knowledge is an important and powerful force that cannot only change economies, but also has the ability to influence decisions, and surmount obstacles (Stewart, 1997). It is a concept that is considered linked with the study of philosophy. Take for instance epistemology, the philosophical branch which studies knowledge. Such variations and terminology include common knowledge (Dixon, 2000), deal knowledge (Krishna, 1994), explicit knowledge, knowledge management, knowledge representation (Markmen, 2002), and knowledge inertia (Liao, 2002).

Knowledge is dynamic and in a constant state of flux due to its ability to change through one's experiences and learning (McInerney, 2002; Sbarcea, 2001). Though many older studies believe that knowledge is synonymous with information, this is not the case. McInerney (2002) points out that knowledge is placed hierarchically with data as the base, followed by information, then knowledge, leading to wisdom at the top (Broadbent, 1998; Streng, 1999).

Knowledge and information are two separate entities, yet knowledge is formed from information (Broadbent, 1998; McInerney, 2002). Information is data that has been organized for a particular purpose (Drucker, 1988). Data is considered facts and/or figures that are important and/or significant in some way (Blair, 2002). Though data and information are important aspects, knowledge is also gained thru knowledge.

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knower. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. (Davenport & Prusak, 1998, p. 5)

Since this study focuses on consumers, it would be appropriate to study consumer knowledge, and the three categories that form it. According to Brucks (1985), subjective knowledge, objective knowledge, and experience form the base of what he defines as consumer knowledge.

Subjective knowledge is what we think we know while objective knowledge is what we actually know (Flynn & Goldsmith, 1999). As an example, for those of us who have never had the experience of walking in outer space, we have a general idea, because we have seen it on TV, in the movies, and read about it. Even though we have not experienced it we can imagine and draw our own conclusions on it, which is subjective knowledge. For those few who have walked in space, they actually know the facts about space walking which is objective knowledge.

Consumers are more likely to purchase an item based on their subjective knowledge more so than their objective knowledge (Selnes & Gronhaug, 1986). Objective knowledge seems to increase the consumer's motivation in seeking and acquiring more information on a product or purchase (Brucks, 1985; Selnes & Troye, 1989). Inversely, product experience, brand experience, and product bargains seem to be associated with the consumer being less motivated in seeking more information on a product or purchase (Bennett & Mandell, 1969; Brucks & Schurr, 1990; Ratchford, 2001).

As Brucks (1985) describes, subjective knowledge is the individual's perception of how much they know. Park & Lessig (1981) argue that one of the major differences between subjective knowledge and objective knowledge is that subjective knowledge also includes self-confidence within a consumer's overall knowledge. Subjective knowledge

creates consumer product emotion, perception, and experience. These can have a considerable impact on attitude, judgment, and choice (Alba & Hutchinson, 1987).

Consumers may have a high level of subjective knowledge and deem themselves experts, but have a low level of objective knowledge, which can lead consumers to an ill-informed purchase. Objective knowledge is what the individual actually knows. This is based on facts and/or figures that can be proven right or wrong (Brucks, 1985). Those with higher levels of objective knowledge are more capable of acquiring information that is both more important and relevant than those with less objective knowledge (Selnes & Troye, 1989).

People with more objective knowledge are dubbed “experts” (Alba & Hutchinson, 1987; Selnes & Troye, 1989). Experts are able to organize information into memory according to its importance, compared to non-experts who place more superficial aspects into memory (Brucks, 1985; Selnes & Troye, 1989). Experts seek out additional information and have better memory organizational skills than non-experts possibly because they are aware that such other attributes exist (Alba & Hutchinson, 1987), leading experts to make well-informed purchases.

Experience is the last component of consumer knowledge. It is associated with memory, and include cue retrieval, memory association (a.k.a. cue linking), frequency knowledge, and emotional attachment (Alba, 1987; Burgess & Lund, 2000; Shenk, 1997).

Cue linking is how one associates new information to other repetitive information to assist in easier memory retrieval (Shenk, 1997). The mind is seen as a virtual filing cabinet, where information is linked to other bits of information in an infinite manner (Lund, 2000). Experience is the link between pieces of information; it is a linking of

ideas, information, and knowledge. The consumer then uses these experiences to help make what they consider the right choice. Similar experiences do not necessarily lead to similar consumer behavior because people do not always learn the same things from those shared experiences (Brucks, 1985).

Brucks explains that, “If different people learn different things from similar experiences, then their behaviors are likely to be different” (Brucks, 1985, p. 2). What the consumer considers to be the right choice may not be the case due to that particular consumer not having the right previous experiences, having erroneous knowledge, having meaningful cues filtered out, or a variety of other variables (Brucks, 1985; Chewning & Harrell, 1990; Owen, 1992).

Manufacturers are trying to inform and persuade the consumer in purchasing a product through a variety of ways including, advertising, branding, and product packaging (Jacoby, Speller & Berning, 1974). Several studies suggest that providing more information on a product could lead to purchasing behaviors: there is now an assortment of information on brands and products everywhere. Frequency knowledge is a person’s “tally of the number of positive and negative attributes associated with a brand, irrespective of their meaning or importance” (Alba & Marmorstein, 1987, p. 14). Much like subjective knowledge, frequency knowledge is based on the consumer’s belief of what they think they know of the product or brand, not their actual knowledge.

Frequency knowledge is associated with experience because when there is a lack of information, “frequency knowledge may provide a reasonable basis for decision making” (Alba & Marmorstein, 1987, p. 14). Frequency information can be recorded in the memory with little effort and perhaps unconsciously (Alba & Marmorstein, 1987;

Hasher and Zacks, 1984), leading a consumer toward purchasing behaviors more than toward searching behaviors.

High-Definition Television

High-Definition Television (HDTV) is an example of new technology that is rapidly being adopted in the United States. Advertisements and promotions are already touting this new product, and sales are underway. According to a study conducted by Forrester Research, as of January 2003, three million Americans owned HDTV receivers (Bernoff & Charron, 2003). The HDTV medium overshadows the traditional NTSC standard by featuring a digital, higher resolution, a wider viewing area, system coupled with surround sound (FCC, 1996).

Due to HDTV's extensive history, this literature review does not attempt to do an in-depth review of the development of HDTV. Brinkley's *Defining Vision: The Battle for the Future of Television* (1997) is a book that gives a thorough breakdown of how HDTV came to be in the United States while Dupagne & Seel's comprehensive book (1998) shows the evolution of HDTV globally. Instead, a brief overview of the components of HDTV that are relevant to this study will be discussed.

Japan's broadcasting network NHK conducted a study on the NTSC television standard. They concluded that viewers who sat too close to the television set became dizzy when compared to those who sat further away (Brinkley, 1997). A higher-resolution display, accompanied by a wider screen, helped create both a better image quality and a larger level of emersion to alleviate these issues (Comstock, 1991).

Using the research from NHK's Dr. Takashi Fujio, Sony was the first Japanese corporation to embark in developing HDTV, introducing the first manufactured HDTV on April 28, 1981. Increasing the NTSC standard of 525 lines to 1125 lines of resolution, this system now known as Hi-Vision sent the signal through an analog wave. Inherently, due to the size of the signal two broadcasting channels were needed to relay the signal (Hanson, Conroy & Donnelly, 1992).

Though the first demonstration of HDTV in North America occurred February 1981, it was not really noticed until 1987 when NHK provided an HDTV demonstration for the Federal Communications Commission (FCC) on behalf of the National Association of Broadcasters (NAB) (Brinkley, 1997). Brinkley (1997) attributes one of the reasons HDTV was created in America was because of the spectrum wars. The NAB was trying to keep its precious broadcasting spectrum from being acquired by Land Mobile services by showing the FCC that broadcasters would need the space for HDTV. However, due to both the spectrum space needed and other political matters, Hi-Vision did not seem to be the answer, and in November of 1987, an advisory committee was created by the FCC to investigate and facilitate an Advanced Television system for the American public known as the Advisory Committee on Advanced Television Service (ACATS) (FCC, 1987).

