Beyond Usability: A Rubric to Evaluate the Emotional Impact of E-commerce Homepages

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Beyond usability: A rubric to evaluate the emotional impact of e-commerce homepages

by

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ABSTRACT

Given the popularity of usability testing, why do people still feel uncomfortable interacting with websites? Could it be because usability testing does not address the user experience but rather tends to deal with efficiency and navigation but seldom with experience? The current implementation of usability research heavily relies on quantitative analysis when the nature of the issue is qualitative. Few studies have adequate scope to include both quantitative and qualitative analysis.

Activity theory describes several elements involved in human activity. By incorporating Activity Theory with quantitative and qualitative measures of user experience, the designer will be better able to assess the affective impact of a website design.

The purpose of this study is to create a suitable instrument to measure and predict affective and experiential aspects of web interaction. The resulting instrument will provide affective data relevant to the overall emotional and experiential response to a website.
1. INTRODUCTION

1.1 Experiential background

We live in a world of constant flux. Everyday we are bombarded with interactions and experiences that shape our thoughts, values, and judgments, as well as test our limits of interaction with technology. For example, once time-consuming research tasks can be accomplished in minutes on the internet. Moreover, with the click of a mouse button the contents of a book can be delivered straight to your door, or even downloaded to your hand-held device—without the need for wires or connections. We beam contact information from one Blackberry to another and send short text messages via our mobile phones, much like the instant messages on the PC of the past. This interaction with technology has progressed at such an intense pace that humans have become practically slaves to technological innovation. Humans are forced to conform with needs of technology, rather then technology conforming to human needs. This fact must be rectified and becomes the primary focus of this thesis.

The advent of the industrial age brought with it a continuous stream of products utilizing technology. Throughout the industrial age (and now) technology has infiltrated our lives: moving from simply being a tool of production, to integral parts of everyday life. (Thackara, 2006) We have overlooked the needs of the human, instead concentrating on the newest technology and how it could help ‘streamline’ our everyday lives. This misdirection has caused a shift away from human-centered design to technology-centered design. Humans have been trained to conform and adapt to the ever-changing face of technology. (Thackara, 2006) We must rally to shift the design focus from technology for
its own sake to technology designed to serve human experience. How users interpret and participate with the experience of technology cannot be separated from how humans decipher that experiential action itself. (McCarthy & Wright, 2007, p. 143)

Graphic designers are creators of the printed and electronic ephemera with which others interact. This role gives the graphic designer some influence in determining societies’ response to these materials— influence that can often be quite real and significant. “Design is asked to influence, not just the look and feel of individual things [or systems], but the quality of experience that people have as they live their lives through time and space, encountering the designed world.” (McDonagh, Hekkert, VanErp, & Gyi, 2003, p. 13) Furthermore, prior to the creation of any such items, the graphic designer must be thoroughly familiar with the target audience and how best to communicate with this audience. Paying close attention to the ‘unarticulated’ needs of a system requires meticulous observation in the users’ natural environment. (Norman, 2005) In addition to being familiar with the intended users and the system requirements, the designer also must be sensitive to the prevailing and previously existing patterns that are in the design of the system. This familiarity enables the designer to create the message and interface that most clearly communicates his message and facilitates interaction with members of the target audience. Essentially then, the designer is creating a specific interaction, or experience, for these target individuals. These resulting experiences encompass emotions that exist in a constant state of reverberating duality: positive and attractive, or negative and repulsive. (Csikszentmihalyi, 1998)

The design practice of communicating messages to specific groups or markets creates unique opportunities for social growth, development, and change. Audience
members are not passive receptors of messages. (Morgan & Welton, 1992) Up to this point virtually all customer needs have been ignored in the design of today’s products, tools, and electronic interfaces, in fact, Donald Norman has said, “One side effect of today’s technologically advanced world is that it is not uncommon to hate the things we interact with.” (Norman, 2005, p. 10)

For it is this resulting experience that has the potential to be shaped and modified by the designer to provide the catalyst for positive social change and interaction among the targeted audience members and the segment of society they represent. Designers can’t control the experiences individuals will have with the system; however, “designers can, and do, work with concern for the quality of people’s experiences relating to individual products and to systems of things. In this way, designers have the ability to influence positively both the beauty of these interactions and…affect people’s perceptions of the company offering them.” (McDonagh, Hekkert, VanErp, & Gyi, 2003, p. 14)

Additionally, “Technology should bring more to our lives then the improved performance of tasks: it should add richness and enjoyment. A good way to bring fun and enjoyment to our lives is to trust in the skill of artists. Fortunately, there are many around.” (Norman, 2005, p. 101) The artifacts of everyday life must be considered a supporting tool in the symbiotic relationship demonstrated in the system of human-computer interaction, and not the primary. (Thackara, 2006) Designers are beginning to realize that emotions play an important role in interaction with a system. “We cognitive scientists now understand that emotion is a necessary part of life, affecting how you feel, how you behave, and how you think” (Norman, 2005, p. 10) “Emotions reflect our personal experiences, associations, and memories.” (Norman, 2005, p. 47)
1.2 Context

My mother brought the subject of research for this thesis to my attention. She has been using the internet for several years to maintain contact with her three sons and sister-in-law via email, view photos of her granddaughter, and access data such as directions and maps. Until recently, these activities constituted the extent of her knowledge and use of the internet. In addition, she had always been hesitant to purchase anything online for fear of fraud or worse identity theft. Eventually she became comfortable shopping online until one day when I received a phone call from her. She wanted to purchase something from a website, but she could not complete the transaction. The site was overwhelming to her and rather than take the time to navigate, experiment, and finally complete her purchase, it was easier for her to call me. I quickly discovered this website was indeed overwhelming and evoked a sense of anxiety for even the most seasoned of internet users.

During this interaction I realized that websites have the power to evoke specific emotional responses from users. As a designer, I recognized these affective responses are the result of the interaction experience- and more importantly, interactions can be designed.
1.3 Problem

This situation raised several important issues: Do some people avoid using the internet? What is it about the internet that makes some people uncomfortable? With the prevalence of usability testing why do some websites still make people feel uncomfortable? Could it be that because usability testing does not address the user experience, but tends to deal with efficiency and navigation rather than with the quality of human experiences and the comfort level of the human experience goes untested?

Activity theory describes several aspects of human activity. Traditional usability testing; however, addresses only one of these elements, neglecting the others. Consequently, traditional website research has tended to overlook issues related to the user experience. One of the problems faced by usability experts is that no satisfactory means of measuring affective experience has been researched and developed. A second problem is that usability research relies heavily on quantitative analysis. However, the quality of an experience is best evaluated qualitatively. Few studies have had adequate scope to include both the quantitative and qualitative analysis of experience design for the web.
1.4 Purpose

The purpose of this study is to create a suitable instrument to measure and predict the affective and experiential aspects of internet interaction. Out of necessity, the study will examine both the quantitative and qualitative aspects of user experience. By combining these two methods of analysis, the resulting instrument will provide more affective data relevant to the emotional interaction users have with a system.

It will also provide designers with a means of identifying successfully designed web interactions. This tool can also be used during the design phase of a website in order to design a more desirable affective response to an on-line shopping experience.
1.5 **Research Questions**

This research will focus on two basic questions:

1. Can we create an instrument that will measure and/or predict affective and experiential reactions to a website?
   
   a. What items must appear on such an instrument?
   
   b. How can these items be defined as relative to the value of the internet interaction?

2. Can the instrument be applied to websites as a design tool to improve affective and experiential responses?
2. REVIEW OF THE LITERATURE

2.1 Human emotion

What are emotions?

Emotions are fundamental in enriching any system interaction. (Brave & Nass, 2003) In the past, systems were developed aesthetically and without regard or response to the emotional influence they possessed. (Papanek, 1985) Furthermore, system designers concluded that interactions with technology, particularly computers, were unemotional and sterile. (Brave & Nass, 2003) However recent design philosophers, psychologists, neuroscientists, and scholars have suggested that emotion plays an integral role in our interactions with technology, including computers and the interfaces designed to interact via this medium.

As designers of interfaces and interactive systems, we must recognize and centralize the emotional-volitional nature of any system. (McCarthy & Wright, 2007) Designers must understand they do not “design emotions,” but rather they design for the optimum experience that results from personal interaction with the objects experienced in everyday life. (Sanders, 2001) Designers lay the foundation and create the scaffolding that their target audience will use to create their personal emotional experiences. (Sanders, 2001) Emotion is no longer regarded as the occasional outburst directed at the computer screen or the frustration observed when attempting to decipher a cryptic error message. It is now understood that a wide range of emotions play seminal roles in practically every goal-oriented activity. (Brave & Nass, 2003) Furthermore, emotion is often aligned with behavioral design. According to Donald Norman, behavioral design is about look and feel - the total experience of using a product. Norman goes on to say, reflection is about one’s
thoughts afterwards, how it makes one feel, the image it portrays, and the message it extends to others regarding individual experience. (Norman, 2005) “Many psychologists now argue that it is impossible for a person to have a thought or perform an action without engaging, at least unconsciously, his or her emotional system.” (Brave & Nass, 2003) Moreover, people are like a phenomenologist: they take their inner feelings much more seriously than the forces of outside occurrences exhorted over them. (Csikszentmihalyi, 1998)

The influence emotion plays on any one individual can vary greatly. People bring previous experiences, values, and prejudices to each interaction they face. “Emotions are in some respect the most subjective elements of consciousness, since it is only the person himself or herself who can tell whether he or she truly experiences love, shame, gratitude, or happiness. Yet an emotion is also the most objective content of the mind, because the ‘gut feeling’ we experience when we are in love, or ashamed, or scared, or happy, is generally more real to us than what we observe in the world outside.” (Csikszentmihalyi, 1998, p. 17) No matter what we are experiencing, or doing, how we value the experience is even more important. (Csikszentmihalyi, 1998)

A discussion revolving around emotion would not be complete without highlighting the semantic differences between emotion and feelings. According to Anthony Damasio, in his book, *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain*, emotions precede feelings. “Feelings [are] mostly shadows of the external manner of emotions,” says Damasio. (Damasio, 2003, p. 29) Damasio goes on to explain that a distinct difference exists between emotion and feeling. “It is true that the common usage of the word emotion tends to encompass the notion of feeling. But in our attempt to understand the complex chain of events that begins with emotion and ends up in feeling, we can be helped by a
principled separation between the part of the process that is made public and the part that remains private… the former part emotion and the latter part feeling,” states Damasio. (Damasio, 2003, p. 27) Interestingly enough, he provides an explanation regarding the ordering of emotions and feelings. According to Damasio, emotions withstood the test of evolution, “we have emotions first and feelings after because evolution came up with emotions first and feelings later. Emotions are built from simple reactions that easily promote the survival of an organism and thus could easily prevail in evolution.” (Damasio, 2003, p. 30) We ultimately concern ourselves with the former- emotions, those which are made public, “Emotions are actions that mostly occur in the public, “visible to others as they occur in the face, in the voice, in specific behaviors. Feelings, on the other hand, are always hidden, like all mental images necessarily are, unseen to anyone other then their rightful owner, the most private property of the organism in whose brain they occur.” (Damasio, 2003, p. 28)

How are Emotions created and processed?

Up to this point, emotions have been defined and viewed as a set of user reactions triggered when the individual interacts with a technological system. However, the source of all emotion and feeling is inside the complex human organ known as the brain. Damasio states, “Emotions play out in the theater of the body. Feelings play out in the theater of the mind.” (Damasio, 2003, p. 28). Furthermore, we must understand the psycho-physiological systems that determine how emotion emerges from interactions with systems such as websites, before we can design, interpret, or attempt to solicit any behavior from our user. The literature provides a plethora of definitions for ‘emotions,’ however, according to Brave and Nass, “generally agreed-on aspects of emotion stand out: (1)
emotion is a reaction to events deemed relevant to the needs, goals, or concerns of an individual; and (2) emotion encompasses physiological, affective, behavioral, and cognitive components.” (Brave & Nass, 2003). One model we can refer to in an attempt to understand the emotional system is based on a simplified view of LeDoux’s work in neuropsychology (Figure 1) (Brave & Nass, 2003) (LeDoux, 2003)

![A simplified model of LeDoux’s work as presented by Brave and Nass (2003). Figure 1](image)

The model diagrams an interaction involving three key regions of the brain: the thalamus, the limbic system, and the cortex. Sensory input enters the system via the thalamus and is then routed either to the cortex, for higher-level processing, or to the limbic system. These two pathways, the thalamic-limbic and the cortico-limbic represent the brain's traffic response system. (Ledoux, 1998). LeDoux refers to the limbic system as the “seat of emotion,” an area that constantly evaluates the needs and goals correlation of the incoming information. If input is determined to be relevant, the limbic system routes signals to the
body and the cortex, while biasing the cognitive processes and attention. (Ledoux, 1998) (Brave & Nass, 2003).

