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## Only Screen Deep? Evaluating Aesthetics, Usability, And Satisfaction In Informational Websites

Carrie Avery  
*University of Central Florida*



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ONLY SCREEN DEEP? EVALUATING AESTHETICS, USABILITY, AND SATISFACTION  
IN INFORMATIONAL WEBSITES

by

CARRIE AVERY  
B.S. University of Central Florida, 2003

A thesis submitted in partial fulfillment of the requirements  
for the degree of Master of Arts  
in the Department of English  
in the College of Arts and Sciences  
at the University of Central Florida  
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## **ABSTRACT**

This thesis explores the role aesthetics plays in informational websites. In the past, satisfaction was thought to originate from the effectiveness and efficiency of a product and less from its aesthetic qualities. This theory is beginning to change as numerous studies have indicated the importance of visual aesthetics in web design. In commercial interfaces, aesthetics (the perceived visual appeal and appropriateness of an object) has shown to correlate positively with many aspects of usability and emotional satisfaction. Because informational websites are usually more subdued than commercial sites, this thesis examines whether aesthetics has similar positive correlations in informational websites.

Heuristics or guidelines for evaluating informational websites are developed based on empirical research and practitioner expertise. Categories for heuristic evaluation include usability, credibility, visual clarity, visual richness, and emotional satisfaction. The heuristics are qualifiers followed by descriptive statements.

A class of graduate students browsed three academic websites, evaluated them, and critiqued the heuristics. Results indicate that aesthetics does correlate with overall impression, usability, satisfaction, and to some extent, credibility. The data also suggests that there are two dimensions of aesthetics: visual richness and visual clarity, with visual richness being the strongest indication of aesthetic impression. Overall impression correlated with the average of all categories. Agreement on ratings varied. Aesthetics is an important factor when designing informational websites, but so are usability, credibility, and satisfaction. The heuristics used in this pilot study are now ready to be tested on a larger population using a random selection of informational websites. Variations of these heuristics can also be put into practice.

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## **LIST OF ACRONYMS/ABBREVIATIONS**

ANOVA	Analysis of Variance
ATM	Automated Teller Machine
DSGS	Dynamic Symmetry Gridding System
GUI	Graphical User Interface
HCI	Human Computer Interaction
IT	Information Technology
MANCOVA	Multivariate Analysis of Covariance
NJIT	New Jersey Institute of Technology
STC	Society for Technical Communication
USU	Utah State University

## CHAPTER ONE: AN INTRODUCTION TO AESTHETICS IN WEB DESIGN

Size, texture, hue, shape, orientation, and position—these elements seem like simple concepts to master. However, the infinite number of combinations of these elements makes visual design enigmatic to many, and gratifying only to the few who can follow the seldom-explicit design principles governing these concepts. I have labored over the design of manuals, websites, and help files wondering how much visual attractiveness matters. This thesis describes how a designer may be better equipped to produce a satisfying, aesthetically pleasing, yet still usable document.

Should design be relegated to the creative ones who seem to have innate abilities, or is design for everyone? Conversely, are the effects of design really so subjective that there are not principles that will work for a universal audience? This thesis will attempt to discern some principles that web designers can follow when they are creating an academic website or another type of informational website. Creating these designs is one thing, but judging them is a different matter. This thesis will offer the guidelines in a form that will enable people with little training to evaluate the aesthetics of an informational website.

### **Beauty Is More than Screen Deep**

Noam Tractinsky explains Vitruvius' three requirements of architecture: *firmitas* (strength), *utilitas* (utility), and *venustas* (beauty) (“Aesthetics in IT” 11). He says that in information technology, *venustas* has been absent from research. The same can be said for

technical communication. Both are relatively new fields that have recently discovered the importance of aesthetics.