General Instrument Corporation announced it had perfected a method of digitally transmitting a high-definition signal. The other participants in the ACATS competition soon developed digital systems that were submitted for testing. (Dupagne & Seel, 2010, p. 85)

In the 1990's three competitors, AT&T/Zenith, General Instrument/MIT, and Philips/Thomson/Sarnoff ultimately merged together with the common goal in making an

HDTV digital system and became known as the Grand Alliance (Dupagne & Seel, 2004; FCC, 1987).

On December 24, 1996, after years of testing and debate, the Federal Communications Commission (FCC) approved the ATSC DTV standard (FCC, 1997). This standard was based on the documented work the ATSC did on the Grand Alliance technology (McConnell, 1996), for terrestrial digital television (DTV) that would enable U.S. broadcasters to transmit programs in standard definition television (SDTV) or HDTV (FCC, 1996).

On April 3, 1997, the FCC proposed to phase out the analog NTSC service by 2006 (FCC, 1997). The regulation planned the process of replacing the NTSC system with the ATSC DTV standard, forcing consumers to buy a new television set equipped to receive the new signal or obtain a conversion box. Then, on April 25, 2007 the FCC extended the analog phase-out date to February 17, 2009 in order to ensure a smooth transition to digital television (FCC, 2007). On February 13, 2009, “Congress extended the date for the completion of the nationwide DTV transition from February 17, 2009 to June 12, 2009... in order to permit analog service to continue until consumers have had additional time to prepare” (FCC, 2009, p. 1).

HDTV, one of the signals that can be transmitted through DTV, offers three fundamental improvements over the existing National Television System Committee (NTSC) television system: higher resolution near 35-mm film quality, larger and wider screen size dimensionally proportional to a movie theater screen, and multi-channel digital audio comparable to a compact disc (Dupagne & Seel, 1998).

There are five components that make up the Advanced Television Systems Committee (ATSC) DTV standard: video coding, audio coding, transport, RF/transmission and the receiver (FCC 6235-proposal). “These five basic components, plus a video format selection function, are sometimes referred to as comprising ‘layers’ of the system” (FCC, 1996, p. 6235).

The most notable difference of the ATSC DTV standard over the traditional NTSC signal is the conversion from an analog wave to a digital signal. Keep in mind that SDTV and EDTV use digital transmission, but are not considered high-definition television because they do not take advantage of 1080 or 720 active vertical lines representing high resolution video images (FCC, 1996). To help avoid conflict, the FCC left the decision over the aspect ratio and scanning arrangement up to broadcasters, enabling eighteen video scanning formats in the ATSC DTV standard for broadcasters to choose from (Dupagne and Seel, 1998).

The broadcaster can choose to run SDTV or HDTV at their discretion (FCC, 1996). Since one spectrum channel takes 6-Mhz (the equivalent of 19-megabits) only one HDTV signal would fit through this pipe (Brinkley, 1997). The amount of the spectrum allowed to the broadcaster will influence their choice however. SDTV may be a great incentive because this new format will allow about five Megabits per program, essentially allowing four to six signals of SDTV instead of the one HDTV signal to be transmitted in a 6-MHz channel (Dupagne and Seel, 1998). Image quality would degrade the more compressed the signal gets (Dupagne and Seel, 1998).

The motion picture expert group layer-2 (MPEG-2) video standard was adopted in the ATSC DTV standard (FCC, 1996). Using the same encoding used for Digital

Versatile Disks (DVD's) to transmit HDTV, a variety of compression techniques, image predictors and algorithms are used to reduce HDTV's digital size to fit into the 6-MHz sized spectrum (FCC, 1996).

These techniques include B-frame prediction (predicting frames), discrete cosine transform also known as DCT (an algorithm that isolates portions of an image), and motion compensation (identifying position movement in frames for fields) to reduce the amount of digital data (FCC, 1996).

Dolby Labs developed the audio compression standard used for the ATSC DTV Standard. Known as audio compression layer-3 (AC-3) it provides six channels of audio-one for each of the left, right, center, rear left, rear right, and a low frequency channel (FCC, 1996). Though six channels are used, it is known as 5.1 surround sound where as the '5' in 5.1 alludes to the left, right, center, rear left and rear right speakers. The '.1' indicates the low frequency channel used for enhancing bass provided by a subwoofer. Using various compression techniques the channels are conformed into a single bit stream at a rate of 384 kilobits (kbps) per second. To allow a lower bit rate, the AC-3 standard also permits using fewer channels all the way down to a monophonic (single) channel (FCC, 1996). Multiple audio channels may also be offered to provide different language tracks, alternate sound tracks and services for the visual or hearing impaired. (FCC, 1996)

The way the data (video, audio or ancillary) is transported is much like how data moves through the Internet. A digital data stream of "packets" of information is sent from the broadcasting transmitter to the receiver. Each packet contains only video, audio

or ancillary data and is then combined in a way to ensure that the data is synchronized at the receiver (FCC, 1996).

The transmission layer of the ATSC DTV Standard uses an eight vestigial sideband (8-VSB) technique (FCC, 1996). A vestigial sideband is a way convert data into a waveform or signal. The eight refers to the amount of amplitude levels used to make up the 19.28 Mbps (6 MHz). “For more benign environments, like that provided in a cable system, the ATSC DTV Standard includes a 16-level VSB high data rate mode that provides double that capacity of the 8-level VSB terrestrial broadcast mode” (FCC, 1996, p. 6241-6242).

The FCC did not provide any specifics on what the DTV receiver would require other than it should be based on the specification of the ATSC DTV signal (FCC, 1996). The first HDTV receivers that went on sale in the United States ranged from \$5,000 to \$10,000 (Brinkley, 1998). They have been declining in price ever since (Dupagne & Seel, 2008). There are several display types attempting to dominate the HDTV marketplace: Plasma displays, Liquid Crystal Displays (LCD’s), Digital Light Processing (DLP) Projectors, and Liquid Crystal on Silicone (LCoS) displays. There are several other types of display types, but this study will primarily focus on ones currently being manufactured for mass distribution.

Cathode-ray-tube (CRT) was the standard display technology since the invention of television (Dupagne & Seel, 2008). These displays have been used on computers and televisions. HDTV uses a wider viewing area, increasing the amount of glass needed for the TV screen, and CRT’s were becoming heavy and cumbersome. Though they were once considered to be brighter and better in producing overall image quality than

projection models (Schiesel, 2003), this no longer holds true (Dupagne & Seel, 2004).

The first HDTV sets that were made using cathode-ray-tube technology suffered from the same issues NTSC big screens suffered from, including “inaccurate color registration and not-so-sharp images” (Taub, 2004).

Plasma displays use plasma gas to turn tiny color elements on and off in milliseconds (Dupagne & Seel, 2010). The sets offer vivid colors and sharp images, but are very expensive to produce. They are also vulnerable to image burn, decrease in brightness over time, and can consume a high amount of energy (Taub, 2004). With the exception of Panasonic, many manufacturers have moved to producing LCD models instead (Dupagne & Seel, 2010).

LCD’s are mostly known for flat-panel computer displays, laptops, and cell-phones which are all direct view sets. They also come in projection sets (Taub, 2004). The technology relies on liquid crystals and color filters that switch on and off rapidly to form images (Dupagne & Seel, 2008). Though LCD’s provide a lighter weight technology thanks to magnifying lenses and directing mirrors, it does not provide the highest quality of brightness due to circuitry obstructing some of the light.

Rear projection sets rely on digital light processing (DLP) technology developed by Texas Instruments. They have 1-inch chips that hold hundreds of thousands of tiny mirrors to control the amount of light and color reflected onto the screen simply by pivoting (Taub, 2004). As Taub (2004) describes, these sets can even rival LCD’s depth size (e.g., RCA exhibited at the 2004 consumer electronics show a 61- and 50-inch DLP model that was a little under 7 inches in depth). This is the same technology, used in a

three chip configuration, that projects digital films in movie theaters (Dupagne & Seel, 2004).