The thalamic-limbic passageway connecting the limbic system and thalamus is responsible for what Damasio refers to as primary emotions: innate aversions and attractions as well as fear. (Damasio, 2005). Designers should take note of these as they are triggered by sudden changes including: strong size contrasts, alarming error messages, flashing text, and other startling objects of visual stimuli. (Brave & Nass, 2003).

The cortico-limbic passageway is responsible for processing higher-level cognitive and emotional operations such as pride, satisfaction, depression and frustration. An example would be deciding whether or not to delete a file, or recognizing the Apple logo. These emotions and actions require more cognitive processing (Brave & Nass, 2003). Furthermore emotions have a direct impact on the interaction between humans and technology. The cortex can trigger not only responses to external stimuli, but also to internally generated stimuli.

Robert Plutchik, in his book, Emotion: A Psychoevolutionary Synthesis, defines eight basic emotions and their additive derivate emotions. The basic emotions are of fear, surprise, sadness, disgust, anger, anticipation, joy and acceptance. This basic set is reiterated and slightly differentiated by Damiso when he states, “The primary (or basic) emotions are easier to define because there is an established tradition of lumping certain prominent emotions in this group. The frequent listing includes fear, anger, disgust, surprise, sadness and happiness, the emotions that first come to mind whenever the term, ‘emotions,’ is invoked.” (Damasio, 2003, p. 44) Furthermore, these emotions cut across
lines of gender and culture and have been noted in human and non-human species alike. To validate the completeness of Plutchik’s emotions, we look to Anthony Ortony who compiled a list of emotions from a vast pool of research and published his findings in the seminal article, ‘What’s basic about basic emotion?,’ which appeared in the July 1990 issue of Psychological Review. (Table 1) In his article, Ortony gathered and compiled the various emotions detailed by a variety of psychologists, theorists and philosophers in an attempt to answer his research which questioned the validity of a common set of basic emotions. Ortony states, “A widespread assumption in theories of emotion is that there exists a small set of basic emotions. From a biological perspective, this idea is manifested in the belief that there might be neurophysiological and anatomical substrates corresponding to the basic emotions.” (Ortony & Turner, 1990, p. Abstract)

For the sake of discussion we will use Plutchik’s model as it provides an opportunity to analyze and create blended emotions, as well as primary emotions.
Anthony Ortony's Compilation of emotional theories

Table 1
By utilizing the circular diagram of basic emotions we see they are located in very precise locations and relationships to each other. Plutchik defends this positioning when he states, “The eventual decision for the optimal ordering [in any model] will also depend upon the kind of internal consistency and research implications provided by one grouping rather than another. Based on his research, Plutchik sequences the order of emotions on the circle: joy, acceptance, fear, surprise, sadness, disgust, anger, and anticipation.” (Plutchik, 1980, p. 156) “The center of the circle is used to represent the idea of conflict resulting from the mixtures of two or more emotions.” (Plutchik, 1980, p. 160) (Figure 2)

Plutchik uses a circular diagram to represent the relationships between primary emotions.
and derived emotions. He places the primary emotions at regular intervals on the wheel; then he uses, the primary, secondary and tertiary dyads of color mixing theory, to describe several derived emotions. (Figure 3) For example, by mixing adjacent emotions, or primary dyads he concludes joy + acceptance = friendliness and fear + surprise = alarm. Plutchik’s model also includes secondary dyads, mixing emotions, once removed, joy + fear = guilt and sadness + anger = sullenness, and finally tertiary dyads, mixing of emotions, twice removed joy + surprise = delight and anticipation + fear = anxiety. (Damasio, 2005, p. 114) (Plutchik, 1980)

In subsequent chapters of his book, Emotion: A Psychoevolutionary Synthesis, Plutchik describes his rationale in structuring the order of emotions as he did. In essence, Plutchik assembled a list of synonyms from the Roget’s Thesaurus for each of the varied dimensional emotional words. He then presented these to a group of college students to
score them. Statistics were generated and the list of intensity determined the 8 resulting emotional headers. He further goes on to detail his analytical and empirical studies that followed the creation of the emotional circle. These additional studies validate not only the completeness of emotions, but also the authority of personality traits formed by the mixture of dyad emotions.

The distance between two emotions dictates the level of ‘blending’ and ‘mixing’ that could occur, thus diluting the primary emotions. (Damasio, 2003, p. 114) The more distant the emotions, the less likely they are to mix. Some emotional theorists, including Antonio Damasio, believe that this mixing of adjacent and different dyadic emotions occurs only in humans, and produces the higher ordered derived emotions. (Damasio, 2005, p. 114) The “higher level,” set of derived emotions is usually, “thought of as a cognitive operation.” (Damasio, 2005, p. 114) The lower levels, or the basic eight emotions in our working model, are universally shared with lower species.

**What influences emotion, can emotions be shaped?**

Finite differences regarding semantics are a constant element of contention among scientists involved with human emotional research; however, all agree that emotions are a necessary part of the human cognitive system. According to Donald Norman, “Emotions are inseparable from and a necessary part of cognition.” (Norman, 2005, p. 7) Norman continues, “Emotion is the conscious experience of affect, complete with attribution of its cause and identification of its object.” (Norman, 2005, p. 11)

Individuals outside the realm of professional psychological research also echo this thesis, for example Clotaire Rapaille in his book, *Culture Code*, discusses the relationship
between experiences, emotion, and the culture in which these experiences occur. Rapaille describes several of, what he calls ‘cultural codes’ along with their associated ‘imprints.’ The code is an attempt to unlock the conventions for personal interpretation. “An imprint and it’s code are like a lock and its combination. If you have all the right numbers in the right sequence, you can open the lock. Doing so over a vast array of imprints has profound implications. It brings us to the answer to one of our most fundamental questions: why do we act the way we do?” (Rapaille, 2007, p. 11) The term ‘imprint,’ was first introduced by Konrad Lorenz as described to us by Rapaille, “The combination of the experience and its accompanying emotion creates something known widely as an imprint. Once an imprint occurs, it strongly conditions our thought processes and shapes our future actions. Each imprint helps make us more of who we are. The combination of imprints defines us.” 2007, #2902@6} These imprints, Rapaille states, influence us on an unconscious level. (Rapaille, 2007)

In addition to Rapaille, Gerald Cupchik, a noted Professor of Psychology at the University of Toronto, contributes some interesting thoughts on the shaping and interaction of emotions and experiences. Cupchik studies the psychology of emotion and aesthetics. He argues that consciousness acts as the division between the interaction of physical and social worlds. He suggests that the various theories of emotion be subdivided into two contrasting groups. “Consciousness serves as a sentient boundary between stimulation from the external physical or social worlds and the internal bodily world. Emotions are a part of consciousness and reflect the complex interaction of mind and body.” Cupchik goes on to say, “While a unified theory of emotion remains elusive, the main theories can be divided into complimentary ‘action’ and ‘experience’ oriented
groups. The action-oriented approaches to emotion, associated with centralism, behaviorism, and cognitivism, focus on the adaptive and purposive mind. In contrast, experience oriented theories relate to peripheralism, psychodynamics, and phenomenology/existentialism, [that] encompass bodily reactions to social meanings.” (Cupchik, 2003, p. 4) Furthermore, Cupchik explains his thoughts on the importance of emotions by saying, “One can argue that in action mode, feelings are the shadows of cognition. When the pattern of ideas is coherent, then there is a feeling of calm or pleasure. When the ideas do not fit together harmoniously, there is the experience of tension.” (Cupchik, 2003, p. 4) This notion of action groups illuminates the belief that experiences can be shaped. “Given that feelings reflect the state of cognition, so to speak, artists and designers can use their feelings as an index of the state of their projects.” (Cupchik, 2003, p. 4)

Cupchik continues his discussion describing the contrasting realms of thought and emotional response to situations and experiences in terms of two processes. “Bottom-up processes are more characteristic of the experience mode in which the body is the focus and the mind serves as background or context. From this perspective, cognition serves as a context for emotions… feedback from bodily states and muscular memories lend coherence to the overall experience…” Cupchik believes that bottom-up and top-down processing relate to one another in much the same way that the designer thinks of the figure – ground relationship. “Top-down processes are typically of the action mode whereby the mind is the central figure dominating the body as ground.” In other words, “cognitions govern feelings.” (Cupchik, 2003, p. 4)
With this in mind, Cupchik says, “In the sum the interaction of mind and body can be characterized in complementary processes depending on whether the figure/ground relation is mind over body or body over mind. When the mind is dominant, then the body functions in terms of [emotions], whereas when the body is dominant, it awakens the mind’s eye with memories and symbolically meaningful experiences.” (Cupchik, 2003, p. 5)

For example, imagine how a smell can trigger memories or how a person can involuntarily drift into inattentiveness, these are prime examples of the body acting as the figure over the mind functioning as the ground.

The model in Figure 4 illustrates the reciprocal nature of Cupchik’s top-down and bottom-up processing theory. As the model suggests, both processes contribute to the overall rich user experience.
Ultimately, the sum of all human emotional responses constitutes what we know as experiences. John McCarthy states in his book, Technology as Experience, “By making the emotional-volitional nature of the act central to our account of experience, we focus on felt life as the concerns, fears, confusion, ambivalence, interests, desires, and expectations that permeate our sense making.” (McCarthy & Wright, 2007)

**How are emotions optimized (Flow)?**

According to Mihaly Csikszentmihalyi, experience can be described as a journey over the course of a given amount of time. (Csikszentmihalyi, 1998). Moreover, “To live means to experience—through doing, feeling, and thinking. Experience takes place in time, so time is the ultimate scarce resource we have.” (Csikszentmihalyi, 1998, p. 8). For this reason, time becomes an essential factor in the interactive system, as well as the concept of optimized emotions, which Csikszentmihalyi calls ‘Flow.’

The relationship between emotions and human experience relates directly to the attention span of human interactions, which is consistent with Csikszentmihalyi’s concept of time as an essential factor. “Emotions refer to the internal states of consciousness. Negative emotions like sadness, fear, anxiety, or boredom produce ‘psychic entropy’ in the mind, that is, a state in which we cannot use attention effectively to deal with external tasks…” By extrapolation we can conclude the antithesis also be true (Csikszentmihalyi, 1998, p. 22).

Csikszentmihalyi explains that these experiences shape us forever, “Over the years, the content of experience will determine the quality of life. Therefore one of the...
most essential decisions any of us can make is about how one’s time is allocated or invested.” (Csikszentmihalyi, 1998, p. 8)

Flow has been described as the point when the optimal levels of challenges (obstacles) and skills (personal) are met. “Flow tends to occur when a person’s skills are fully involved in overcoming a challenge that is just about manageable. Optimal experiences usually involve a fine balance between one’s ability to act, and the available opportunities to action.” (Emphasis added) (Csikszentmihalyi, 1998, p. 30) As skill level rises, challenges must also rise otherwise the user will become bored or apathetic. The

![Csikszentmihalyi’s graph indicating skills and challenges correlate](image)
optimum level of Flow occurs when the skills are high enough to balance the challenges presented. (Figure 5)

Furthermore: “human beings feel best in flow, when they are fully involved in meeting a challenge, solving a problem, discovering something new. Most activities that produce flow also have clear goals, clear rules, immediate feedback- a set of external demands that focuses our attention and makes demands on our skills” (Csikszentmihalyi, 1998, p.  66). Donald Norman agrees: “In the flow state, you become so engrossed and captured by the activity being performed that it is as if you and the activity were one: You are in a trance where the world disappears from consciousness. Time stops. … Flow is a motivating, captivating, addictive state.” (Norman, 2005, p.  48)
2.2 **Human behavior**

What is human behavior?

Philosophers such as Carl Jung, B.F. Skinner, and Abraham Maslow acknowledge that human behavior is driven by motivation, emotion, and affective factors. These understandings reiterate the importance that products and services must cater to the human aspect of the interaction. This human aspect must be recognized along with their associated human behaviors, “companies have turned to design to differentiate their offerings through human-centered innovation and to create stronger emotional connections with their customers.” (McDonagh, Hekkert, VanErp, & Gyi, 2003, p. 13)

One example of a brand that has used principles of human behavior to shape its direction in the consumer market is the technology and communication company Apple, Incorporated. Apple’s iPod was the first of its kind; this innovation also came with a hefty price tag, one that consumers were apprehensive to accept. In order to be successful, Apple realized they needed to hone in on the entire *experience* of purchasing the iPod. Apple realized that consumers were much more emotionally driven to purchase a $350 music player on impulse when their entire emotional experience consisted of positive human behavior. From the design of the store to the packaging, Apple designed the ultimate consumer buying experience, and made the iPod a highly successful personal entertainment and information system. Other corporations such as Braun and Philips have recognized that design adds a strategic advantage to their businesses. (McDonagh, Hekkert, VanErp, & Gyi, 2003)

One of the most important aspects of human behavior is the complex processing required for the human brain to acquire, store, and process new information, as well as
novel experiences. In addition, humans utilize selective perception: what is seen means exactly what the viewer wants it to mean. John Morgan, author of the popular visual communication textbook, *See What I Mean: An Introduction to Visual Communication* says it best, “We direct our attention mainly to those messages we know we will like: they suit our tastes, confirm our prejudices, or excite our indignation in ways which appeal to our self-esteem. However, selection does not end there. When we are presented with a complex message, we are likely to notice particularly those parts of it which confirm our previous attitudes.” (Morgan & Welton, 1992, p. 61) Essentially humans thrive on pattern association. They become accustomed to seeing something presented in a certain manner and format, and become comfortable and proficient in their usage.