To understand the importance of good visual design, one must understand what impact aesthetics has on design (for a user). Virginia Postrel describes aesthetics as “fundamentally the art of using line, form, tone, color, and texture to arouse an emotional reaction in the beholder” (6). According to this definition, aesthetics is just one important aspect of visual design. Donald Norman adds that emotion, as elicited by visual design, alters the psychological state of the user and interacts with cognition, creating a kind of positive feedback that makes the website easier or more difficult to use (Norman, *Emotional Design* 20).

However, in other studies, aesthetics is synonymous with attractiveness, or beauty. For this thesis, aesthetics is defined as “visual appeal and appropriateness.” Because many academic websites refrain from other sensory aesthetics, I focus on the visual. Some studies indicate that aesthetics correlates with usability, credibility, overall impression, and emotional satisfaction among other variables (Jordan; Karvonen; Ngo, Teo and Byrne; Schenkman; Lavie and Tractinsky; van der Heijden; Tractinsky, Katz and Ikar; Tractinsky, “Apparent Usability”). However, other studies indicate that aesthetics has little impact on satisfaction or usability (Spool et al.; Hassenzahl, “Interplay”). Still others, specifically studies focused mainly on commercial interfaces, have problems with the methodology used to reach such conclusions (Monk; Frohlich). Besides looking for a helpful framework for users to evaluate informational websites, I also seek answers to as to the impact of aesthetics in informational websites.

### **Who Qualifies as a Designer?**

In many companies and organizations, there are various types of designers ranging from graphic designers, to content writers, to developers, to information designers. David and Jean Farkas review these common roles in *Principles of Web Design* (70-73). In this thesis, when I speak of designers, I am mainly referring to people who create the visual appeal of a website including those who are often responsible for designing the entire site. Technical communicators do not always have graphic design as one of their specialties, but they might often be given the opportunity to create something that demands visual expertise.

In Chapter Three, I interview a content designer because my heuristics or guidelines include usability, credibility, and satisfaction as well. Because the guidelines cover many aspects of design, my heuristics may work best for designers who are working independently to create an entire website. However, my research suggests that skilled teams representing every specialty of web design, from aesthetics to usability, often create effective websites.

### **Different Approaches to Design**

Many graphic designers have enough training and experience that they feel no need to test their design on the user. They believe that information can be conveyed purely and not be misinterpreted. These designers are often right in thinking that they do not need to poll other users because they may be using some universal principles or principles common to the specific audience and designer. When designers do not poll potential users, the designer (and possibly the client) dictates what the design will look like. Both convention and creativity are valued with this approach, and design depends on context and audience analysis.

Conversely, there is a move to allow anyone to create aesthetically pleasing documents through the use of templates, rules, and formulas. This approach mimics the expertise of designers and the principles of nature to create aesthetically pleasing ratios and symmetries, allowing those without an eye for design to create optimally placed websites or documents. Advocates of this approach assume that there are universal principles that can be followed. Designers can use this approach as well, but there is less creativity and intuition involved and the assumption is still that users need not be consulted.

Still others who believe that users should be the ultimate judges and designs need to be tested by a representative pool of participants. Some of these practitioners believe that beauty may be in the eye of the beholder in that the meaning or value of a design depends on the user, but the content of the design can be agreed upon (Hassenzahl, “Interplay”; Postrel). For example, humans may recognize the color white, but associate it with peace or death, depending on the culture. In other situations, even the interpretation of content of design also depends on culture. For instance, a two-dimensional drawing showing depth may be interpreted differently among cultures.

Recognizing all these approaches, one may reach the conclusion that some principles are universally appreciated, and still others depend on previous exposure, and others depend on personal predilections. Another conclusion one might draw is that the ability to create design depends on training, experience, the ability to recognize certain universals, and originality.

Taking all these approaches into consideration, I develop guidelines or heuristics that can be applied by designers alone, but, to add greater validity, these heuristics should also be tested with users. Some of these heuristics may be universally desirable in informational web pages.

However, the designer can decide her own heuristics and determine how she wants her heuristics rated.