The relatively new technology Liquid Crystal on Silicon (LCoS) is much like its predecessor the LCD. Liquid crystals are used to control light reflected to the screen, but instead of light traveling on the LCoS chip, light travels through it (Taub, 2004). This makes for a brighter image since the circuitry is in a silicon layer behind an aluminum reflective plate (Boer, 2005). There are also no moving parts unlike the DLP chip making the LCoS chip more durable.

Another technology is the Active Matrix Organic Light Emitting Diode (AMOLED). Developed by Sony, the technology was found too expensive to manufacture into television sets, but made its way to several cell phones instead (Dupaigne & Seel, 2010). AMOLED uses various organic molecules to emit different colored light (Wolf, 2009).

An [AM]OLED display consists of three layers of material arranged in a thin sandwich: A negatively charged layer, called the cathode, is placed atop a substrate material; electroluminescent organic material is placed in the middle; and a positively charged layer, called the anode, is placed on top. When electrical voltage passes from the cathode to the anode, it courses through the organic material, causing it to emit visible light. (Kim, 2005, p. 62)

An advantage of AMOLED is that it can produce true blacks because the technology is inherently luminescent and no backlight is required (Kim, 2005). Creating AMOLED is “quite similar to, but cheaper than, those used in silicon device technology” (Wolf, 2009, p. 22). A disadvantage of AMOLED is that blue colors have a much lower life span and manufactures are still looking for ways to improve it (Kim, 2005).

Diffusion of Innovations

For an innovation to survive it must be adopted. HDTV is already set to become the next standard in TV, but how long will it take for the majority of Americans to adopt it? Following Roger's theory of Diffusion of Innovations (DoI) (1995) the adoption cycle flows from awareness, to interest, then trial, to decision, and finally leading to adoption. The stages that affect an innovation's adoption according to Rogers (1983) are:

Knowledge: Exposure to its existence, and understanding of its functions.

Persuasion: The forming of a favorable attitude to it.

Decision: Commitment to its adoption.

Implementation: Putting it to use.

Confirmation: Reinforcement based on positive outcomes from it.

These steps, also known as the innovation decision process, lead the consumer to adopt, meaning purchase a new technology, or to reject the technology. Information overload could be a factor between knowledge and persuasion in the DoI model that affects adoption of high-definition television.

As Goldberger (1993) stated, sensory overload can lead to misinformation and exaggeration. Information overload would affect adoption in the DoI model by changing or delaying persuasion. Persuading and creating positive attitudes is an important part of adoption, but if the message is unpersuasive or creates negative attitudes the information provided could be harmful in the diffusion process (Jacoby, Speller & Berning, 1974).

Many of the disciplines that study information overload see it as a negative concept, typically showing the harmful points of information overload. On the other hand there are some positive benefits. Political campaigns are a good example of the

effects of information overload. An opposing group could flood the media market with so much information that people could get information overload on the topic. The result could be the public possibly ignoring the topic all together, or even having a negative feeling toward it.

Currently HDTV is diffusing its way into the American public but the transition to HDTV did not occur as fast as the FCC originally planned for. In October of 2004 the FCC started a communications campaign on HDTV and Digital Television to help address consumer confusion and misconceptions in hopes of raising HDTV's adoption rate (FCC News Release, 2004). Commercials, billboards, posters, Internet advertisements, and other forms of media attempted to spread the word on HDTV. Even with the campaign, the phasing-out of the NTSC signal was delayed from December 2006 to February 2009, because consumers were not prepared or ready (FCC, 2006).

As the February 17, 2009 deadline approached, millions of consumers were still not ready for the transition, prompting Congress to delay the change until June 12, 2009 (FCC, 2009). In order to improve awareness the FCC re-launched the nationwide public awareness campaign with the National Telecommunications and Information Administration (NTIA) in partnership with the Consumer Electronics Association (CEA) and the National Association of Broadcasters (NAB) (Dupaigne & Seel, 2010). On June 12, 2009 analog broadcasting was turned off in the U.S.

If information overload could influence the public's willingness to pursue information, advertisers would know that they should not give the public as much conflicting information. If the public does not pursue information it could delay or stop the adoption cycle, while in the interest or trial stage.

Getting information to the public is an important step, but if the public does not understand the message we must refine our methods of disseminating in getting the information. The idea of giving vast amounts of information to the consumer has become the norm, but advertising should be based on both quantity and quality for the best results. Comprehensive and persuasive information must be structured so consumers can pursue purchasing behaviors not skewed by knowledge errors. Information overload is important to examine because as the literature review pointed out, it possibly causes these misperceptions.

METHODOLOGY

RQ1: Will those with higher levels of information overload retain less knowledge than those with a lower level of information overload?

RQ2: Will those with higher levels of information overload respond less accurately than those given lower levels of information overload?

RQ3: Will those with higher levels of information overload filter out information?

The population studied was college students. To understand information overload and its affects on college students' consumer knowledge, an experiment was conducted to evaluate students' levels of overload. In order to answer the purposed research questions, research done by Mengis & Eppler (2003) was used as a guideline for evaluating and measuring information overload. Brucks (1985) research was used as a guideline for evaluating and measuring consumer knowledge. A computer based pre-stimulus questionnaire, computer based stimulus, and computer based post-stimulus questionnaire were the components used in the study. The stimulus was a website comprised of various facts about HDTV.

A purposive sample of thirty-four Colorado State University students participated. To entice them to enroll in the study, a \$20 honorarium was awarded to each participant. To notify the students of the experiment there were announcements in classrooms and a posting in the campus newspaper. The criteria for them to participate was that they must be Colorado State University students and not a technical journalism major.

The thirty-four subjects signed up for the study online, and chose one of four different testing times to attend the study. Each testing session contained ten participants, and five randomly chosen students out of each session were part of the experimental group and the other five students in every session became the control group. There were a total of seventeen students in the control group and seventeen students in the experimental group.

Both groups received the same pre-stimuli questionnaire. Once the questionnaire was completed, the participants saw one of two websites. For 15 minutes the experimental group saw a website with more information overload characteristics, while the control group viewed a website with less information overload characteristics for 15 minutes. After the exposure, the two groups took a common post-stimuli questionnaire.

The pre and post stimuli questionnaire took about 10 minutes each. The website was viewed for only 15 minutes while 20 minutes was used for the introduction/ participation agreement approval forms and de-briefing. In total the sessions lasted approximately 45 minutes.

Participants used university computers to view the stimuli and to answer the questionnaire. No problems arose with the students, but if one did they would have been allowed to quit the experiment at any time.

I conducted two of the four sessions in the experiment, while an assistant conducted the other two sessions. She was taught how to proceed with the experiment to avoid inter-coder reliability issues.

The pre-questionnaire focused on four topics: consumer personal factors; consumer experience; consumer subjective knowledge; and consumer objective knowledge.

Demographic questions included age, sex, ethnicity, level of education, household income, and self projected level of knowledge about HDTV.

In regard to experience, subjects were asked how often they had heard or seen information on HDTV, how often they looked for electronics technology information, and the times they physically encountered HDTV on a seven-point Likert scale ranging from one (Frequently) to seven (Never).

Subjects' subjective knowledge was measured by asking the students about their perceptions of their level of knowledge of high-definition television. Such questions included: their level of knowledge to make a confident purchase, their level of knowledge among their friends, their level of knowledge compared to others, how much they have heard about it, and their confidence in knowing the differences between HDTV's on a seven-point Likert scale ranging from one (Strongly Agree) to seven (Strongly Disagree).

To assess the subject's objective knowledge, a series of multiple choice questions based on High-Definition Television in America in accordance to the ATSC DTV standard were asked. Such questions included: what is HDTV, the difference between HDTV and NTSC, what is HDTV's aspect ratio, audio standard, video codec, resolution, transmission type, and how many different types of HDTV receivers on the market.