Designers must also understand that human behavior does not occur in an emotional or experiential vacuum. “Precious experience, prejudice, and the brain’s preference for simple explanations all color the interpretations which we give to the impressions of our senses. In order to help the audience focus on those parts of a message which are intended to be important, some attempt must be made to anticipate these selective processes; however, at times these processes can be anticipated so that we sketch key points and leave the receiver’s imagination to close the gaps.” (Morgan & Welton, 1992, p. 73).

**What motivates human behavior?**

Human motivation can be discussed and interpreted in terms of behavior. Rapaille states, “…Henri Laborit, … drew a clear connection between learning and emotion, showing that without the latter the former was impossible. The stronger the emotion, the
more clearly an experience is learned.” (Rapaille, 2007, p. 6) Norman describes this occurrence well, “…everything that you do has both a cognitive and an affective component– cognitive to assign meaning, affective to assign value. You cannot escape affect: it is always there. More important, the affective state, whether positive or negative affect, changes how we think.” (Norman, 2005, p. 25) Humans strive to achieve a positive affect in every situation in which they find themselves. They seek out pleasure, or denounce and escape from pain. (Skinner, 2005) Motivation propels human behavior forward to achieve positive affect and personal satisfaction. It is for this reason we must ensure the interaction between human and technology be tailored to meet the specific emotional needs of users, in our case the interface take on the Activity Theory role of mediator.

Donald Norman describes an affordance as, “the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.” (Norman, 2005) In our case, the ‘thing,’ becomes the mediating tool for which the interaction takes place through, the interface. This affordance affects the motivational level of the user. In our current framework, the affordance is the website interface, which in turn, affects the users’ level of motivation in the interaction. The designers’ job, then, includes, eliminating or diminishing the intrusion of barriers between the human and the affordance level. Norman describes this task, “The design challenge is to keep the virtues while removing the barriers: make it easier to store, send, share. Make it easier to find just the desired pictures years after they have been taken and put into storage.” (Norman, 2005, p. 50)
Activity Theory: Reasons to act

Activity Theory is based in part on the work of Vygotsky, Leont’ev, and has been expanded upon by Yro Engström. In essence, activity theory states that human beings interact with their environment via situations mediated by tools. Through mediation these situations create experiences. “This notion is usually portrayed by what has come to be known as the mediation model of human interactions with the environment.” (Mwanza, 2001, p. 344) Leont’ev developed Vygotsky’s initial theory further by providing links between social and cultural mediations, resulting in a hierarchical model of human activity. Engström drew upon both Vygotsky and Leont’ev’s models of human interaction activity by expanding them to encompass rules, community, and the division of labor. This resulting model has come to be known as the Activity Triangle Model. (Figure 6) (Mwanza, 2001, p. 344) Bonnie Nardi and Victor Kaptelinin have applied activity theory to the field of human and computer interaction.

This theory provides an excellent framework through which to explore the interaction between the user, tools, and outcomes with regard to website experience design.

Activity theory divides an activity of interest into seven components:

1. The Activity
2. The Tool
3. The Subject
4. The Object
5. The Rules
6. The Community
7. The Division of labor
Subject describes the user who is enacting the activity, and the object is the motivation or intended outcome of the enactment. The tool, is situated between the subject (user) and the Object (outcome). It is the device, in this case, a ecommerce website, through which the activity is implemented. The tool facilitates the efforts of the user to achieve the desired outcome. The rules component mediates the activity; as does any culture, pattern, gender, society, or any other factor that imposes any rules on this interaction. Community refers to the environment in which the activity is completed, and finally, the rules of labor divide existing roles of in the activity (if necessary). It has the effect of assigning duties to those responsible for completion of each task as well as the division of a larger activity into tasks (if necessary). (Figure 6)
2.3 **Human experience**

**Experience: The sum of the parts**

Each of the major behavioral theoretical approaches develops a view on human motivation. Operant learning suggests consequence is the primary component determinant in motivation. In contrast, classical conditioning contends that biological response to external stimuli produces the necessary motivation to guide behavior. B.F. Skinner has given us yet another explanation for behavior. He believes that behavior reflects the natural instinctual response of all beings to gravitate towards the positive or pleasurable stimuli or experience, we are therefore motivated to move toward positive stimuli, and away from negative ones. (Skinner, 1981) Another interesting cognitive approach to human motivation is called expectancy theory, devised and explored by Victor Vroom, a theorist interested in studying employee motivation in the workplace. Expectancy theory proposes an interesting relationship between motivation, expectancy, instrumentality, and value. In detailing these components Vroom describes expectancy as the perceived probability of success, instrumentality as the connection of success and reward, and value as the value of obtaining the goal. When combined they create the following equation: Motivation = Expectancy * Instrumentality * Value. (Vroom, 1967) The use of the multiplier as the mathematical operator indicates that all three of the variables (expectancy, instrumentality and value) must rank high in order to produce a high value of motivation. If the individual does not believe they can achieve the goal, doesn’t connect with the result or goal, or see the personal value in completing the goal, then any low value will cause motivation to fall.
Cognitive Thin Slicing: The power of a glance

In *Rambler*, Dr. Samuel Johnson, an essayist, poet, biographer, lexicographer, and critic of English literature says, “Few have strength of reason to overrule the perceptions of sense, and yet fewer have curiosity or benevolence to struggle long against the first impression: he who therefore fails to please in his salutation and address is at once rejected, and never obtains an opportunity of showing his latest excellences or essential qualities.” (Johnson & Bate, 1968) The concept of first impressions has produced several maxims throughout the ages, one of the most famous being, “You never have a second chance to make a first impression.” The New York Times columnist, Malcolm Gladwell, in his book, *Blink*, has applied this concept to cognitive human behavior and popular culture, a concept borrowed from the neurosciences that Gladwell describes as ‘thin-slicing.’ Thin slicing is a type of thought that happens in ‘the blink of an eye.’ This rapid cognition, in essence, produces, “Narrow slivers of experience.” (Gladwell, 2007, p. 44) These slivers then influence and optimize human experiences. The concept of thin-slicing is something innate in human beings, we are constantly subconsciously evaluating people, situations and experiences.

According to Gladwell, “Thin-slicing, refers to the ability of our unconscious to find patterns in situations and behavior based on very narrow slices of experience.” (Gladwell, 2007, p. 23) Humans make associations between situations and experiences by comparing experiences already processed and using pattern matching to correlate past experience and new situations. “We [humans] make connections much more quickly between pairs of ideas that are already related in our minds than we do between pairs of ideas that are unfamiliar to us.” (Gladwell, 2007, p. 77) Rapid cognition is a phenomenon
which occurs in humans. “Thin-slicing is not an exotic gift. It is a central part of what it means to be human. We thin-slice whenever we meet a new person or have to make sense of something quickly or encounter a novel situation. We thin-slice because we have to, and we come to rely on that ability because there are lots of hidden fists out there, lots of situations where careful attention to the details of a very thin slice, even for no more than a second or two, can tell us an awful lot.” (Gladwell, 2007, p. 44) The human brain toggles between the conscious and unconscious modes of thinking constantly, analyzing and making decisions for us. (Gladwell, 2007) This constant engagement of our conscious and subconscious brain provides a compulsory thought process of complex situations at an automated level. “Thin-slicing is part of what makes the unconscious so dazzling. . . . when our unconscious engages in thin-slicing, what we are doing is an automated, accelerated unconscious version of . . . [processing] complex situations.” (Gladwell, 2007, p. 23)

However, this power of glance has the power to promote presumed prejudices, false assumptions and incorrect pattern matching. “Part of what it means to take thin-slicing and first impressions seriously is accepting the fact that sometimes we can know more about someone or something in the blink of an eye than we can after months of study. But we also have to acknowledge and understand those circumstances when rapid cognition leads us astray.” (Gladwell, 2007, p. 76)

Donald Norman also provides thoughts on first impressions, “The overall impact of a product comes through reflection [the reflective level]– in retrospective memory and reassessment.” (Norman, 2005, p. 88) He continues by stating, “We pay more attention to, and remember, messages that we like. If we are faced with a message we dislike, or
which fails to confirm our prejudices, we tend to ignore those parts which make us uncomfortable.” Norman provides the necessary theory to support Gladwell’s idea and provides us with the knowledge to apply the notion of first impressions to website design. Says Norman, “For example, if we dislike or mistrust the source, our interpretation of the message is likely to be hostile. In all this, first impressions are vital. If we begin with a false idea about the purpose of a communication, such an initial error is unlikely to be corrected, and mistakes may snowball.” (Norman, 2005, p. 59)
2.4 **Design functions**

**Definition of Design**

The Merriam-Webster dictionary gives the following broad definition of ‘Design:’

“1: to create, fashion, execute, or construct according to plan. 2 a: to conceive and plan out in the mind, b: to have as a purpose, c: to devise for a specific function or end, 3 archaic: to indicate with a distinctive mark, sign, or name, [and] 4 a: to make a drawing, pattern, or sketch of b: to draw the plans for.” (Webster-Merriam.)

A more utilitarian definition is contributed by Victor Papanek: “The mode of action by which a design fulfils its purpose is its function” (Papanek, 1985, p. 7) While Rickard Buchanan writes, “Design is the human power to conceive, plan, and realize products that serve human beings in the accomplishment of any individual or collective purpose.” (Buchanan, 2001) Buchanan’s definition explains the meaning of design in terms of the problems it solves and the novel systems design creates.

The most successfully designed systems now provide new or unique experiences and depend less on aesthetics. This transition has been based, in part, on audience research, and task analysis, “Design must become an innovative, highly creative, cross disciplinary tool … It must be more research oriented, and we must stop defiling the earth itself with poorly designed objects and structures.” (Papanek, 1985) Designers must become more aware of the consequences of their designed systems, and the associated emotions they may evoke.

Donald Norman sub-divides design into three ‘thought’ categories, or levels which are subsidiaries of the construct Norman calls ‘Behavioral Design.’ The three
thought levels are visceral, behavioral, and reflective; the design requirements for each level differ in their necessities. Norman explains that all three levels appear in real experiences, and rarely are seen independent of one another. Describing the visceral level, he writes, “the visceral level is pre-consciousness, pre-thought. This is where appearance matters and first impressions are formed. Visceral design is about the initial impact of a product, about its appearance, touch and feel. The next level is the behavioral level, “the behavioral level is about use, about experience with a product.” The finally level is reflective thought, “It is only at the reflective level that the consciousness and the highest levels of feeling, emotions and cognition reside. It is only here that the full impact of both thought and emotions are experienced” (Norman, 2005, p. 38)

The visceral and behavioral thought levels describe only the here and now-instantaneous reactions to the immediate moment. In contrast, thought at the Reflective level extends into the future and makes comparisons with the past. “Reflective design, therefore, is about long-term relationships, about the feelings of satisfaction produced by owning, displaying, and using a product. A person’s self-identity is located within the reflective level, and here is where the interaction between the product and our identity is important as demonstrated in pride (or shame) of ownership or use. Customer interaction and service matter at this level.” (Norman, 2005, p. 38) As noted earlier, humans strive to group and define experiences though patterns. Norman echo’s this sentiment, “The visceral level is incapable of reasoning, of comparing a situation with past history. It works by what cognitive scientists call ‘pattern matching’.” (Norman, 2005, p. 29)

Allowing reaction to design to be fragmented into three levels of thought allows the design to address each individual requirement independent of the others. Visceral
design concentrates on the appearance of the system, while behavioral design focuses on the personal pleasure and effectiveness of the system’s use. Finally reflective design directs attention to the self-image and personal satisfaction the system creates which the user stores in long-term memory. (Norman, 2005, p. 38) Appropriate design strategies at the visceral and behavioral levels should lead to a positive reflective stage.

Humans are prewired to receive emotional signals from our environment, signals that are automatically processed and interpreted at the visceral level, “Visceral design is what nature does.” (Norman, 2005, p. 65) Norman includes natural occurring examples such as symmetry, round smooth surfaces and objects that are pleasant to touch. Continuing in this discussion of symmetry Norman adds: “Human preference for faces and bodies that are symmetrical presumable reflects selection of the fittest” (Norman, 2005, p. 66) Attentiveness to visceral design is important because, “Visceral design is all about immediate emotional impact.” (Norman, 2005, p. 69) Furthermore, when we perceive something as ‘pretty,’ that judgment comes directly from the visceral level.