## **Overview**

In Chapter Two, I discuss the definition of aesthetics. I also consider theories surrounding how aesthetics may work to aid cognition or increase apparent usability. I explain other variables that aesthetics has been shown to impact, including satisfaction, credibility, and intention to use. I assert that there are certain parallels between different three-part frameworks involving communication and aesthetics. I also explain that not everyone believes aesthetics affects usability and satisfaction. I ponder whether there are really two dimensions of aesthetics, whether aesthetics and overall impression can be broken down into components, and whether the surface can be substance.

In Chapter Three, I discuss existing guidelines that range from those written by experienced practitioners to those that are tested, from guidelines that seem to be universal to guidelines that depend on the context. I then introduce my guidelines derived from existing heuristics, from research studies, and from interviewing a designer. I explain how my heuristics compare to other heuristics based on a given set of criteria. I then describe my interview with a content designer.

In Chapter Four, I explain the methodology of my pilot study. I then give the results of the pilot study and discuss the ramifications of the study. I find that aesthetics correlates with overall impression, usability, and satisfaction, and credibility. The two dimensions of aesthetics—visual clarity, which includes aesthetics principles and formulas found in design

books, and visual richness, which concerns the unique style or originality of a design—correlate with different variables according to the pilot study. This does not mean that aesthetics causes these other factors, but it suggests that aesthetics may be related to these factors in some way. I also found that aesthetic impression and overall impression seem to correlate well with the individual heuristics averaged together.

In Chapter Five, I conclude by explaining the implications of the study. I discuss how important aesthetics is and how important it is likely to become. I emphasize that context is the major determinant. I also suggest that the two dimensions of aesthetics should be considered when designing a website. I again outline the approaches to design and equate them to the difference between object and subject and then assert that these approaches can all contribute to a better understanding of aesthetics.



## CHAPTER TWO: AESTHETICS: A BRIDGE BETWEEN USABILITY AND SATISFACTION?

What makes for a successful document? Ask a technical communicator this question and one likely answer is “usability.” Partially because design trends fluctuate, experts in human computer interaction (HCI) have emphasized usability before aesthetics (Nielsen 92; Norman, *Everyday Things*). Aesthetics for the purpose of this thesis means “visual appeal and appropriateness,” but its other implications will be discussed briefly. Usability, as defined by the International Standards Organization, includes effectiveness, efficiency, and satisfaction. However, designers have attributed satisfaction to the effectiveness and efficiency of the product, as opposed to it being a factor all on its own. By neglecting certain emotions, designers may have marginalized aesthetics in hopes of achieving efficiency and effectiveness. They did not realize they might be compromising usability by ignoring visual appeal.

It is not just in product design and web design that aesthetics have been neglected. In technical documentation, beginning with the Scientific Revolution and gaining strength in the Age of Reason, scientists strove to “quantify nature” and began to subjugate visuals as “mere aesthetics” (Olsen 15). There was a split between arts and sciences, form and function, emotion and cognition. Scientific writers viewed visuals as secondary. To an extent, this divide continues to separate visual and verbal design as well as aesthetics and usability, despite the fact that we are now in what many consider a much more visual age.

## **Defining Aesthetics and Design**

Despite this split, aesthetics is not diametrically opposed to usability or to text. Aesthetics is a complicated phenomenon whose definitions vary in different fields. Aesthetics is a branch of philosophy. It is studied in psychology. It is synonymous with beauty and attractiveness. “Visual appeal and appropriateness” may seem like a limiting definition, but it focuses the subject on two positive aspects: appeal, which *Merriam-Webster’s Collegiate Dictionary and Thesaurus 11<sup>th</sup> Edition, CD-ROM* defines as the “power of arousing a sympathetic response” and appropriate, which the same source defines as “especially suitable or compatible.” This definition captures both dimensions of aesthetics that are described in this thesis.