The post-questionnaire focused on six topics: change in consumer subjective knowledge; change in consumer objective knowledge; information characteristics; task & process parameters; organizational design; and information technology. To find out the

subject's subjective consumer knowledge, they were asked about what they perceived their knowledge on High-Definition Television to be. Such questions include: their level of knowledge to make a confident purchase, their level of knowledge among their friends, their level of knowledge compared to others, how much they've heard about it, and their confidence in knowing the differences between HDTV's on a seven-point Likert scale ranging from one (Strongly Agree) to seven (Strongly Disagree).

To ascertain the subject's objective knowledge, once again a series of multiple choice questions based on High-Definition Television in America in accordance to the ATSC DTV standard were asked. Such questions included: what is HDTV, the difference between HDTV and NTSC, what are HDTV's aspect ratio, audio standard, video codec, resolution, transmission type, and how many different types of HDTV receivers are on the market.

To find the websites information characteristics, a seven-point Likert scale from one (Strongly Agree) to seven (Strongly Disagree) was given. The questions asked if the website had too much information and if it was informative.

To find the task and processing parameters a seven-point Likert scale from one (Strongly Agree) to seven (Strongly Disagree) was given. Questions were asked to find out if the information on the Website was complex, understandable, and if they felt there was time pressure.

Subjects were then asked questions to see their views on the websites organization and design, such as if the information structure on the website was organized or chaotic, and if it flowed well from one topic to another.

Subjects were asked if the links the website provided increased their knowledge, had valuable information, and if it was repetitive using a seven-point Likert scale ranging from one (Strongly Agree) to seven (Strongly Disagree).

To measure the amount of information available to them through the media, a series of questions based on how much information the media provides on HDTV were asked.

The questionnaires were computer-based and a database collected the responses. This assisted in avoiding coding error. Once all the data was collected a test was performed to analyze differences between the experimental group and the control group.

In order to pre-test the experiment, a controlled convenience sample of ten subjects were enlisted. After the subjects took the questionnaire an open forum discussed how long it took, which questions needed clarification, how the questions needed to be reworded, and what would make the questionnaire more efficient. Thereafter, the subjects randomly took one of the two stimuli where once again an open forum took place see how long it took, if the sites served their purpose, how the questions should be reworded, and what would make the survey more desirable for other subjects to take it. Lastly, the final questionnaire was given and another open forum took place to discuss the questionnaire.

When each student arrived they signed a letter of consent, received their \$20 honorarium, and signed an acknowledgement form. The questionnaire was then administered to those who agreed to take part in the study. This questionnaire acquired data on consumer experience, personal traits, and their subjective and objective knowledge. Once the questionnaire was completed the subject was given one of two

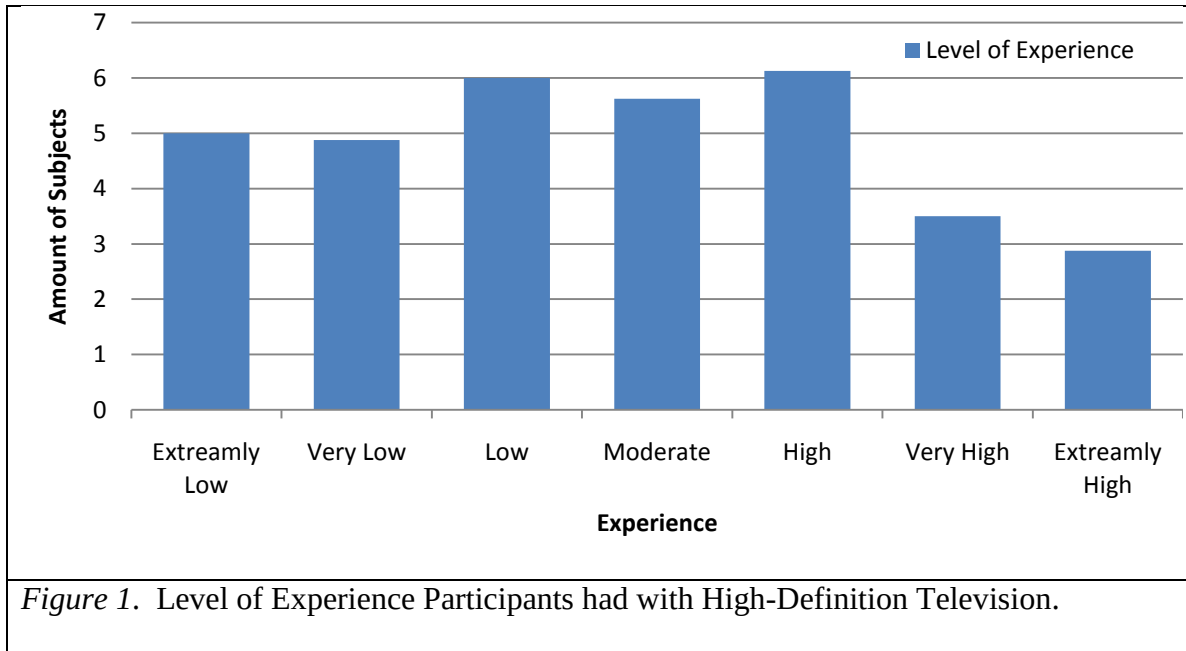
randomly selected stimuli. The stimuli were two separate websites containing information on high-definition television. One site contained more traits of information overload than the other. After the subject was exposed to the stimulus a secondary questionnaire was administered to gain data on the consumer's objective and subjective knowledge.

RESULTS

A total of thirty-four subjects participated in the study. The respondent's age ranged from 18 to 28 with a mean age of 20 years of age (see Table 1).

Table 1		
<i>Demographics of study sample</i>		
	Number (N = 34)	Percentage (%)
Age (years)		
18	12	35.29%
19	6	17.65%
20	4	11.76%
21	5	14.71%
22	3	8.82%
23	1	2.94%
25	1	2.94%
26	1	2.94%
28	1	2.94%
Gender		
Male	17	50%
Female	17	50%
Education Level		
Freshman	13	38.24%
Sophomore	6	17.65%
Junior	5	14.71%
Senior	8	23.53%
Graduate School	2	5.88%
College		
Agricultural Sciences	0	0.00%
Applied Human Sciences	4	11.76%
Business	9	26.47%
Engineering	1	2.94%
Liberal Arts	6	17.65%
Natural Resources	5	14.71%
Natural Sciences	3	8.82%
Veterinary Medicine and Biomedical Sciences	2	5.88%
Other	4	11.76%

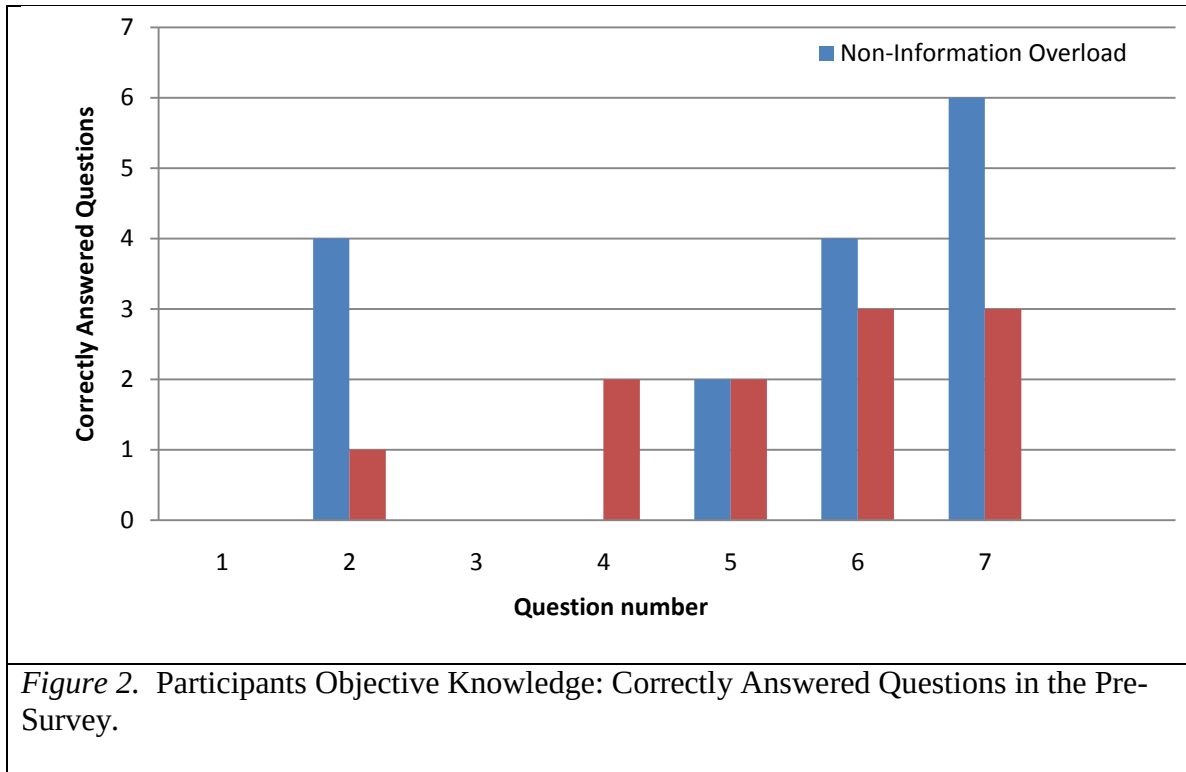
Seventeen participants were male and the other seventeen were female, making the gender mix proportional. The respondents answered eight questions that related to their experience with HDTV or similar electronics. There was a good spread of participants' experience with HDTV, the average being between low and high (see Figure 1).