The behavioral level concerns itself with usage. “Behavioral design is all about use. Appearance doesn’t really matter. Rationale doesn’t matter. Performance does. This is the aspect of design that practitioners in the usability community focus upon.” (Norman, 2005, p. 69) By focusing solely on this area, usability practitioners loose sight of the visceral and reflective components, resulting in sub-par interactions. They have neglected to address the intended outcome of the interaction. “The first step in good behavioral design is to understand just how people will use a product.” (Norman, 2005, p. 71)
Norman’s reflective level is all about how people feel after using the product. “Their real value can be in fulfilling people’s emotional needs, and one of the most important needs of all is to establish one’s self-image and one’s place in the world.” “Attractiveness is a visceral-level phenomenon—the response is entirely to the surface of an object. Beauty comes from the reflective level. Beauty looks below the surface. Beauty comes from the conscious reflection and experience. It is influenced by knowledge, learning, and culture. Objects that are unattractive on the surface can give pleasure. Discordant music, for example, can be beautiful. Ugly art can be beautiful.” (Norman, 2005, p. 87)

When relating design to experience design, or human-centered design, we will do well to be aware of Donald Norman’s definition, “‘User experience’ encompasses all aspects of the end-user’s interaction with the company, its services, and its products. … True user experience goes far beyond giving customers what they say they want, or providing checklist features. In order to achieve high-quality user experience in a company’s offerings there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design.” (Norman, 2005)
2.5 Design variables

In addition to previously discussing design functions appearing in system interactions, a discussion regarding the following specific tenets of design is necessary:

1. Color
2. Contrast
3. Hierarchy
4. Legibility
5. Scanibility
6. Purpose

These design variables are not only important for aesthetic purposes, but serve as signifiers as well. Additionally, they have potential to cause dramatic shifts in the interpretation of visual communication. While some elements are defined specifically with regard to their use on the web, all principles have their foundations in art and design.

Color

Leatrice Eiseman a Pantone© color specialist, states in her book, *Color: Messages and Meanings*, ‘Color can be, and often is, more effective than words.’ She continues, “There is no question that color is a powerful communication tool that can be used…” (Eiseman, 2006, p. 66) By harnessing the power of color, the design further creates an all-encompassing emotional experience. Color has the power to shift emotional connotation. “Color can not only move people on an emotional level, but it is also a ‘moving element’ that can stimulate an action or reaction, causing people to move in a desired direction.” The influence of color
provides the designer with a powerful tool used to evoke emotions and drive
interactions.

Gender and age also play roles in the interpretation of color and color
schemes. Today both women and men perceive color as an emotional aspect of
advertising. (Eiseman, 2006) Women tend to be much more emotional and
appreciate the well-coordinated pallets. They are deliberate in their purchases,
often times preferring to see the merchandise in person before buying. (Eiseman,
2006) For this reason, website designers should be sensitive to these issues. Men,
are much more impulsive when purchasing; however recent studies have revealed
men are becoming more ‘color aware.’ (Eiseman, 2006, p. 72) When recognizing
the color patterns associated with the target audience, the designer must also be
aware of their age.

Outside the bounds of gender, age plays a role in color selection. The
older the audience the more necessary it is to have a high degree of contrast
between figure and ground. In addition, it is important to steer away from cool
colors as these seem to cause the most problems for aging eyes. (Eiseman, 2006,
p. 73)

Color has also been shown to affect cognition, retention, and action.
According to Eiseman, “Studies have shown that color accelerates learning,
retention and recall by 55% to 78%; improves and increases comprehension by up
to 73%; increases recognition by up to 87%; and increases motivation and
participation, moving people to action, by up to 80%...” (Eiseman, 2006, p. 75)
These statistics suggest that color is much more important to a composition than just aesthetics.

David Lauer and Stephen Pentak, in their book, Design Basics, states color has the ability to lead the eye and “…to be the most powerful of the visual elements.” (Lauer & Pentak, 2008, p. 269) They defend this statement by referring to Ed Lissitzky’s “now familiar composition featuring the dominant red square.” (Lauer & Pentak, 2008, p. 269) Additionally, they support Eiseman’s assertion that color plays a part in emotional and physical processing. Says Lauer and Pentak, “Because of the learned association of color with objects, we continue to relate colors to physical sensations.” (Lauer & Pentak, 2008, p. 266)

Contrast

As a design principle, contrast occurs when two elements visibly differ in an aspect of their design. This difference can be implemented in a variety of ways such as: color, shape, location, size, appearance, quantity, direction, etc. When incorporating any type of contrast, the designer is essentially directing the visual hierarchy of the information in a composition. Unexpected and sudden changes in scale can create visual interest in a specific item and grab attention. (Lauer & Pentak, 2008, p. 80) This concept is especially important when designing a website that can stand out among its competitors, while also appealing to the intended audience.

In addition to providing difference, contrast can also provide unity by allowing the designer to lead the viewer through a composition. By leading the viewer within a
composition the designer controls the pace and tempo of the interaction. Website design can benefit greatly by applying principles of contrast to all pages, especially homepages.

**Hierarchy**

Hierarchy allows the designer to create a sense of ordered importance within a composition. According to Lauer, “In past centuries visual scale was often related to thematic importance…The artist thus immediately not only establishes an obvious focal point but also indicates the relative importance [of elements].” (Lauer & Pentak, 2008, p. 73) By adapting this principle the web designer can create a sense of flow on the page. Furthermore type and image can be related in such a way as to guide the viewer through the page, and provide ease of use by eliminating visual obstacles. William Lidwell, in his book, *Universal Principles of Design*, states “Hierarchical organization is the simplest structure for visualizing and understanding complexity.” (Lidwell, Holden, & Butler, 2003, p. 104)

Lidwell continues in his description of hierarchy to discuss the importance of superordinate and subordinate elements as an effective method of increasing immediate knowledge of a system. (Lidwell et al., 2003, p. 104) Regarding the importance of hierarchical relationships Lidwell states, “Perception of hierarchical relationships among elements is a primary function of their relative left-right and top-down positions, but is also influenced by their proximity, size, and the presence of connecting lines.” (Lidwell et al., 2003, p. 102) The ability to locate information becomes paramount during technological interactions.
Legibility

Once the information is located within a page or composition, legibility indicates whether or not the user can actually decipher the information. Suzanne Watzman, researcher and designer of interfaces, states, “Readability is the ability to find what you need on the page; legibility is being able to read it when you get there. Effective page design makes a page readable; good use of typography makes it legible.” (Watzman, 2003, p. 269) Watzman continues to describe the criteria that affects legibility, “Legibility is determined by: typeface, output/viewing device, line length/column width, letter [and] word spacing…. justified versus ragged columns, movement, color, [and] viewing environment.” (Watzman, 2003, p. 269) These criteria provide the designer several options when attempting to create readable and legible compositions.

Scanibility

Scanibility describes the ability to quickly ascertain important information from the visual hierarchy of a page or composition. Watzman uses the term visual mapping to describe this variable, when she says, “At a glance, the page design should reveal easy navigation and clear, intuitive paths to discovering additional details and information. This is called visual mapping.” In the book, Research-Based Web Design & Usability Guidelines, published by the U.S. Department of Health and Human services, scanibility is achieved by, “[using] clear, well-located headings; short phrases and sentences; and small readable paragraphs.” In addition, this book discusses the importance of scanning with regard to age, “Studies report that about eighty percent of users scan any new page. Only sixteen
percent actually read every word…Keep in mind that older users (70 and over) will tend to scan much more slowly through a webpage than will younger users (ages 39 and younger).” (Compiler, 2006, p. 171)

Watzman recognizes the important role scanibility plays in motivating the user to interact when she states, “Motivation and accessibility can be accomplished by providing the reader with ways to understand the information hierarchy quickly.” The ability to cognitively process the information quickly has a motivating or impeding implication. In essence, the user is effectively thin slicing the composition, creating first impressions quickly based on prior experiences. By controlling design variables, the designer can increase the level of motivation; therefore increasing the satisfaction level of the interaction.

**Elemental Purpose**

Through editing the amount of visual information present on a webpage or composition the designer is assisting the viewer with deconstruction and cognition of the message. Elemental purpose questions the necessity of each element on a page or composition. In *Research-Based Web Design & Usability Guidelines*, the guideline for elemental purpose is, “Limit page information only to that which is needed by users while on that page.” By not overburdening the user with extraneous information, we decrease the number of obstacles to successful experience. Continuing in *Research-Based Web Design & Usability Guidelines*, “Displaying too much information may confuse users and hinder assimilation of needed information.” (Compiler, 2006, p. 176)
2.6 Findings from the Literature

Designers must take an interest in the shifting focus of design as well as the evident importance of emotional experiences. Donald Norman states this best,

“Designers take note. Humans are predisposed to anthropomorphize, to project human emotions and beliefs into anything. On the one hand, the anthropomorphic responses can bring great delight and pleasure to the user of a product. If everything works smoothly, fulfilling expectations, the affective system responds positively, bringing pleasure to the user. Similarly, if the design itself is elegant, beautiful, or perhaps playful and fun, once again the affective system reacts positively. In both cases, we attribute our pleasure to the product, so we praise it, and in extreme cases become emotionally attached to it. However, when the behavior is frustrating, when the system appears to be recalcitrant or refuses to behave properly, the result is negative affect, anger, or, even rage. We blame the product. The principles for designing pleasurable, effective interactions between people and products are the very same ones that support pleasurable and effective interaction between individuals.”

(Norman, 2005, p. 138)

The Apple iPod example, previously presented, dealt mostly with the physical experience; however, this research will place human behavior at the center of a discussion relating to e-commerce website interaction by scrutinizing this resulting behavior and the motivational aspects of behavior through the context of activity theory.
We have seen that usability testers tend to focus on the behavioral level of design and neglect the visceral level and the reflective level. This results in a serious deficit in their evaluation of the interactive experience. One reason usability experts have tended to overlook the visceral and reflective levels is that these levels are harder to assess. Based on the literature, we now know that this is a serious oversight and that there is now sufficient knowledge of human affect and motivation to correct this deficiency.

As we have seen, interactions evoke emotions that are chosen from a broad spectrum. The literature has shown us that these emotions play pivotal roles in the initial reaction, secondary processing, and final reflection of the interaction. By concentrating on these emotional reactions we can begin to design for the user, rather than around them and users can begin to positively experience technology. The reflective level of Normans model further enhances the assertion that to measure the affectiveness of an interaction, we can measure the related user satisfaction level.
3. METHODOLOGY

3.1 Overview

Current usability testing provides no satisfactory means of measuring affective experience beyond that recorded by the test subject—no predictive methodology exists that the designer can use during the iterative stages of the design process. Secondly, current usability research is heavily dependent on the quantitative analyses of data with seriously little attention given to qualitative data. Too few studies have had an adequate scope to recognize and answer these problems. As a result web interactions have lacked the rich user experience level that is possible with the recognition and implementation of affective design.

The purpose of this research will be to create a suitable instrument to measure and predict the affective and experiential aspects of internet interaction. Out of necessity, this instrument will include both quantitative and qualitative measures. When combined, these criteria will present a resulting score as well as a visual interpretation; both of which can be used by designers to scrutinize the affective response their design has on an intended audience. These results can then be further utilized during the designers’ iterative design process to enhance the affective and experiential aspects of their design.

Once again, our research questions consist of:

1. Can we create an instrument that will measure and/or predict affective and experiential reactions to a website?
   a. What items must appear on such an instrument?
   b. How can these items be defined as relative to the value of the internet interaction?

2. Can the instrument be applied to websites to derive affective and experiential ratings.
A content analysis of several ecommerce websites will be done to determine the overarching commonalities present among them. Second, they will be screened and compared to identify commonalities such as those offered by Nielsen and Schniederman. Finally, after completing this methodology, an assessment rubric will be created.

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1 The criteria were assembled and selected from current guidelines and recommendations provided by Jackob Nielsen in *Designing Web Usability*, Ben Shneiderman in *Research-Based Web Design & Usability Guidelines*, and finally Jakob Nielsen and Marie Tahir in *Homepage Usability*. These sources provided a screen through which criteria were chosen and included as elements in the resulting rubric.
3.2 Selection of evaluation criteria

Activity and human behavior theory provide solid analytical frameworks through which we will explore, identify, develop, and finally deploy an instrument to assess and predict the emotional response and impact of a given webpage. The investigation of ‘emotional impact,’ as it relates to web page design must begin with an analysis of user experience. This analysis will define the affective elements of the interactive experience. The investigation, therefore, begins with a content analysis of current websites, as well as the analysis of widely accepted web design guidelines. It continues with the selection of final evaluation components, moves to solidifying the target audience of interest, and finally ends with the creation of an evaluation matrix.

Content analysis allows us to define and identify both successful and unsuccessful patterns and elements in user interaction within web page design. The analysis will focus on the design and implementation of ecommerce homepages. Through this process, it will be discerned which design elements produce desirable interactions. These design elements will then be reported in the form of an evaluation matrix. The content analysis investigation tool chosen for this purpose is based on research and case studies that set a precedence in the areas of homepage design and usability guidelines. This precedence has set standard design patterns for various types of site designs, in particularly homepage design. The homepages selected for analysis were randomly sampled from a list of sites listed on Google in the Major Retailers > Shopping > General Merchandise > Major Retailers division. This listing contained fifty-eight (58) major United States retailers at the date of access. (Google)
Defining the Macro Elements

Previously implemented usability tests have concentrated on the quantitative aspects of website interaction: the number of clicks of a mouse, time on task, number of navigational errors, deviations from optimum interaction, etc. No previous research could be found which measured the affective attributes of website interaction. As stated previously, design has the power to change perception and affect emotional responses to interaction.