In a recent article, Gitte Lindgaard and T.W. Allan Whitfield offer a more comprehensive theoretical basis for aesthetics. They believe aesthetics is a “pre-linguistic form of cognition.” Root-Bernstein similarly describes an “aesthetic cognition” in recounting the role that aesthetics plays in science (62). Aesthetics appears to function as a modulator of cognition and emotion (Lindgaard and Whitfield 75). Lindgaard and Whitfield propose that hominids relied upon aesthetics before verbal communication: “The shape, colour and sound of something would provide an invariant indicator of its identity” (Lindgaard and Whitfield 77).

To explain aesthetics further, Whitfield has developed the categorical-motivational model where at one extreme, a stimulus has highly formed categories and affect is greatest when the aesthetics matches expectation and conventions. At the other extreme, where a category is not fully formed, people are pleased with novelty. This novelty will be integrated into new categories for comparison with later experiences. This model feeds into Barnard’s Interacting Cognitive Sub-systems (ICS) architecture, which integrates cognition and emotion (Lindgaard and

Whitfield 78). Whitfield's description for stimuli that belong to well-formed categories is reminiscent of schema theory, where people form a mental model based on previous experience (Griffin 27). Whitfield's categorical-motivational model also accounts for the processing of new information on the basis of differences as well as similarities to previous experience. This sensory knowledge we call aesthetics thus has more to do with cognition than we realize.

Just as aesthetics can be defined in multiple ways, so can design. Several authors make distinctions between art for art's sake and engineering. Jakob Nielsen says, "There are essentially two basic approaches to design: the artistic ideal of expressing yourself and the engineering ideal of solving a problem for a customer" (11). Mullet and Sano state, "Unlike the fine arts, which exists for their own sake design must always solve a particular real-world problem (11). Steven Johnson postulates, "there are no artists working in the interface medium who are not, in one way or another, engineers as well (6). For Johnson, interface design is a fusion of art and technology. These authors take the view that style and substance have more in common than their connotations imply.

### **Similarities and Differences among the Visual, Verbal, and Usable**

While aesthetics, as a modulator between cognition and emotion, may predate verbal communication, there are parallels between visual and verbal communication. Riley and Parker found four parallels between the major principles of visual and verbal communication: cohesion, clarity, completeness, and correctness (Riley and Parker 184). These four principles are common to both visual and verbal communication. Additionally, the procedures of verbal and visual design are similar, following four of the five ancient Greek canons of rhetoric: invention

(content), arrangement, style and delivery (Dragga and Gong). There are differences between the processing of visuals and text (Williams and Harkus), but the underlying desire for internal consistency is the same. Kostelnick and Roberts have introduced verbal/visual cognates common to both: arrangement, emphasis, clarity, conciseness, ethos, and tone (14).

There are also parallels between usability and aesthetics: they are both user-centered and both are employed to deliver a satisfying and expected product through a similar process. To make things more usable, one must make them more visible. Many of Nielsen's usability recommendations and William Horton's visual rhetoric characteristics share overlapping elements. Some of these design principles are contrast, repetition, alignment, and proximity (Horton; Williams and Tollett; Barnum 40). All three researchers conclude that proper and reliable arrangement of material is essential for maximum visual impact and usability.

However, in contrast to technical writing and usability testing, the visual design process relies more heavily on intuition. Usability testing is regarded as a scientific activity. Similarly, writing has style manuals and grammar books devoted to it. Although the last ten years has produced technical communication theory and practice stressing visual literacy, and usability studies have expanded to encompass user-centered design, many technical communication works continue to emphasize cognition and the differences between visual and verbal processing (Portewig; Griffin). Additionally, as with text, they focus on context and appropriateness, but not usually on emotional appeal. Many web design and graphic user interface books neglect aesthetics altogether (Martin; Fowler; Lynch). Perhaps some authors ignore aesthetics because design is seen as an art, which is necessarily more subjective and unquantifiable, whereas usability testing is grounded in scientific method and therefore seems more objective. Is it less common to have and be able to hone artistic skills than technical skills? Although Chapter Three

of this thesis offers some references that focus on a combination of aesthetics and technical details, it seems to be conventional wisdom that aesthetics skills are learned through talent and intuition; lacking those qualities, visual design is best left up to the designer.