RQ1: Will those with higher levels of information overload retain less knowledge than those with a lower level of information overload?

The first research question sought to determine if students experiencing higher levels of information overload would retain less knowledge than those exposed to lower levels of information overload. In order to answer the question we measured both subjective and objective knowledge types.

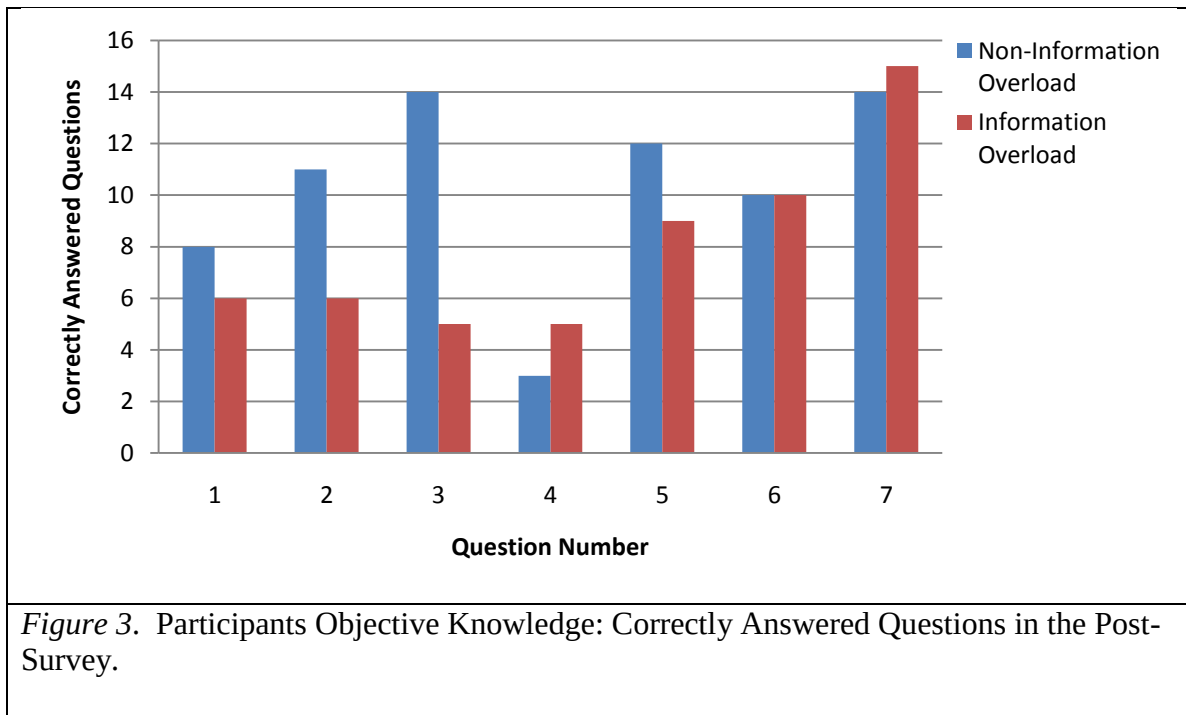
Respondents answered seven multiple choice questions in order to evaluate their objective knowledge. Both groups demonstrated low objective knowledge on HDTV before the stimuli (See Figure 2).



After the stimuli, both group's objective knowledge scores significantly improved showing a p value of less than 0.0001 (see Table 2).

Table 2 <i>Unpaired Test Results on Objective Knowledge Change in Both Non-Information Overload Group and Information Overload Group</i> P value and statistical significance: The two-tailed P value is less than 0.0001 By conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval: The mean of Pre Survey minus Post Survey equals -2.97 95% confidence interval of this difference: From -3.48 to -2.46 Intermediate values used in calculations: $t = 11.5924$ $df = 66$ standard error of difference = 0.256
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The group given the non-information overloaded stimuli performed 13.44% better than the information overloaded group (see Figure 3).