This research moves beyond the measurement of these quantifiable physical variables of interaction and instead will focus on two aspects of webpage design, content and composition. The content aspect will quantify the amount of screen real estate devoted to several different reoccurring webpage elements. The behavioral aspect of a webpage can be measured by analyzing a website in terms of common design principles. This research will define these Macro qualitative aspects as composition. These macro elements of content and composition will provide the two distinct areas of data analysis for our rubric.

Defining Micro elements for Macro- Content

From the fifty-eight major US retailers identified by Google, five were chosen at random for analysis\(^2\). The homepage components of interest for content analysis were

\(^2\) The research examines the methods used to create an instrument to measure affective interactions with websites. Five sites were chosen at random as a baseline to generate an average design pattern for ecommerce websites and therefore assist in the creation of this prototype. This research also realizes that outliers exist in any analysis and can therefore not be accounted for, but recognized as a potential flaw. Further research may be necessary.
categorized and highlighted according to the following list adapted from Jackob Nielsen’s book, *Homepage Usability: 50 Websites Deconstructed*:

1. Branding
2. Navigation
3. Advertising
4. Content
5. Other
6. White Space

Once identified, the resulting percentage of screen real-estate space was calculated for each of these components and graphed to assist in identification of principle elements within each page. This was accomplished as follows: first a screen shot of the homepage was captured and imported into an Adobe Illustrator document. Measurements of each active area were made and highlighted according to a set color legend. The resulting

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<td>Navigation</td>
<td>multiple</td>
<td>multiple</td>
<td>3.95</td>
<td>10.26%</td>
<td>3.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>1.14</td>
<td>1.68</td>
<td>4.51</td>
<td>11.76%</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>3.08</td>
<td>5.4</td>
<td>15.15</td>
<td>41.00%</td>
<td>1.09</td>
<td>2.09</td>
<td>2.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>multiple</td>
<td>multiple</td>
<td>9.40</td>
<td>24.64%</td>
<td>1.99</td>
<td>2.20</td>
<td>4.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Space</td>
<td>calculated</td>
<td>calculated</td>
<td>6.31</td>
<td>11.22%</td>
<td>9.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>6.1</td>
<td>38.43</td>
<td>100.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A typical example of calculating area in a Microsoft Excel workbook.

Table 2
measurements were then entered into a Microsoft Excel spreadsheet which used the geometric formula: Length x Width = Area (l x w = a). The resulting area calculations were then graphed as a percentage of the overall area of the homepage and then utilized in the final analysis. (Table 2)

The results appear on an analysis page for each of the five websites and can be found in the Appendix, page 100. This analysis indicated that several commonalities existed among the five randomly selected ecommerce homepages, especially the screen real estate devoted to the micro element areas of branding, navigation, advertising, content, other, and white space. These results revealed that, indeed, ecommerce website homepages tend to be designed with a preset pattern incorporating certain reoccurring elements, and therefore provided us with a foundational collection of ‘content elements.’

Based on this reoccurring design pattern, median screen real estate space for each element was calculated and these results were used as the baseline for comparison in the rubric.

**Defining Micro elements for Macro- Composition**

After identification of the common content space, a selection of elements was compiled that would later be used to analyze the composition of the homepages. These elements were again chosen from a group defined by Nielson and Schneiderman based on their ability to provide an assessment of the homepage composition and are color, contrast, hierarchy, legibility, scanibility, and elemental purpose. (Nielsen, 2000) (Schniderman & (U.S.), 2006)
Activity Theory was used in tandem with content analysis to identify the degree to which Csikszentmihalyi’s concept of ‘Flow’ was present within the composition of each homepage. As described earlier, Flow occurs when the participants’ level of obstacles is in correct proportion with their corresponding level of skill for the particular interaction. In order to achieve a successful rich user experience, we must maximize the motivation level, while decreasing the amount of obstacles present in each webpage. Activity Theory describes the necessity of motivation of the user as modulated or created by the tool, using the skill the target audience already possess. By combining these two theories relative user satisfaction can be measured. Therefore measure the motivation elements and obstacles present in the homepage can be measured and the results can be used to calculate the relative level of affective impact, or Flow, of the website.

The following set of design criteria or composition elements can either increase or decrease both obstacles and motivation.

**Assembling the components: Macro + Micro elements**

Having captured both quantitative and qualitative data, an instrument was created. This instrument is divided into four quadrants, one measures the quantitative, one the qualitative data, and the remaining two quadrants contain visual interpretations of these respective values. This resulting instrument is the: Affective Experience Evaluation Rubric (AEER).
3.3 **Explanation of Affective Experience Evaluation Rubric (AEER)**

Charles Osgood’s semantic differential provides a theoretical framework that allows the investigation of connotations associated with language, image, and message. Osgood’s methodology has been extended into several arenas; and for purposes this research was applied to web design. His system “asks the receiver to rate each item on a series of scales,” much like those of any standard Likert scale, with polar opposites, “young/old, good/bad.” The resulting measurement of connotation can then be assessed based on the scaled answers. (Morgan & Welton, 1992, p. 36) For this research evaluation areas will be measured on a three point scale, each with corresponding point values. Each measure has the ability to increase motivation, stay neutral or present an obstacle during the interaction.

Based on Norman’s research, all human experiences consist of four simultaneously occurring facets:

- A) Action or Emotional response
- B) User satisfaction
- C) User motivation, and
- D) User obstacles.

Designers can only control the last two facets: user motivation and obstacles. The resulting user emotional response and satisfaction are by-products of the overall experience. Again, our attempt is to create a website homepage that contributes to the user satisfaction therefore resulting in a positive emotional response.

A slight modification to the expectancy theory equation produced by Vroom, provides us with an additional theoretical framework analysis model that may describe the resulting experience involved in human computer interaction. The original formula
created by Vroom states that \( \text{Motivation} = \text{Valance} \times \text{Expectancy} \) (Instrumentality).

Vroom’s theory and formula were created to help predict the motivation level of employees to complete tasks within a business environment. By including a variable for obstacles we might say \( \text{Experience} = \text{Motivation} – \text{Obstacles} \). In other words, the overall level of the experience is equal to the motivation level less the obstacles present. As stated earlier, we can project a rich user experience by measuring the potential resulting level of user satisfaction; a high level of satisfaction equates to a rich user experience.

The Macro Content area provides the quantitative data for analysis. For purposes of this research implementation each of the six measures must indicate either neutrality, the measure does not preclude interaction (or it does not create an obstacle); or motivation, the measure provides positive attributes resulting in increased desire to interact; or finally an obstacle, the measure creates an obstacle to successful interaction. To implement this requirement, AEER tallies the corresponding columns and either multiples these results with 0 (zero, indicating neutrality) or 1 (one, indicating motivation). The sum of these results becomes the Content area score. When observed the highest possible ranking score is 6 (six). This number is then graphed on the \( y \)-axis of the affective impact graph.

The Micro Content area provides the quantitative data for analysis. This prototype implements each of these elements as having one of three possible connotations: Obstacle, Neutral or Motivational. Implementation of this requirement is achieved by the tallied scores having multipliers of -1 (negative one, indicating obstacle), 0 (zero, indicating neutrality), and finally 1 (one, indicating motivation). The resulting sum is then graphed on the \( x \)-axis of the affective impact graph.
4. IMPLEMENTATION

4.1 Definition of user profile and consumer preferences

It would not be possible to study all audiences and every diverse user need. The development of these understandings will require the input of many research studies developed over time. For purposes of this study we will define a user ‘profile,’ upon which to base our analysis. This profile consisted of several demographic and usage indicators: gender, age, ethnicity, occupation, internet proficiency (measured on a scale of (1) low to (5) high), and the propensity to shop online (measured on a scale of (1) not often to (5) more then 3 times per week).

The selected target audience for this research is a female, age 51, Caucasian, homemaker, her level of Internet proficiency = 2, and finally her level of shopping online = 1. As stated earlier, all audience subsets require different design criteria and design strategies.

We look to current internet usage trends to assist with the justification of our user profile. A May 2008 survey conducted and complied by the well respected PEW/INTERNET and American Life Project states that of internet users to date, 73% of them are women, 70% fall within the ages of 50-64 and 95% of them have a household income of over $75,000. Furthermore according to this same survey, over 71% of American adults indicate they buy products online.\(^3\) This particular demographic provides great opportunity to capture additional market share by providing another channel for their disposable income. Like all audiences, this specific sub-set of users

\(^3\) See Appendix for details of survey as well as complete survey results from PEW/INTERNET and Amerian Life Project captured from http://www.pewinternet.org/.
demands specific design requirements. By looking to print and electronic media we can begin to establish a baseline of their consumer preferences with regard to visual communication.

To assist in identifying these preferences, consumer demographics and market reach of the most popular magazine websites were compiled from Quantcast.com, a leader in the publication of demographic information of website users. A query was composed with the following parameters adult college educated Caucasian females between ages 45-54 who’s annual household income was between $60-100K with magazine preferences reaching at least 100K people and whose market penetration was at least 50% with strict filtering guidelines. The data returned from the query indicated that the top websites included people.com, newsweek.com, oprah.com, time.com and tvguide.com. This information does not indicate or project this demographics propensity for purchasing the relating magazines, only that these websites have the largest reach across our defined search. However, extrapolations suggest their printed counterparts may be equally preferred.

A 2006 New York Times article indicated that among overall readership the top five circulating magazines included: People, O: The Oprah Magazine, Martha Stewart Living, Vanity Fair and Glamour. (Seelye, 2006) Fusing the demographic data provided by Quantcast.com and this New York Times article we can assemble and assess consumer preferences tied to design and visual presentation.

4.2 Selection of websites for analysis

Among the fifty-five ecommerce websites indexed from Google, two were
selected for application of AEER: Bestbuy.com and Amazon.com. These two websites were chosen based on their statistical usage indicators provided by Quantcast.com. As indicated these two sites have an extremely large market penetration as well as unique monthly visitors. The potential exists that our profile user will likely be faced with interacting with either, if not both, of these ecommerce sites.

4.3 Application of AEER: Analysis of two ecommerce websites

To apply AEER we must first capture screenshots of the webpages to be analyzed. (Figure 7)

Once captured these screen shots are inserted into graphic manipulation software, in our case Adobe © Illustrator, for analysis. Once in Illustrator, overlaid transparent color boxes indicate rectangular sections for measurement of their screen area. (Figures 8 & 9)
Analysis of screen real estate for Amazon.com

Figure 8
Analysis of screen real estate for Bestbuy.com

Figure 9
From these rectangular areas, measurements are taken and entered into a Microsoft® Excel spreadsheet to calculate the area, percent of area as related to the screen real estate, and whitespace usage. (Table 3 & 4)

<table>
<thead>
<tr>
<th>Screen Real Estate Breakdown</th>
<th>Site</th>
<th>Navigation Length</th>
<th>Length</th>
<th>Width</th>
<th>Area</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amazon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Branding</td>
<td>1.07</td>
<td>0.29</td>
<td>0.31</td>
<td>0.81%</td>
<td>1.07</td>
<td>1.44</td>
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<tr>
<td>Navigation</td>
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<td>multiple</td>
<td>3.95</td>
<td>10.28%</td>
<td>3.95</td>
<td>7.68</td>
</tr>
<tr>
<td>Advertising</td>
<td>1.94</td>
<td>1.68</td>
<td>4.61</td>
<td>11.7%</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>3.07</td>
<td>5.4</td>
<td>15.95</td>
<td>41.5%</td>
<td>5.00</td>
<td>0.15</td>
</tr>
<tr>
<td>Other</td>
<td>multiple</td>
<td>multiple</td>
<td>9.40</td>
<td>24.6%</td>
<td>1.90</td>
<td>2.20</td>
</tr>
<tr>
<td>Whitespace</td>
<td>calculated</td>
<td>calculated</td>
<td>4.31</td>
<td>11.2%</td>
<td>9.40</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6.3</td>
<td>6.1</td>
<td>38.43</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Area calculation spreadsheet for Amazon.com
Table 3

<table>
<thead>
<tr>
<th>Screen Real Estate Breakdown</th>
<th>Site</th>
<th>Navigation Length</th>
<th>Length</th>
<th>Width</th>
<th>Area</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amazon</td>
<td></td>
<td>3.6</td>
<td>0.31</td>
<td>1.116</td>
<td></td>
</tr>
<tr>
<td>Branding</td>
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<td>calculated</td>
<td>1.15</td>
<td>3.76%</td>
<td>2.047</td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td>multiple</td>
<td>multiple</td>
<td>2.047</td>
<td>6.69%</td>
<td>0.41</td>
<td>0.19</td>
</tr>
<tr>
<td>Advertising</td>
<td>4.9</td>
<td>0.56</td>
<td>4.51</td>
<td>14.7%</td>
<td>0.49</td>
<td>0.19</td>
</tr>
<tr>
<td>Content</td>
<td>4.9</td>
<td>3.88</td>
<td>18.38</td>
<td>60.07%</td>
<td>0.19</td>
<td>0.09</td>
</tr>
<tr>
<td>Other</td>
<td>multiple</td>
<td>multiple</td>
<td>3.21</td>
<td>10.6%</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>Whitespace</td>
<td>calculated</td>
<td>calculated</td>
<td>1.30</td>
<td>4.28%</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5.1</td>
<td>6</td>
<td>30.60</td>
<td>100.0%</td>
<td>1.149</td>
<td></td>
</tr>
</tbody>
</table>

Area calculation spreadsheet for Bestbuy.com
Table 4
When the area calculations are complete, entering the corresponding percentages completes the analysis page, and allowing Excel to create a pie chart based on these values. The resulting pie chart is inserted into the analysis sheet. (Figure 10 & 11)
Final analysis page for Amazon.com
Figure 10
Final analysis page for Bestbuy.com

Figure 11
**Area** percentages calculated in the previous step are entered into AEER by selecting the correct box and plotting them into the upper left quadrant (quadrant one). The numbers underneath the center box indicate previously calculated areas. You will notice that if you deviate from the average, either up or down, you will choose that appropriate check box. Once the checkboxes are complete, tally the columns, do the multiplication indicated, and sum these numbers. This resulting number is the macro content indicator. This will be used to graph our affective impact in a later step. (Figure 12)
Before analyzing the qualitative elements of AEER we must first establish best practice guidelines in an attempt to curb individual preferences. Each variable will be described in terms of its relative association with positive motivation, neutral motivation, and negative motivation, or in this case a positive association with being an obstacle to motivation.