### **Replicating Aesthetics**

Recently, in attempting to better comprehend aesthetics, scientists have tried to quantify aesthetics. In a study of aesthetic fidelity, defined as the degree to which the user's impression matches the designer's intent, researchers identified 13 distinct aesthetic dimensions. They also discovered experimentally that as users viewed sites differently and designers strayed away from target impressions, aesthetic fidelity decreased. They found that there was nothing inherently different about any aesthetic dimensions that lowered their fidelity (Park, Choi and Kim). This discovery may seem obvious, but to reach these conclusions statistically, the authors carried out three complementary studies: an exploratory study with web users, a longitudinal experiment with professional web designers, and an online survey with web users. It appears that reactions to aesthetics, like writing and usability, can be studied scientifically.

In this section, I review articles that focus on quantifying or programming certain principles of aesthetics. In general, researchers seem to believe that there are certain universal principles of aesthetics such as coherence and consistency. The articles range from discussing the aesthetics of the overall look to the aesthetics of individual parts and everything in between.

Ch'ng and Ngo, in "Screen design: a dynamic symmetry grid based approach," emphasize a quantitative approach to aesthetics by formulating an algorithm based on Jay Hambridge's technique for dynamic symmetry grids. Dynamic rectangles are based on square

roots. About 75% of examined screen designs show this technique even unwittingly (Ch'ng and Ngo 126). Human perception can sense the desirability of the placement of objects within a defined space in dynamic rectangles with each other and static rectangles with each other (Ch'ng and Ngo 131). The authors developed a Dynamic Symmetry Gridding System (DSGS) that allows users to move layout elements and adjust their sizes to maximize desirable placement relative to dynamic rectangles.

Ch'ng and Ngo tested two different approaches to DSGS based design, automated and iterative. In automated, the user places all the items and then uses the automation to place the elements as close along the grid lines as possible. The iterative approach allows for Snap to Grid and other means of interaction with the grid (Ch'ng and Ngo 132). Both studies yielded viewer preferences for the Dynamic Symmetry reformatted layout over originally created layout (Ch'ng and Ngo 133). The study showed that Dynamic Grids are preferable to some users, suggesting some aesthetics are universal in screen design.

The study of the Golden Rectangle and Dynamic Symmetry, designs based on ideal ratios, dates back to Greek antiques and architecture. People in many cultures generally prefer these types of proportions that occur by nature and are replicated by humans. However, in at least one study where students interacted with the web pages (as opposed to just viewing them as in Ch'ng and Ngo's study), they did not exhibit a preference for dynamic grids, implying aesthetic preference may not be universal and completely based on visceral reactions (at least online) (van Schaik and Ling).

Another study that attempts to quantify aesthetics and model it is "Modeling Interface Aesthetics." The authors claim, "Interface aesthetics play a greater role in affecting usability than we might be willing to admit. Careful application can aid acceptability, learnability,

comprehensibility, productivity” (Ngo, Teo, and Bryne 26). The authors synthesize known information into a framework of fourteen aesthetic measures for graphic displays: balance, equilibrium, symmetry, sequence, cohesion, unity, proportion, simplicity, density, regularity, economy, homogeneity, rhythm, and order and complexity.

Ngo, Teo, and Byrne developed formulas for all these measures using definitions, summation, and algebraic properties. They compared viewer judgments between actual screens and model screens. Originally, they had used model screens and found their model screens scored high aesthetically. They averaged the individual aesthetic weights of each of the fourteen values (all with 1 being the highest value) to assess an overall weight value. They displayed five actual screens to students who rated them on a low-medium-high scale. The results correlated to the weighted aesthetic values.