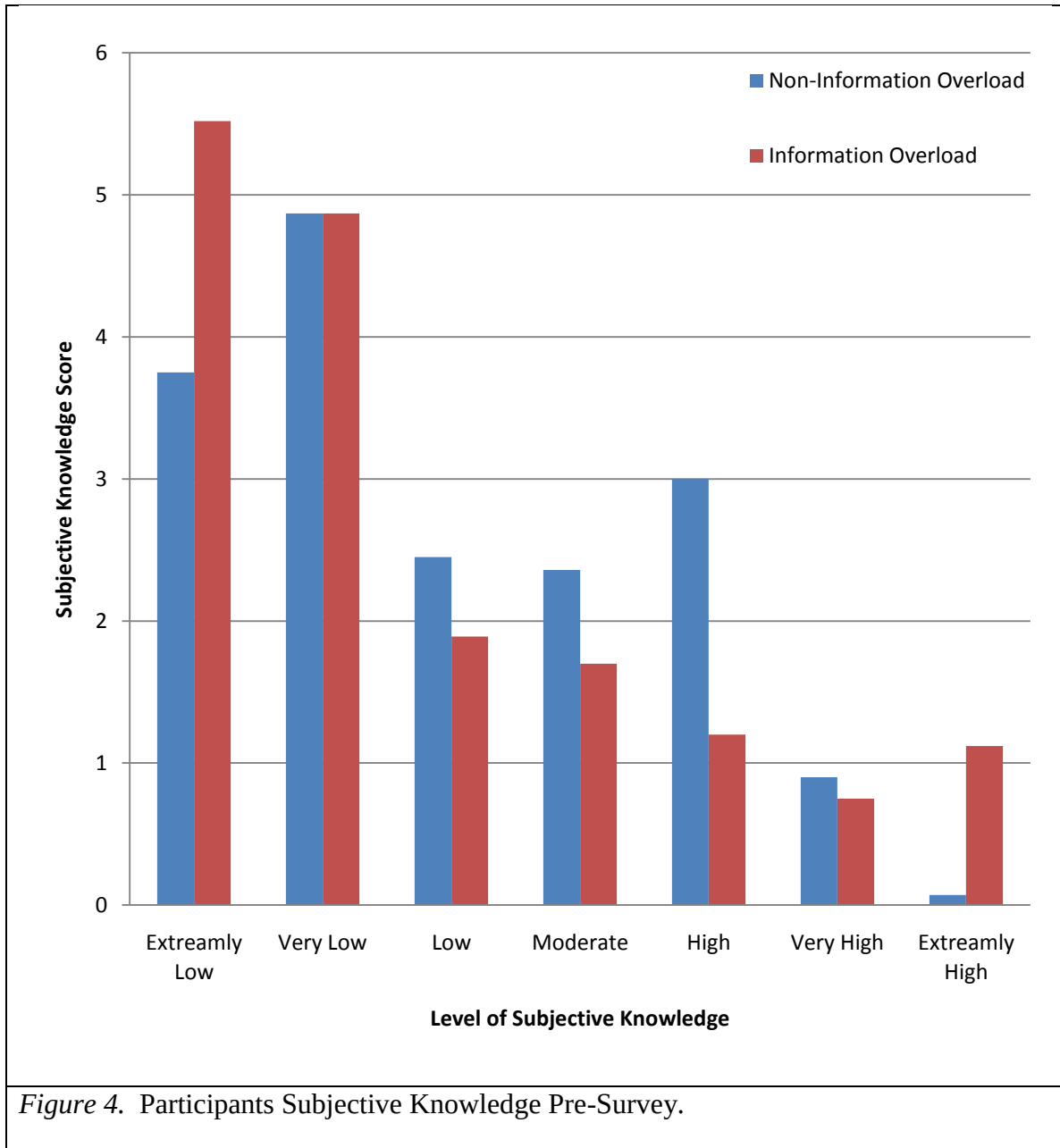


The t-test results of objective knowledge difference between the information overload groups provided a p value of 0.02 (see Table 3).

Table 3 <i>Unpaired Test Results on Objective Knowledge Change Between the Non-Information Overload Group and the Information Overload Group, Post Survey</i> P value and statistical significance: The two-tailed P value equals 0.0235 By conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Non IO minus IO equals 0.94 95% confidence interval of this difference: From 0.14 to 1.75 Intermediate values used in calculations: $t = 2.3785$ $df = 32$ standard error of difference = 0.396
--

This showed that there was a significant difference between groups when information overload was introduced.

In order to evaluate respondents' subjective knowledge, the students answered ten seven-point Likert type questions for the study. Both groups showed little subjective knowledge of HDTV (see Figure 4).



After the stimuli the non-information overload group rose significantly in subjective knowledge, showing a p value of 0.0006 (see Table 4).

Table 4

Unpaired Test Results on Subjective Knowledge Change for the Non-Information Overload Group

P value and statistical significance:

The two-tailed P value equals 0.0006

By conventional criteria, this difference is considered to be extremely statistically significant.

Confidence interval:

The mean of Non IO minus IO equals -1.71

95% confidence interval of this difference: From -2.61 to -0.80

Intermediate values used in calculations:

t = 3.8369

df = 32

standard error of difference = 0.445

The information overload group also rose in subjective knowledge showing a p value of 0.0125 (see Table 5).

Table 5

Unpaired Test Results on Subjective Knowledge Change for the Information Overload Group

P value and statistical significance:

The two-tailed P value equals 0.0125

By conventional criteria, this difference is considered to be statistically significant.

Confidence interval:

The mean of Non IO minus IO equals -1.47

95% confidence interval of this difference: From -2.60 to -0.34

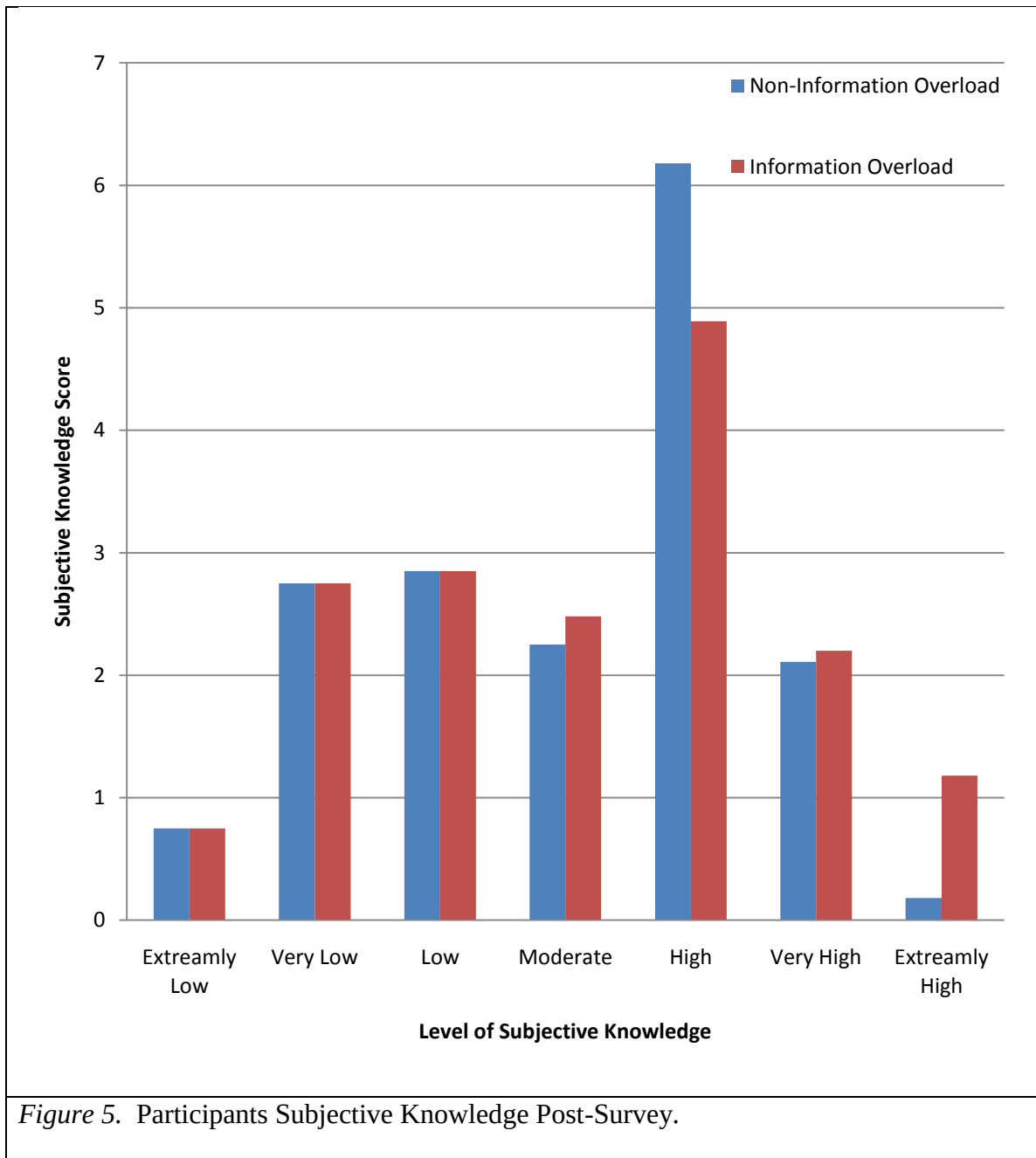
Intermediate values used in calculations:

t = 2.6463

df = 32

standard error of difference = 0.556

Both groups almost identically rose in their perceived knowledge shifting closer to being “somewhat knowledgeable” about HDTV now (see Figure 5).



The t-test results of subjective knowledge difference between the information overload groups provided a p value of 0.8840 (see Table 6).

Table 6

Unpaired Test Results on Subjective Knowledge Change Between Non-Information Overload Group and the Information Overload Group

P value and statistical significance:

The two-tailed P value equals 0.8840

By conventional criteria, this difference is considered to be not statistically significant.

Confidence interval:

The mean of Non IO minus IO equals -0.06

95% confidence interval of this difference: From -0.86 to 0.74

Intermediate values used in calculations:

$t = 0.1465$

$df = 66$

standard error of difference = 0.402

This showed that there was not a significant difference between the groups when information overload was introduced.

RQ2: Will those with higher levels of information overload respond less accurately than those given lower levels of information overload?

This question primarily asks about objective knowledge and whether consumers facing higher levels of information overload would respond less accurately than those experiencing lower levels of information overload. As stated in the first research question, the data showed that both groups had a statistically significant increase in objective knowledge scores of 46.21%. The group encountering the information overloaded stimuli scored 13.44% lower than the non-information overloaded group. This means that those exposed to higher levels of information overload will responded less accurately than those exposed to less information overload.