**Color: Positive Motivation**

When choosing level motivation, the color must provide a positive emotional quality. Color should be used to compliment the brand as well as assist in the visual mapping of the page. Moreover, color should appeal to a broad audience, but specifically in our case, to the profile user. As mentioned in literature review, color has more power to motivate a user than previously thought. This example shows a clear color palette, clear color usage, strong use of white space as a compositional element, no brand competition, as well as color consistency across the page.

**Color: Neutral Motivation**

While this selection falls short of being excellent, it is not completely failing on all levels of color usage. Expect to see solid color palettes, clear type and message, as well as a strong use of white space. Often pages in the neutral category will contain one main shortcoming that will therefore place that the page in the neutral category. Specifically, vibrating colors and lack of color contrast are often the cause of a neutral motivation ranking.

**Color: Obstacle**

Pages in this category fall short on almost every level of color usage. Expect vibrating, dull or inappropriate color palettes, unclear color usage, possible contrast
problems with figure/ground relations, and an overall sense of discomfort when viewing the page.

See Figures 13, 14, and 15 for visual representations of these areas.
COMPOSITION ANALYSIS
MICRO ELEMENT: COLOR
MEASURE: Motivation

This composition provides warm tonal colors, ideal for our target profile user. The use of tonal variations creates unity and assists in the scanability of the page.

Composition Analysis
Figure 13
**Composition Analysis**

**Micro Element: Color**

**Measure:** Neutral

Cool colors like black vibrate against saturated colors, such as pink in this composition. While not a terrible combination, at times reverse typography out of a black field is difficult to read. Our profile users' age may indicate this composition to be problematic.

1. Vibrating colors create tension
2. Thin San Serif reversals out of 100% Black make type difficult to read
3. Navigation is lost in ‘murky’ tint of Black.

**Comments**

Cool colors like black vibrate against saturated colors, such as pink in this composition. While not a terrible combination, at times reverse typography out of a black field is difficult to read. Our profile users' age may indicate this composition to be problematic.
Absences of color creates dull, flat composition

Thin colored strokes on navigational elements create difficult to differentiate icons.

None complimentary color palette lacks ability to create hierarchy and scanability.

COMMENTS
Our profile user may find this composition to be static and unmodivating. Additionally the color red denotes negativity.

Composition Analysis
Figure 15
**Contrast: Positive Motivation**

Contrast can be implemented in a variety ways. For a page to fall into the positive Motivation category, it should have a strong composition with adequate contrast. It will be readable and legible, while also scannable. The contrast should compliment the overall hierarchy of the composition and assist in leading the viewer through the page. No strong or overwhelming areas of contrast in color, size, or contrast should exist. Overall, there should be a strong sense of harmony and unity.

**Contrast: Neutral Motivation**

Considered average, a neutral motivation composition will contain both elements of motivation and obstacle. Expect to see acceptable usages of contrast that overall support visual mapping. Typically, one or less appearances of strong contrast should exist. There may be a slight feeling of interest associated with the page.

**Contrast: Obstacle**

Pages in this category fall short on almost every level of contrast usage. Large, overbearing and shocking usages of contrast and that are inappropriate to the audience are present. Strong color contrasts, type contrast, and size contrasts will be evident. Pages in this category will also elicit emotional reactions including anxiety, confusion, and possibly fear.

See Figures 16, 17, and 18 for visual representations of these areas.
COMPOSITION ANALYSIS
MICRO ELEMENT: CONTRAST
MEASURE: Motivation

By providing a clear sense of elemental contrast this composition assists with navigation and cognition.

**COMMENTS**

1. Size contrast establishes focal point
2. Color contrast enhances scanibility
3. Balance of contrasting image and type provide additional compositional support

Composition Analysis
Figure 16
The composition provides an average amount of color and size contrast, providing our target user direction. However, the typographic contrast between figure and ground may pose a problem.

The composition provides an average amount of color and size contrast, providing our target user direction. However, the typographic contrast between figure and ground may pose a problem.

Composition Analysis

Figure 17
While recognizing this website may be intended for a younger audience, design should still reflect usage of the least common denominator. Our profile user would find it difficult to read and navigate through the vast options provided with little to no contrast indicating preference.

1. Lack of color contrast detracts from composition
2. Lack of size contrast detracts from composition
3. Lack of type contrast in navigation creates difficulties distinguishing top level from secondary navigational elements.

Composition Analysis Figure 18
**Hierarchy: Positive Motivation**

To obtain a positive motivational status, the composition must include graphic visual cues, have an underlying grid structure, and successfully lead the viewer through the page. Expect to see an excellent chunking of information that aids in the scannability, as well as quick information retrieval. Additionally, strong use of white space as a graphic element will be evident.

**Hierarchy: Neutral Motivation**

This level displays neither excellent nor terrible hierarchy. The composition has some level of visual mapping, however there may be areas that confuse the viewer. Graphic cues may be present, but they lack proper hierarchical importance. An underlying grid structure is usually evident and white space is often satisfactorily.

**Hierarchy: Obstacle**

A composition placed in this category lacks all aspects of hierarchy including, inappropriate use of whitespace, little or no underlying grid structure, absence of graphical visual cues, little or no use of information clustering, and a severely impaired ability to visually map and scan the page. Frustration exists due to the inability to locate information quickly and/or navigate to different pages.

See Figures 19, 20, and 21 for visual representations of these areas.
An excellent example of hierarchy. This page provides a clear picture to our user. Elements use size and color contrast to chunk information assisting in scannability.

Composition Analysis
Figure 19
An example of average hierarchy is provided here. Notice the use of scale to provide visual cues to the user. Our profile user would appreciate these contrasts.
COMPOSITION ANALYSIS
MICRO ELEMENT: HIERARCHY
MEASURE: Obstacle

With no hierarchy, this composition creates large obstacles for users. Our profile user would especially find it difficult to interact with such a flat, overcrowded page.

Composition Analysis
Figure 21
Legibility: Positive Motivation

Compositions scoring a positive motivation demonstrate the highest level of legibility. Not only are all elements necessary, but once located they are all discernible. The user can easily scan the page and immediately identify their options. No ambiguity exists between image, type, and navigational elements.

Legibility: Neutral Motivation

Several positive aspects will appear in this category; however the overall legibility will fall short of being deemed excellent. Expect to see areas of type that are illegible due to inappropriate applications of size, contrast, etc…

Legibility: Obstacle

Compositions in this category are not legible. The copy cannot be read for a variety of reasons. Perhaps not enough contrast between figure and ground, incorrect color for typography, not enough contrast between thicks and thins of serif typefaces, type reversed out of a light background, or images that are indiscernible.

See Figures 22, 23, and 24 for visual representations of these areas.
COMPOSITION ANALYSIS
MICRO ELEMENT: LEGIBILITY
MEASURE: Motivation

By providing clear legibility, this homepage increases motivational interaction. The use of type size contrast assists in page scanning.

1. Excellent use of type size contrast
2. Chunking allowing quick scanning
3. Clear navigational choices
COMPOSITION ANALYSIS
MICRO ELEMENT: LEGIBILITY
MEASURE: Neutral

An average legible page provides adequate size contrast in typography and navigation. However, by incorporating unnecessary type treatments increases the potential for legibility issues.

1. Easy to read navigation
2. Type size contrasts assists in page scanning
3. Unnecessary type treatment

Composition Analysis
Figure 23
Composition Analysis

Micro Element: Legibility
Measure: Obstacle

One located, information is difficult to read with small line lengths and small type. Start contrast between black and white can be a potential obstacle.

Comments

1. Short line length impedes legibility
2. Small typography is difficult to read
3. Lack of type contrast

Composition Analysis
Figure 24
**Scanibility: Positive Motivation**

Compositions in this category will contain all the above-mentioned elements working together in tandem to create a highly scannible composition. The page can quickly be visually mapped; graphical cues are prevalent and draw attention, while at the same time not overpower the content of the page. The user can also quickly determine the purpose and context of the page and the purpose of the site. It would be virtually impossible to score scanibility: positive motivation if any of the above elements scored below neutral- all elements must work together to achieve this level.

**Scanibility: Neutral Motivation**

The composition is neither good nor bad. Without excellence in all factors of scanibility, the composition precludes flawless interaction; however the composition still maintains some semblance of order, and the majority can be quickly visually mapped. Expect to see sites score lower in some, if not all, of the above mentioned categories.

**Scanibility: Obstacle**

The composition lacks any sense of hierarchy, and therefore causes the viewer to loose interest quickly due to frustration. Information is not quickly located, navigational elements are difficult to find, and/or there are elements that do not work in harmony with the text to produce a legible page.

See Figures 25, 26, and 27 for visual representations of these areas.
COMPOSITION ANALYSIS
MICRO ELEMENT: SCANIBILITY
MEASURE: Motivation

Through hierarchy and legibility, this homepage successfully creates a highly scannible page.

Composition Analysis
Figure 25
Use of color contrast assists in the scanibility of this page, however lack of navigational color can be an obstacle.

Composition Analysis
Figure 26
COMPOSITION ANALYSIS
MICRO ELEMENT: SCANIBILITY
MEASURE: Obstacle

COMMENTS
Lack of contrast, hierarchy and legibility this page is simply overwhelming and unscannible.

Composition Analysis
Figure 27
Elemental Purpose: Positive Motivation

Each element, type, image, and brand, etc. appearing in the composition holds a purpose on the page. Without any one of these elements, the composition would not be successful and potential obstacles due to clarity would be present. With all elements working together, unity and harmony are produced, thus promoting a successful composition. Visual mapping, cueing, and hierarchy are all clear and present.

Elemental Purpose: Neutral Motivation

Again, the composition is neither good nor bad. Some positives exist, as well as some negatives. Expect to see slight overcrowding, misuse of white space, or extraneous graphical elements in the composition. Often large chunks of copy inhabit unusual areas on the composition and impede quick visual mapping. The majority of elements appearing on the page are necessary, however the composition would still be strong if some were removed.

Elemental Purpose: Obstacle

A composition in this category will contain extraneous elements that lack purpose or support interaction. Visual mapping will be impaired due to the additional of unnecessary elements. Quite often elements exist merely to serve nothing other than an aesthetic purpose.

See Figures 28, 29, and 30 for visual representations of these areas.
By selecting only necessary elements this composition provides a sense of interactive comfort. The user feels empowered to complete the interaction without error.
Elements have ability to detract from composition

Clear navigational elements

Incorporating security check helps ease apprehensive users

**COMMENTS**

This page represents an average homepage. The majority of elements serve very specific purposes, however some extra elements may hinder interaction.

Composition Analysis

Figure 29
COMPOSITION ANALYSIS

MICRO ELEMENT: ELEMENTAL PURPOSE

MEASURE: Obstacle

The profile user would have difficulty navigating and scanning this page. Upon arriving on this homepage the user would feel overwhelmed by all the choices.

1. Poor use of trapped white space.
2. Elements are large and overpower composition
3. Unnecessary information creates clutter

Composition Analysis
Figure 30
Now that we have established baseline examples for each of the design variables, quadrant II of AEER, our qualitative area, may be assessed and completed. In analyzing Amazon.com’s compositional elements and screening them the AEER established guidelines, the following levela were identified:

1. Color: Obstacle- While the palette is consistent with warm tones and tints, variations in typographic color are noticed. The strong dark ad on the right side of the page pulls attention away from the content. There is also a general lack of consistency in color usage for type and images which serves to create visual chaos.