Common sense suggests that one cannot put a value on a design and that everyone has his or her own aesthetic. Additionally, aesthetics is thought to be holistic, and more valuable than the sum of its components (Hoffman and Krauss 206). Ngo, Teo, and Byrne’s study quantified which of five layouts can be considered effective and ineffective. These measurements can be used to find out if one’s layout will be aesthetically pleasing. Ngo and Ch’ng follow what Nielsen describes as the engineering approach to design. Their studies involve designing a model to help measure aesthetic value.

One of the salient measures of aesthetics and usability is consistency. Mahajan and Schneiderman, in “Visual and Textual Consistency Checking Tools for Graphical User Interfaces” looked at how using inconsistent terminology affects usability. The authors define consistency as “a relation between two potentially conflicting models: the actual system and the user’s mental model” (Mahajan and Schneiderman 722). The authors cite studies that found

visual inconsistencies were a distraction that weakened user comprehension and satisfaction (Mahajan and Schneiderman 722-724). They designed a collection of programs called SHERLOCK that evaluates user interfaces for several dimensions of consistency including aspect ratio, widget tools, widget density, margins, area balance, distinct typefaces, distinct background colors, distinct foreground colors, and concordance tools (Mahajan and Schneiderman 728-730). The researchers tested the suite of programs on four user interfaces and found inconsistencies in all of them.

The results suggest that aesthetics and usability can have the symbiotic relationship that Mullet and Sano mentioned (9). Thus, it might represent a first step toward improving aesthetics and usability at the same time. Unfortunately, one drawback of the current version of SHERLOCK is that it requires programming knowledge to run (Mahajan and Schneiderman 731).

Of course, replacing the human designer means sacrificing creativity and ingenuity. There have been similar attempts to replace a human writer with a computer program or to rely on computer-monitored accuracy and speed tests in usability testing. Just as human writers and usability testers are needed, so are graphic designers. In studies where scientists try to replicate aesthetics through the use of formulas and ratios, one major thing is missing: originality or novelty. These two dimensions of aesthetics: the visual clarity, convention, or appropriateness and the visual richness, novelty, or appeal are main concepts of this thesis. One can combine creativity of the user with the processing power of computers. Certain tasks can be automated as long as originality is left to the designer.

One example is the Kandinsky system, a system for creating collage displays. This system reverses the notion that product usability invariably precedes aesthetics. The authors



believe that home and office users often need to generate artistic posters, paintings, and other visual communication that are first and foremost aesthetically pleasing. Accordingly, the Kandinsky system relies on designers to create templates, but the computer does the repetitive work, such as generating variations of existing images (Fogarty 142).

### **Parallels among Theorists in Different Fields**

I have established some similarities among the visual, verbal, and usable. Being human endeavors, aesthetics, writing, and usability all have similar aims and follow a similar process that has both objective and subjective components. Now, to close the gap further, I turn to the work of rhetoricians and scientists who have devised frameworks for explaining design and rhetoric.

Carliner developed a three part-framework for information design consisting of the physical level aimed at helping the user find the information, a cognitive level aimed at helping the user understand the information, and an affective level aimed at motivating the user to apply the information (561). Stultz describes how Carliner's physical, cognitive, and affective framework parallels Aristotle's three modes of rhetoric— ethos, logos, and, pathos (Stultz 17). Norman introduces the visceral, behavioral, and reflective levels of design, also known as the hardwired, performance, and contemplative levels respectively (*Emotional Design* 63). I argue that Norman's levels correspond both with Carliner's physical, cognitive, and affective levels of design and with Aristotle's ethos, logos, and pathos as discussed by Stultz (Stultz 17-18). Just as all of these levels are overlapping and interdependent, so are usability and aesthetics. In rhetoric, one cannot make a convincing appeal without using all three modes: ethos, logos, and pathos.