RQ3: Will those with higher levels of information overload filter out information?

The third and final research question sought to determine if students facing higher levels of information overload will filter out information compared to those with lower levels of information overload. Analysis shows that there was no significant difference in the amount of filtering between the two groups, with a p value of 0.36 (see Table 7).

Table 7

Unpaired Test Results on filtering between the Non-Information Overload Group and the Information Overload Group

P value and statistical significance:

The two-tailed P value equals 0.3621

By conventional criteria, this difference is considered to be not statistically significant.

Confidence interval:

The mean of Non IO minus IO equals 0.29

95% confidence interval of this difference: From -0.35 to 0.94

Intermediate values used in calculations:

$t = 0.9245$

$df = 32$

standard error of difference = 0.318

With a scale from one to seven, one being extremely low filtering and seven being extreme filtering both, groups averaged a two. This means that both groups showed very low filtering and that information overload did not impact the filtering of information.

DISCUSSION

This study suggests that there is a correlation between levels of information overload and objective consumer knowledge gain. Even though consumers' objective knowledge can significantly increase with high levels of information overload, the amount of gain can be stifled. Higher levels of information overload can reduce the amount of objective knowledge a person can acquire, but in this study information overload did not completely stop objective knowledge gain. The subjects still gained a considerable amount of knowledge even when information overload was introduced. This means the subjects learned the facts about HDTV, but those experiencing higher levels of information overload learned considerably less.

Interestingly information overload did not seem to influence consumers' subjective knowledge. The participants in the study showed an increase in subjective knowledge regardless of exposure to information overload. The students with information overload perceived themselves to be just as knowledgeable as those who do not experience information overload. This means that those exposed to higher levels of information overload could have an unwarranted high sense of self-confidence regarding their knowledge level. This could lead to erroneously purchasing an HDTV without actually knowing all the facts. Consumers may believe they are knowledgeable on HDTV, but in reality do not completely understand it. Consumers may try to spread the inaccurate and fragmented information to others, leading to a spiral of misinformation among buyers.

The data also hints that consumers might not be filtering out information, or they do not believe they are filtering. Students could be compressing the information too much in order to handle the load. When they search for the information in their memory they are missing bits and pieces. The students could have given a confirmation bias, trying to provide the desired answer to the researcher. The students might have actually filtered information but was unaware of it because they did it automatically. As Hasher and Zacks (1984) pointed out, consumers may be unaware of any filtering or loss of knowledge as it can happen unconsciously.

There may be a biological cause to the filtering as well. The dorsolateral prefrontal cortex is a segment of the brain that is involved in working memory, and plays an important role in the regulation of intellectual function and action (Hale & Fiorello, 2004). Research from Dr. Angelika Dimoka shows that activity in the dorsolateral prefrontal cortex, can be hindered by information overload (Begley, 2011).

They start making stupid mistakes and bad choices because the brain region responsible for smart decision making has essentially left the premises. (Begley, 2011, p. 28)

The data shows that the subjects' perceptions of both websites with and without information overload were similar. This included the site's flow, organization, and time spent viewing information had nearly identical results. The amount of information consumers are exposed to can decrease objective knowledge while flow organization and time perceptions may not affect it at all. This means that even with information overload, consumers can perceive the information delivered as being the same, but the amount of information retained can be different.

Information overload is a problem that is undetectable while being experienced by the consumer. They don't know when information overload is occurring and cannot tell the difference when it is not. It hinders objective knowledge while inaccurately increasing subjective knowledge. The pioneering work on consumer decision-making by Jacoby, Speller & Berning (1974) has shown that even inferior products can be adopted if there is a high level of information overload. In order to raise objective knowledge with subjective knowledge, advertisers, marketers, and manufacturers should focus on quality instead of quantity if they want consumers to make informed purchasing decisions about their products.

For consumers this misunderstanding can be negative because they are purchasing an item without knowing all the facts, but for manufacturers this might be a good thing. Manufacturers selling a cheaper or less advanced product could take advantage of information overload selling less advanced items to consumers who may think it is similar to a higher-end product. Lobbyists and politicians saturate the airways with a barrage of information hindering knowledge gain. Those trying to increase public objective knowledge such as government agencies, promoters, news media, and the like should avoid information overload in order to increase the public's objective knowledge to its fullest.

Limitations and Suggestions for Future Research

The most noticeable limitation of this study is the sample size. A small, isolated sample makes the study unsuitable to generalize to a larger population. In the future, the preferred method would be to conduct an experiment with a larger population and with a

sample representative of the general public. In addition, a qualitative interview or focus group with consumers might reveal unknown variables of information overload, or consumer knowledge that were unable to be measured through questionnaires.

Though this study does not delve deeply into Everett Rogers (1983) diffusion of innovations theory, it would be interesting to see if information overload would affect the innovation-decision process of adopting technology (Rogers, 1983). The first step in Roger's theoretical model is knowledge which happens when a consumer "is exposed to an innovation's existence and gains an understanding of how it functions" (Rogers, 1983, p 162). However, would there be any difference between objective knowledge and subjective knowledge? Can information overload affect consumer knowledge for better and worse in the adoption process? Exploring the difference between objective and subjective knowledge in the adoption process is needed.

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APPENDIX

Letter of Consent:

An Experiment Analyzing Information Overload and its Impact on Students' Consumer Knowledge of High Definition Television

Principal Investigator: Pete Seel

Co-Principal Investigator: Anthony Vigil

March 22, 201106

Dear *Colorado State University Student*,

Thank you for participating in this study. Your input on this study is appreciated and for your contribution you have received a \$20 honorarium.

This study is made up of three steps, overall totaling 60 minutes of your time. The first part is a questionnaire that asks about you as well as what you so far know about High Definition television. In the second step of this study you will be asked to look at a Website for 15 minutes that is about High Definition Television. Lastly you will be asked to take a final questionnaire that asks about the Website.

The purpose of this study to gain your input and insight on High Definition TV.

We promise in writing:

- 1) Your identification is confidential.
- 2) Your participation is voluntary.

You can stop filling out the survey at any time, and if you have difficulties answering any particular question you may ask for help or skip it.

There are no known risks in participating in this study.

If you have any questions or concerns about this study feel free to ask. If you have questions in the future which you can't think of now, you may also contact Anthony Vigil via email at study@anthonyvigil.com.

If you have any questions about your rights as a volunteer in this research, contact Janell Meldrem, Human Research Administrator, at 970-491-1655.

Thank you for your time.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

Signature of person agreeing to take part in the study Date

Printed name of person agreeing to take part in the study

Page 1 of 2 Participant's initials _____ Date _____

Name of person providing information to participant

Date

Signature of Research Staff

Obtain your parent's permission ONLY if you are under 18 years of age.

PARENTAL SIGNATURE FOR MINOR

As parent or guardian I authorize _____ (print name) to become a participant for the described research. The nature and general purpose of the project have been satisfactorily explained to me by _____ and I am satisfied that proper precautions will be observed.

Minor's date of birth

Parent/Guardian name (printed)

Parent/Guardian signature

Date

Page 2 of 2 Participant's initials _____ Date _____

Debriefing Form

Thank you for completing this study on HDTV.

As we indicated earlier, the purpose of this research project was to gain your input and insight on High Definition Television.

We have gained valuable information on HDTV and the information associated with it because of you and other participants. The data will be compiled and summarized to fulfill Colorado State University's requirement for completing the masters program.

Do you have any questions?

If so feel free to contact the investigator, Anthony Vigil at study@anthonyvigil.com or 303-906-5023. If you have any questions about your rights as a volunteer in this research, contact Janell Meldrem, Human Research Administrator at 970-491-1655.

Thanks again for participating.

-Anthony Vigil

Pre-questionnaire

New technology can help societies, as well as the human race progress. However the survival of these new technologies rely on you the consumer. My name is Anthony Vigil, and I am a graduate student at Colorado State University. I am conducting a study on a new technology called High Definition Television, and am asking you for your help.