2. Contrast: Neutral- The average contrast between figure and ground is acceptable. A lack of contrast between thin rules around content areas and the background make it difficult to ascertain these boxes, thus creating an obstacle for scanibility. There is also a lack of size contrast between images and type.

3. Hierarchy: Obstacle- Recognizing the area has an underlying grid structure, the content is scattered about the page and appears under ads. Navigation takes a secondary role due to its unusual placement on the right. In addition, several images are distracting because of a lack of size contrast to indicate a relative level of importance. Also a lack of typographic contrast causes difficulty in visual mapping.

4. Legibility: Obstacle- There is an average implementation of typographic elements. While the content is legible, smaller point sizes in the right column
will prove difficult to read for our profile user. Two different sans serif
typefaces visually complete with one another on the same page.

5. Scanibility: Obstacle- Because of a lack of contrast and successful hierarchy,
the visual mapping of this page becomes an obstacle. A lack of visual cues,
or graphic indicators also toads to the difficulty with navigation.

6. Elemental Purpose: Neutral- While all elements seem to appear on the page
for a reason, their composition is incorrect. The ad on the right may or may
not be necessary for this online retail provider. Furthermore all the ‘bonus’
boxes on the left and right, Add to your collection…, a Treat Yourself and
Check this out, only further add to the visual disractions on this page.

With these selections solidified, we can now complete quadrant two as shown on
the following page. (Figure 31)
In analyzing Bestbuy.com’s compositional elements and screening them with our previously established guidelines, we find the following:

1. **Color:** Neutral - Consistent cool pallet; however cream-colored typography on the top header bar may be difficult to read. Average use of whitespace, could possibly have incorporated a better solution with the center ‘Outlet Center’ bar. For the most part, the san serif typography is readable and legible.

2. **Contrast:** Neutral - There is an average contrast between the typography and the background, however certain areas may pose problems due to small grey
3. Hierarchy: Positive Motivation- Based on analyzing visual hierarchy, we see this composition is well gridded and visually processes very easily. The use of images, as well as visual cues, and graphical elements as navigation tools also added to the positive motivation of hierarchy.

4. Legibility: Neutral- Overall the typography is legible with a few exceptions. Small grey type under product descriptions, reversed small san serif and small type for the input box all lead toward the neutral rating.

5. Scanibility: Positive Motivation- Again analyzing this composition’s scanibility alone from other elements, we see the information chunked and able to be skimmed. Large navigational elements on the upper left assist with quick identification of popular links. Less important links, such as gift cards etc, appear subordinate to the larger elements, and are located at the bottom.

6. Elemental Purpose: Neutral- Each element serves a specific purpose in this composition; however, several elements could be eliminated and still achieve a usable page. For example, all self-promotional materials: gift cards, credit cared, rewards zone, could be placed on secondary pages or simple links in the navigation menu.

With these selections solidified, we can now complete quadrant two as shown on the following page. (Figure 32)
With our quantitative and qualitative measurements completing quadrants I and II of AEER, the complete the visual representations of this data reveal the affective emotional score of the respective homepages contained in quadrants III and IV.
To complete quadrant III, the graph, we plot our quantitative result on the $y$-axis. The qualitative results are then plotted on the $x$-axis. Once complete the interaction of the $x$ and $y$-axes establish the affective range. For quadrant the results are summed and divide by 12, resulting in an integer that is placed on the continuum. (Figure 33)
We complete the graphs for Bestbuy.com’s AEER the same way. (Figure 34)

The findings from this method give Amazon.com a final affective score equal to 0 \(((\text{Motivation}+\text{Obstacles})/\text{Elements})\), while Bestbuy.com’s final affective score is equal to 0.04. As indicated by the visual graphs, Amazon.com, was graphed in the left of center in the Neutral area, while Bestbuy.com was graphed to the right of center in the Interest area.
Because the intersection of results falls to the left of center, Amazon.com shows a propensity for surprising or potential fearful interactions. The location of intersection between qualitative and quantitative measurements indicates a delicate balance exists between these two values and changes to either could immediately impact the affective score. If we look only at the continuum graph of the affective score of zero (0), we see it is neither an obstacle nor motivational, merely neutral.

With regard to Bestbuy.com, the intersection falls to the right of center just slightly into the interested realm. This would indicate the site is overall useable, but could be modified to even further enhance its motivational qualities. When referring to the affective continuum we notice a score of 0.41. This level just reached the interested intersection, and teeters between neutral and interest.
CONCLUSIONS AND IMPLICATIONS

This research has generated an innovative evaluation rubric that may better assist the graphic designer to assess the affective impact of interaction in ecommerce websites. Not only will the designer be able to better assess the potential affective emotional impact of their designs, they may also be able to design interactions with websites that can be shaped into positive, pleasurable, motivational, and emotional interactions. The designer now has a tool to measure the success or failure of website design and can better facilitate a productive iterate design process.

This research has provided answers to several questions posed at the commencement of the study. An instrument has been created that can measure and/or predict affective and experiential reactions to ecommerce websites. The items appearing on the instrument were screened against several sources to validate their inclusion. Furthermore, they were defined as necessary to facilitate the increase of value and motivation of interactions with ecommerce websites. Finally, this instrument can be applied to website design and utilized as a tool to gauge and potentially improve affective and experiential responses.

This research has further acknowledged and reinforced the role of emotions in human interaction with technology. No longer can usability testing rely solely on the quantitative measurements. Qualitative measures must be incorporated into usability testing to truly assess the overall impact a website has on the experiential response to interaction.
AREAS OF FUTURE RESEARCH

6.1 Recognition of research shortcomings

We must acknowledge several shortcomings present during the creation of this prototype rubric. One, quantitative averages were based on the assessment of only five randomly selected websites listed in the Google directory of ecommerce sites. This raises the potential that our statistical mean could be skewed and not accurately reflect the true average screen real estate of ecommerce homepages. Further research and analysis must be executed with a larger number of websites to determine the sample size (n) of homepages to analyze to accurately calculate the mean for ecommerce homepages.

Second, our sample only included sites listed in Google’s ecommerce directory. These sites may or may not be indicative of the actual sites visited by our target audience. Furthermore, this directory may not have contained a complete source to base our analysis of the compositional elements of the rubric.

Third, while recognizing the standard distribution of statistics includes outliers to every measurable variable, this research should be further enhanced to attempt to capture these outliers.

Finally, several liberties were taken in the name of prototype creation. In the future, these liberties can be validated in a controlled study to eliminate any bias the researches had towards any ecommerce homepage.

6.2 Opportunities for validation of AEER

AEER incorporates several aspects of analysis in an attempt to predict the emotional and experiential impact of a given ecommerce homepage. The included
elements should be tested for the necessity of inclusion. Several studies have show that facial recognition and measurement can accurately predict on an organic scale the emotional response of a user when faced with external visual stimuli. This type of study could prove valuable in validating the ability of AEER to accurately predict the emotional and experiential impact.

Additionally, the potential exists for AEER to be implemented across other disciplines where the concern is with the experience of interaction between humans and objects. For example, industrial design could validate the design of a product, while designers of environmental graphics could assess the impact of their installations.

Finally, to validate the compositional elements and examples for designers presented in this study, additional research should be completed utilizing the Kansei Engineering preference testing method with subjects. The results would exist on a semantic differential scale and help determine the accuracy of the examples provided.

A great many opportunities exist for further examination and validation of AEER. It is hoped that by continue this research, a final effort can provide the human computer interaction and design disciplines with a quintessential instrument that will, without any doubt, reflect the emotional and experiential impact of a design.
APPENDIX
Representation of typical spreadsheet used to calculate screen real estate in Microsoft Excel

<table>
<thead>
<tr>
<th>Screen Real Estate Breakdown</th>
<th>Site: Homier</th>
<th>Navigation Length</th>
<th>width</th>
<th>area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length</td>
<td>Width</td>
<td>Area</td>
<td>Percent</td>
</tr>
<tr>
<td>Branding</td>
<td>1.32</td>
<td>0.4</td>
<td>0.53</td>
<td>1.71%</td>
</tr>
<tr>
<td>Navigation</td>
<td>multiple</td>
<td>multiple</td>
<td>1.67</td>
<td>5.40%</td>
</tr>
<tr>
<td>Advertising</td>
<td>1.76</td>
<td>3.49</td>
<td>4.51</td>
<td>14.97%</td>
</tr>
<tr>
<td>Content</td>
<td>3.21</td>
<td>4</td>
<td>12.21</td>
<td>39.45%</td>
</tr>
<tr>
<td>Other</td>
<td>multiple</td>
<td>multiple</td>
<td>3.61</td>
<td>11.44%</td>
</tr>
<tr>
<td>Other</td>
<td>multiple</td>
<td>multiple</td>
<td>3.61</td>
<td>11.44%</td>
</tr>
<tr>
<td>White space</td>
<td>calculated</td>
<td>calculated</td>
<td>8.42</td>
<td>27.21%</td>
</tr>
<tr>
<td>Total</td>
<td>5.63</td>
<td>5.7</td>
<td>30.95</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Measures taken from Illustrator and are read in inches.
Demographics of internet Users

Below is the percentage of each group who use the internet, according to our May 2008 survey. As an example, 73% of adult women use the internet.

<table>
<thead>
<tr>
<th>Use the internet</th>
<th>73%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Adults</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>73</td>
</tr>
<tr>
<td>Men</td>
<td>73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18-29</td>
<td>90%</td>
</tr>
<tr>
<td>30-49</td>
<td>85</td>
</tr>
<tr>
<td>50-64</td>
<td>70</td>
</tr>
<tr>
<td>65+</td>
<td>35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>White, Non-Hispanic</td>
<td>75%</td>
</tr>
<tr>
<td>Black, Non-Hispanic</td>
<td>59</td>
</tr>
<tr>
<td>English-speaking Hispanic</td>
<td>80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geography</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>74%</td>
</tr>
<tr>
<td>Suburban</td>
<td>77</td>
</tr>
<tr>
<td>Rural</td>
<td>63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $30,000/yr</td>
<td>53%</td>
</tr>
<tr>
<td>$30,000-$49,999</td>
<td>76</td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>85</td>
</tr>
<tr>
<td>$75,000+</td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational attainment</th>
<th>44%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than High School</td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td>Percentage</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td>High School</td>
<td>63</td>
</tr>
<tr>
<td>Some College</td>
<td>84</td>
</tr>
<tr>
<td>College +</td>
<td>91</td>
</tr>
</tbody>
</table>

Source: Pew Internet & American Life Project, April 8 – May 11, 2008 Tracking Survey. N=2,251 adults, 18 and older. Margin of error is ±2% for results based on the full sample and ±3% for results based on internet users.

Please note that prior to our January 2005 survey, the question used to identify internet users read, “Do you ever go online to access the internet or World Wide Web or to send and receive email?” The current two-part question wording reads, “Do you use the internet, at least occasionally?” and “Do you send or receive email, at least occasionally?”

Last updated July 22, 2008.

**NOTE:** If you followed an outside link to get to this page, please refer to the Latest Trends section of our website to ensure that you are viewing the most recent version of this table: [http://www.pewinternet.org/trends.asp](http://www.pewinternet.org/trends.asp)
PEW Internet and American Life Project. Sourced after the results.