Likewise, in document design, attention must be paid to the visual, the verbal, and the usable, where the usable includes emotional satisfaction or pathos.

Another book that offers a three-part framework is *Designing Visual Language* by Kostelnick and Roberts. This book's six main verbal-visual cognates correspond with Norman's three-part framework of physical, cognitive, and reflective. For Kostelnick and Roberts, arrangement and emphasis focus on how to structure the design by attending to the first thing the user sees, which Norman terms the visceral or physical level. Attention to clarity and conciseness ensures that the document is functional and not cluttered. Lastly, Kostelnick and Roberts' ethos and tone contribute the subjective effects. Arrangement, emphasis, clarity, and conciseness combine to establish a certain ethos and tone. Ethos is "a sense of character or credibility" (Kostelnick and Roberts 21). Tone is "your attitude toward your reader" (Kostelnick and Roberts 20).

Technical communicators have long been convinced of the importance of verbal and usable content (Barnum; Dumas and Redish), so the visual receives the most attention in this thesis. Having established some similarities between the three elements of the visual, the verbal, and the usable, I now focus on the importance of aesthetics. Another corresponding framework is to think of aesthetics, usability, and emotion as interdependent, overlapping, and therefore integral components of a website.

### **Aesthetics' Impact on Other Variables**

Numerous studies have indicated the importance of visual aesthetics in web design. In most of these studies, aesthetics is equated with beauty or visual attractiveness. HCI research is

beginning to verify what marketers and designers have surmised in product design: visual appeal can sometimes make or break a product; thus, aesthetics should be acknowledged as an important factor. Aesthetics has shown to positively correlate with credibility, overall impression, emotional satisfaction, apparent usability, learnability, and intention to use (Jordan; Karvonen; Ngo, Teo and Byrne; Schenkman; Lavie and Tractinsky; van Schaik; van der Heijden; Tractinsky, Katz and Ikar; Tractinsky, "Apparent Usability").

### **Limitations**

Admittedly, there are limitations to the role of aesthetics. Van Shaik and Ling found that aesthetics does correspond with usability to an extent, and that both are important in screen ratio. The screen ratio between frame elements should be properly balanced to enhance aesthetics and usability. In contrast, their findings disagreed with Ngo and others who suggested that humans prefer designs based on dynamic grids and golden sections. This preference suggests that in real use, as opposed to apparent use, universal aesthetics may play less of a role than previous experience does. Here we see that aesthetic conventions are sometimes built on biological and psychological principles and sometimes based on precedent.

Previous experience is an important factor, as aesthetics is thought to follow the categorical-motivational model where users sometimes seek to categorize their perceptions and formulate their impressions based on previous exposure (Lindgaard and Whitfield 78). However, because websites are relatively new and their genres are not clearly defined, some users expect novelty (Haig and Whitfield 2). Lindgaard and Dudek found that beauty does not always determine usability as one website scored well on aesthetics, but low on usability (445). One

guideline suggested by all this research is to follow convention and at the same time introduce something unique (Powell 415). A graphic designer, Stephen Doyle, captures this sentiment by saying the job of graphic design “is to make something that distinguishes itself when you see it in context” (Postrel 104). One must create something that both “fits in and stands out” (Postrel 104).

Van der Heidjen found even with regular use of a website, aesthetics had an impact, but not a determining one. He suggests that intention to use is sometimes an overriding factor (van der Heijden 546). Intention partially explains results that suggest “the quality of graphic design seems to have little impact on users’ ability to find and process information” (Spool et al. 85). The testers in Spool et al.’s experiments all had the same intention: to complete the test. As with much communication, it appears that context plays a major role. However, context and aesthetics do not have to be at odds with each other. If one chooses the proper aesthetic to match the context, then the overall quality of the document will improve.