This is a three-part study, which combined will only take about 45 minutes of your time.

This study is important because it represents your thoughts and beliefs and will also aid in understanding new technologies like HDTV. These new technologies may influence you and your children for years to come. Your input is greatly appreciated. The intent of this study is to gain input on your experiences and attitudes toward High Definition TV.

We promise in writing:

- 1) your identification is confidential.
- 2) Your participation is voluntary.

You may stop at any time, and if you have difficulties answering any particular question you may skip it.

Time span of the study: The overall span of this study on High Definition Television is expected to take only a few months.

All questions refer to High Definition television in America (in accordance to the ATSC DTV standard).

On the scale provided please circle the number corresponding with the item you relate to.

Question

- 1) I consider myself an HDTV:
 - a) Novice
 - b) Intermediate
 - c) Expert
- 2) I am:
 - a) Male
 - b) Female
 - c) Wish not to disclose
- 3) I have purchased an HDTV:
 - a) Yes
 - b) No
- 4) My yearly income is:
 - a) \$10,000 or Less
 - b) \$10,000 to \$20,000
 - c) \$20,000 to \$30,000
 - d) \$30,000 to \$40,000
 - e) \$40,000 or More

5) My current/or highest level of education is:

- a) Freshman
- b) Sophomore
- c) Junior
- d) Senior
- e) Graduate school

What is you're major(s)? _____

6) I am _____ years old.

7) I have watched a televised event on HDTV:

- a) Yes
- b) No

8) I have a great memory.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

9) My profession studies or uses High Definition Television (Such as the broadcasting industry):

Frequently						Never
1	2	3	4	5	6	7

10) I am interested in finding out more information on High Definition Television:

Frequently						Never
1	2	3	4	5	6	7

11) I seek information on home electronic equipment over \$100 (TV's, Stereo systems, computers):

Frequently						Never
1	2	3	4	5	6	7

12) I purchase home electronic equipment priced over \$100 (TV's, Stereo systems, computers):

Frequently						Never
1	2	3	4	5	6	7

13) I seek information on electronic merchandise priced under \$100 (movies, music, games):

Frequently						Never
1	2	3	4	5	6	7

14) I purchase electronic merchandise under \$100 (movies, music, games):

Frequently						Never
1	2	3	4	5	6	7

15) I have heard or seen information on HDTV sets (within the last month):

Frequently						Never
1	2	3	4	5	6	7

16) I have used an HDTV (within the last month):

Frequently						Never
1	2	3	4	5	6	7

17) I am knowledgeable about High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

18) I know how to judge the quality of a High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

19) I think I know enough about High Definition Television to feel confident to make a purchase.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

20) I do not feel very knowledgeable about High Definition Television. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

21) Among my circle of friends, I'm one of the "experts" on High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

22) Compared to most other people, I know less about High Definition Television.***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

23) I have heard of the new High Definition Televisions types/receivers around.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

24) When it comes to High Definition Television, I really don't know a lot. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

25) I can tell if a High Definition Television is worth the price or not.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

26) I have looked for information on High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

27) The audio standard used in High definition television is:

- a) AC-3
- b) MP-3
- c) PCM
- d) Uncompressed audio
- e) WMA
- f) Don't know

28) The resolution standard for High definition television in active vertical lines is:

- a) 128
- b) 525
- c) 720
- d) 1080
- e) 1125
- f) Don't know

29) The format High Definition video is encoded in is:

- a) ASF
- b) AVI
- c) DIVX
- d) Mpeg-2
- e) XVID
- f) Don't know

30) There are currently ___ types of High definition sets/receivers on the market:

- a) Three
- b) Five
- c) Seven
- d) Nine
- e) Zero
- f) Don't know

31) High Definition Televisions aspect ratio (width divided by height) is:

- a) 1:1
- b) 1.33:1 or 4:3
- c) 1.78:1 or 16:9
- d) 1.85:1
- e) 2:1
- f) Don't know

32) The High Definition Television signal is transmitted in _____ form:

- a) Analog (Wave)
- b) Digital (Packets)
- c) Both Analog and Digital
- d) Hyper threading
- e) All of the above
- f) Don't know

33) The difference between High Definition transmitted Television and NTSC transmitted Television is:

- a) Image resolution
- b) Audio quality
- c) Screen size
- d) All of the above
- e) None of the above
- f) Don't know

34) The amount of information available on HDTV in the media is:

Too Much							Not Enough
1	2	3	4	5	6	7	

35) The amount of information the media (television, radio, and newspapers) has mentioned on HDTV or High Definition Television within the last week is. (Excluding this survey)

Too Much							Not Enough
1	2	3	4	5	6	7	

Post-questionnaire

- 1) I am knowledgeable about High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 2) I know how to judge the quality of a High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 3) I think I know enough about High Definition Television to feel confident to make a purchase.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 4) I do not feel very knowledgeable about High Definition Television. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 5) Among my circle of friends, I'm one of the "experts" on High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 6) Compared to most other people, I know less about High Definition Television.***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 7) I have heard of the new High Definition Televisions types/receivers around.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 8) When it comes to High Definition Television, I really don't know a lot. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 9) I can tell if a High Definition Television is worth the price or not.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7
- 10) I have looked for information on High Definition Television.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

11) The audio standard used in High definition television is:

- a) AC-3
- b) MP-3
- c) PCM
- d) Uncompressed audio
- e) WMA
- f) Don't know

12) The resolution standard for High definition television in active vertical lines is:

- g) 128
- h) 525
- i) 720
- j) 1080
- k) 1125
- l) Don't know

13) The format High Definition video is encoded in is:

- m) ASF
- n) AVI
- o) DIVX
- p) Mpeg-2
- q) XVID
- r) Don't know

14) There are currently ___ types of High definition sets/receivers on the market:

- s) Three
- t) Five
- u) Seven
- v) Nine
- w) Zero
- x) Don't know

15) High Definition Televisions aspect ratio (width divided by height) is:

- y) 1:1
- z) 1.33:1 or 4:3
- aa) 1.78:1 or 16:9
- bb) 1.85:1
- cc) 2:1
- dd) Don't know

16) The High Definition Television signal is transmitted in _____ form:

- ee) Analog (Wave)
- ff) Digital (Packets)
- gg) Both Analog and Digital
- hh) Hyper threading
- ii) All of the above
- jj) Don't know

17) The difference between High Definition transmitted Television and NTSC transmitted Television is:

- kk) Image resolution
- ll) Audio quality
- mm) Screen size
- nn) All of the above
- oo) None of the above
- pp) Don't know

18) The amount of information available on HDTV in the media is:

Too Much							Not Enough
1	2	3	4	5	6	7	

19) The amount of information the media (television, radio, and newspapers) has mentioned on HDTV or High Definition Television within the last week is. (Excluding this survey)

Too Much							Not Enough
1	2	3	4	5	6	7	

20) I consider myself an HDTV:

- a. Novice
- b. Intermediate
- c. Expert

21) I am interested in finding out more information on High Definition Television:

- a) Yes
- b) No

22) I have a great memory.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

23) The website on High Definition Television had too much information.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

24) The website on High Definition Television did not have enough information. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

25) The information on the High Definition Television website was informative.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

26) The information on the High Definition Television website was useless. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

27) The information on the High Definition Television website lowered my understanding of HDTV. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

28) The information on the High Definition Television website was complex. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

29) The information on the High Definition Television website was easy to understand.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

30) I feel there was not enough time to look at the Website.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

31) The information on the High Definition Television website was organized.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

32) The information on the High Definition Television website was chaotic. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

33) The information on the High Definition Television website was flowed well from one topic to another.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

34) The links associated with the High Definition Television website increased my knowledge.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

35) The links associated with the High Definition Television website have valuable information.

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

36) The links associated with the High Definition Television website held useless information. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7

37) The links associated with the High Definition Television website were repetitive. ***

Strongly Agree	Agree	Somewhat Agree	Unsure	Somewhat Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6	7