<table>
<thead>
<tr>
<th>Internet Activities</th>
<th>Percent of internet users who report this activity</th>
<th>Most recent survey date</th>
</tr>
</thead>
<tbody>
<tr>
<td>According to our May 2008 survey, 73% of American adults use the internet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Here are some of the things they do online:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use a search engine to find information</td>
<td>92</td>
<td>December 2007</td>
</tr>
<tr>
<td>Search for a map or driving directions</td>
<td>89</td>
<td>May 2008</td>
</tr>
<tr>
<td>Look for info on a hobby or interest</td>
<td>83</td>
<td>December 2006</td>
</tr>
<tr>
<td>Look for information online about a service or product you are thinking of buying*</td>
<td>81</td>
<td>September 2007</td>
</tr>
<tr>
<td>Check the weather</td>
<td>80</td>
<td>May 2008</td>
</tr>
<tr>
<td>Look for health/medical info*</td>
<td>75</td>
<td>December 2007</td>
</tr>
<tr>
<td>Get travel info</td>
<td>73</td>
<td>May-June 2004</td>
</tr>
<tr>
<td>Get news</td>
<td>73</td>
<td>May 2008</td>
</tr>
<tr>
<td>Buy a product</td>
<td>71</td>
<td>December 2007</td>
</tr>
<tr>
<td>Visit a local, state or federal government website*</td>
<td>66</td>
<td>May 2008</td>
</tr>
<tr>
<td>Buy or make a reservation for travel</td>
<td>64</td>
<td>September 2007</td>
</tr>
<tr>
<td>Surf the Web for fun</td>
<td>62</td>
<td>February-April 2007</td>
</tr>
<tr>
<td>Go to a website that provides info or support for a specific medical condition or personal situation</td>
<td>58</td>
<td>November 2004</td>
</tr>
<tr>
<td>Research for school or training</td>
<td>57</td>
<td>January 2005</td>
</tr>
<tr>
<td>Watch a video clip or listen to an audio clip</td>
<td>56</td>
<td>November 2004</td>
</tr>
<tr>
<td>Look for &quot;how-to,&quot; &quot;do-it-yourself&quot; or repair information</td>
<td>55</td>
<td>February-March 2005</td>
</tr>
<tr>
<td>Look online for news or information about politics or the upcoming campaigns*</td>
<td>55</td>
<td>May 2008</td>
</tr>
<tr>
<td>Activity</td>
<td>Year</td>
<td>Month</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td>Look up phone number or address</td>
<td>54</td>
<td>February 2004</td>
</tr>
<tr>
<td>Do any banking online</td>
<td>53</td>
<td>September 2007</td>
</tr>
<tr>
<td>Watch a video on a video-sharing site like YouTube or Google Video</td>
<td>52</td>
<td>May 2008</td>
</tr>
<tr>
<td>Take a virtual tour of a location online</td>
<td>51</td>
<td>August 2006</td>
</tr>
<tr>
<td>Do any type of research for your job</td>
<td>51</td>
<td>February-March 2007</td>
</tr>
<tr>
<td>Look online for info about a job*</td>
<td>47</td>
<td>May 2008</td>
</tr>
<tr>
<td>Get sports scores and info online*</td>
<td>45</td>
<td>August 2006</td>
</tr>
<tr>
<td>Get info online about a college, university or other school you or a family member might attend</td>
<td>45</td>
<td>January 2005</td>
</tr>
<tr>
<td>Download other files such as games, videos, or pictures</td>
<td>42</td>
<td>February-March 2005</td>
</tr>
<tr>
<td>Get financial info online, such as stock quotes or mortgage interest rates</td>
<td>41</td>
<td>August 2006</td>
</tr>
<tr>
<td>Send instant messages</td>
<td>40</td>
<td>May 2008</td>
</tr>
<tr>
<td>Look for info about a place to live*</td>
<td>39</td>
<td>August 2006</td>
</tr>
<tr>
<td>Download computer programs from the internet</td>
<td>39</td>
<td>May-June 2005</td>
</tr>
<tr>
<td>Pay bills online</td>
<td>38</td>
<td>January 2005</td>
</tr>
<tr>
<td>Download music files to your computer</td>
<td>37</td>
<td>December 2007</td>
</tr>
<tr>
<td>Upload photos to a website so you can share them with others online</td>
<td>37</td>
<td>August 2006</td>
</tr>
<tr>
<td>Get financial info online, such as stock quotes or mortgage interest rates</td>
<td>36</td>
<td>September 2007</td>
</tr>
<tr>
<td>Look for information on Wikipedia</td>
<td>36</td>
<td>February-March 2007</td>
</tr>
<tr>
<td>Send or receive text messages using a cell phone</td>
<td>35</td>
<td>September 2005</td>
</tr>
<tr>
<td>Look for religious/spiritual info</td>
<td>35</td>
<td>February-March 2007</td>
</tr>
<tr>
<td>Play online games*</td>
<td>35</td>
<td>August 2006</td>
</tr>
<tr>
<td>Activity</td>
<td>Number</td>
<td>Date</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Listen to music online at a website</td>
<td>34</td>
<td>May-June 2004</td>
</tr>
<tr>
<td>Read someone else’s online journal or blog*</td>
<td>33</td>
<td>May 2008</td>
</tr>
<tr>
<td>Rate a product, service or person using an online rating system</td>
<td>32</td>
<td>September 2007</td>
</tr>
<tr>
<td>Use online classified ads or sites like Craig’s list</td>
<td>32</td>
<td>September 2007</td>
</tr>
<tr>
<td>Post a comment or review online about a product you bought or a service you received</td>
<td>30</td>
<td>September 2007</td>
</tr>
<tr>
<td>Log on to the internet using a wireless device</td>
<td>30</td>
<td>February-April 2006</td>
</tr>
<tr>
<td>Use an online social networking site like MySpace, Facebook or LinkedIn.com*</td>
<td>29</td>
<td>May 2008</td>
</tr>
<tr>
<td>Listen to a live or recorded radio broadcast online, such as a newscast, sporting event, or radio show</td>
<td>29</td>
<td>May-June 2004</td>
</tr>
<tr>
<td>Pay to access or download digital content online*</td>
<td>28</td>
<td>December 2007</td>
</tr>
<tr>
<td>Categorize or tag online content like a photo, news story or blog post</td>
<td>28</td>
<td>December 2006</td>
</tr>
<tr>
<td>Search for info about someone you know or might meet</td>
<td>28</td>
<td>September 2005</td>
</tr>
<tr>
<td>Download video files to your computer</td>
<td>27</td>
<td>December 2007</td>
</tr>
<tr>
<td>Share files from own computer with others</td>
<td>27</td>
<td>May-June 2005</td>
</tr>
<tr>
<td>Participate in an online auction</td>
<td>26</td>
<td>September 2007</td>
</tr>
<tr>
<td>Research your family’s history or genealogy online*</td>
<td>25</td>
<td>August 2006</td>
</tr>
<tr>
<td>Download screensavers from the internet</td>
<td>23</td>
<td>May-June 2005</td>
</tr>
<tr>
<td>Post comments to an online news group, website, blog or photo site</td>
<td>22</td>
<td>December 2007</td>
</tr>
<tr>
<td>Chat in a chat room or in an online discussion</td>
<td>22</td>
<td>September 2005</td>
</tr>
<tr>
<td>Share something online that you created yourself</td>
<td>21</td>
<td>December 2007</td>
</tr>
<tr>
<td>Activity</td>
<td>Frequency</td>
<td>Date Range</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Download computer games from the internet</td>
<td>21</td>
<td>May-June 2005</td>
</tr>
<tr>
<td>Make a donation to a charity online</td>
<td>20</td>
<td>May 2008</td>
</tr>
<tr>
<td>Download a podcast so you can listen to it or view it later*</td>
<td>19</td>
<td>May 2008</td>
</tr>
<tr>
<td>Create content for the internet</td>
<td>19</td>
<td>November 2004</td>
</tr>
<tr>
<td>View live images online of a remote location or person, using a webcam</td>
<td>17</td>
<td>December 2006</td>
</tr>
<tr>
<td>Download or share files using peer-to-peer file-sharing networks, such as BitTorrent or LimeWire</td>
<td>15</td>
<td>May 2008</td>
</tr>
<tr>
<td>Sell something online</td>
<td>15</td>
<td>August 2006</td>
</tr>
<tr>
<td>Create or work on your own webpage</td>
<td>14</td>
<td>December 2007</td>
</tr>
<tr>
<td>Create or work on web pages or blogs for others, including friends, groups you belong to, or for work</td>
<td>13</td>
<td>December 2007</td>
</tr>
<tr>
<td>Make a phone call online*</td>
<td>13</td>
<td>December 2007</td>
</tr>
<tr>
<td>Visit an adult website</td>
<td>13</td>
<td>May-June 2005</td>
</tr>
<tr>
<td>Take a class online just for personal enjoyment or enrichment*</td>
<td>13</td>
<td>January 2005</td>
</tr>
<tr>
<td>Create or work on your own online journal or blog*</td>
<td>12</td>
<td>May 2008</td>
</tr>
<tr>
<td>Participate in an online discussion, a listserv, or other online group forum that helps people with personal issues or health problems*</td>
<td>12</td>
<td>August 2006</td>
</tr>
<tr>
<td>Send or receive an invitation to a meeting or party using an online invitation service</td>
<td>12</td>
<td>November 2004</td>
</tr>
<tr>
<td>Take a class online for credit toward a degree of some kind*</td>
<td>12</td>
<td>December 2005</td>
</tr>
<tr>
<td>Buy or sell stocks, bonds, or mutual funds</td>
<td>11</td>
<td>September 2007</td>
</tr>
<tr>
<td>Take material you find online—like songs, text or images—and remix it into your own artistic creation</td>
<td>11</td>
<td>December 2007</td>
</tr>
</tbody>
</table>
Use an online dating website*

<table>
<thead>
<tr>
<th>Item</th>
<th>Year</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create or use an avatar or online graphic representation of yourself, for example, in a virtual world such as Second Life*</td>
<td>6</td>
<td>December 2007</td>
</tr>
<tr>
<td>Download or share adult content online</td>
<td>4</td>
<td>May-June 2005</td>
</tr>
</tbody>
</table>

Source: Pew internet & American Life Project Tracking surveys (March 2000 – May 2008). Please note that the wording for some items has been abbreviated. For full question wording, please refer to the questionnaire.

1 In 2000-2, item wording was as follows: “Look for health or medical information.” In 2003-7, respondents were prompted with questions about specific health topics, yielding a consistently higher estimate (80%) for the percentage of internet users who seek health information online. In 2008, we returned to asking the more basic question and found that it returns a similar result: 75% of internet users have looked for health or medical information online.

2 In our January 2006 survey and our May 2008 survey a separate standalone question was asked of internet users with slightly different wording: “Have you ever read someone else’s online journal, web log or blog?” In January 2006, 39% of internet users said “yes.” In May 2008, 42% of internet users said “yes.”

*Item wording has changed slightly over time for the items marked with an asterisk. Please see questionnaires for question wording changes.

Last updated: July 22, 2008

**NOTE:** If you followed an outside link to get to this page, please refer to the Latest Trends section of our website to ensure that you are viewing the most recent version of this table: [http://www.pewinternet.org/trends.asp](http://www.pewinternet.org/trends.asp)
Consumer demographics compiled from Quantcase.com accessed on July 28, 2008.

Your search for: All caucasian female adults aged 45-54 $60-$100k+ college on magazines sites reaching at least 100K US people

US internet population: 2,898,265 people matching demographic target

US Monthly Reach: 231,119,289

223.8K people people.com (people.com)
Part of the Time Inc. Sites [beta]. (US Network Reach: 31,119,289)
This site reaches over 12 million monthly people, of which 8.9 million (77%) are in the U.S. The site attracts a more affluent, more female audience.
US Reach: 8,920,077 3% in target (index 130)
Global Reach: 11,546,233 Category Affinity: 274

205.9K people newsweek.com (newsweek.com)
Part of the Newsweek Network. (US Network Reach: 10,274,377)
Features articles from the current weekly issue as well as breaking news stories.
US Reach: 10,253,212 3% in target (index 144)
Global Reach: 11,766,208 Category Affinity: 220

120.9K people oprah.com (oprah.com)
This site reaches over 4.4 million U.S. monthly people. The site is popular among a primarily older, mostly female crowd.
US Reach: 4,383,214 3% in target (index 118) Category Affinity: 255

113.8K people time.com (time.com)
Part of the Time Inc. Sites [beta]. (US Network Reach: 31,119,289)
Comprehensive news articles from the magazine. Updated daily.
US Reach: 5,920,566 2% in target (index 118)
Global Reach: 7,947,262 Category Affinity: 260
**tvguide.com (tvguide.com)**

This site reaches over 5.0 million U.S. monthly people. The site caters to a slightly female skewed, 25-54 group.

US Reach: 5,038,664 3% in target (index 112)  Category Affinity: 282

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**forbes.com (forbes.com)**

This site reaches over 4.2 million U.S. monthly people. The site appeals to a somewhat male, more affluent, more educated, 55+ audience.

US Reach: 4,179,497 2% in target (index 111)  Category Affinity: 215

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**ew.com (ew.com)**

Part of the Time Inc. Sites (beta). (US Network Reach: 31,119,288)

Online version of the print magazine includes entertainment news, interviews, reviews of music, film, TV and books, and a special area for magazine subscribers.

US Reach: 3,402,748 3% in target (index 146)  Global Reach: 4,477,758  Category Affinity: 253

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**nationalgeographic.com (nationalgeographic.com)**

Part of the National Geographic Network. (US Network Reach: 4,098,981)

With a look into the pages of the magazine, plus interactive features, maps, photography, news, exhibitions, things for kids, educational features, and hosting live events. Searchable web site.

US Reach: 4,701,698 2% in target (index 160)  Global Reach: 7,951,302  Category Affinity: 212

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**epicurious.com (epicurious.com)**

This site reaches over 1.9 million U.S. monthly people. The site attracts a more affluent, more educated, 55+, more female audience.

US Reach: 1,863,048 3% in target (index 213)  Category Affinity: 241
**pcworld.com (pcworld.com)**
Part of the IDG Communications Network. (US Network Reach: 6,073,128)
Computer and Internet news and information resource. Reviews, how-tos, downloads, product and price information.
US Reach: 3,756,799  2% in target (index 96)  Global Reach: 8,550,875
Category Affinity: 230

**bhg.com (bhg.com)**
This site reaches over 2.0 million U.S. monthly people. The site appeals to a 55+, primarily female crowd.
US Reach: 2,017,641  3% in target (index 161)  Category Affinity: 228
WORKS CITED


BIBLIOGRAPHY