### **Benefits**

Recent studies have suggested that aesthetics is a major factor in usability. Improved ease of use due to aesthetics may be part of the human drive for internal consistency. Tractinsky found that in both Israel and Japan, the aesthetics of ATMs affected the apparent usability of those ATMs (Tractinsky, "Apparent Usability"). He and others have found that perceived aesthetics affects perceived usability more than actual usability does (Tractinsky, Katz and Ikar). Lavie and Tractinsky determined that there are likely two dimensions of aesthetics. One is classical aesthetics, which represents visual clarity and is closely aligned with the findings of

usability experts. The other is expressive aesthetics, which includes creativity and breaking design conventions (visual richness) (Lavie and Tractinsky 287). These results correspond to the categorical-motivational model envisioned by Whitfield, where stimuli are appreciated both for their novelty and for their adherence to conventions in categories. Aesthetics is appreciated both for its appeal and its appropriateness.

Norman was one of the first to theorize a connection between emotion and ease of use. Emotion for this thesis, as adapted from *Merriam-Webster's Collegiate Dictionary and Thesaurus 11<sup>th</sup> Edition, CD-ROM*, is defined as “a conscious, subjective mental response to a stimulus.” Once a practitioner who emphasized usability over aesthetics, Norman now recognizes the power of aesthetics. According to Norman, aesthetics can affect the psychological processes of the brain by way of emotions. People who are anxious and upset tend to have tunnel vision, whereas those who are relaxed and happy expand their brain processes. Relaxed people are more likely to find alternative solutions and tolerate minor difficulties (Norman, *Emotional Design* 19-20, 26). In short, design plays a role in shaping people's emotions and thus the usability of a product. The effect of design on emotion helps to explain the ATM study where aesthetically pleasing ATM layouts received higher perceived usability scores (Tractinsky, Katz, Ikar).

Spillers also studies the relationship between emotion, cognition, and aesthetics. Spillers describes how emotion acts as a cognitive artifact, “physical objects made by humans for the purpose of aiding, enhancing, or, improving cognition” (2). Spillers believes that affect or emotion performs similar actions. A user presented with an unfamiliar screen may feel curious or annoyed. This feeling causes an “emotional state change” that results in either satisfaction or disappointment (Spillers 2). During product use, an emotional state change can lead the user to

explore an interface, change his or her level of concentration, free up cognitive resources, or shift group dynamics (Spillers 3). “Affective artifacts represent or elicit emotions and assist product interaction and user cognition during the product appraisal process” (Spillers 3).

Spillers discusses Kansei engineering, which is a successful design approach “aimed at capturing a consumer’s expected feelings . . . by organizing design requirements around the emotions that embody user expectations and interaction” (3). Kansei can be considered the “emotional signature” of the product. Spillers agrees that aesthetics serves as an affective artifact that may cause a change in emotion, which in turn helps drive cognition and “sense-making” (4).

Jordan also discusses aesthetics as a major factor in product purchasing and use. He suggests that the pleasure or positive emotion of a product is not always dependent on whether tasks are inherently pleasurable or unpleasurable (Jordan, “Human Factors” 30). In the field of human factors, Jordan is a forerunner in developing pleasurable products that go beyond usability to facilitate an enjoyable interaction with the product. Similarly, Haig and Whitfield predict that the usability of websites will be a given, and that aesthetics will determine the success of a website (1).

Other benefits to an aesthetic design include increased credibility and a more favorable overall impression. Karvonen found that “clear” and “clean” designs convey the most trust in an e-commerce site (87). Kostelnick and Roberts assert, “Aesthetic appeal can enhance ethos” (302). Shenkman and Jönsson found beauty was an important predictor of overall impression saying, “observers may judge web pages to be similar based on the amount of complexity, legibility, and order, but they may like them based on their beauty” (375).

## **Aesthetics' Contribution to Satisfaction**

Tractinsky and others have found that aesthetics affects perceived usability. However, do these variables drive user satisfaction? A suitable definition for satisfaction comes from *Merriam-Webster's Collegiate Dictionary and Thesaurus 11<sup>th</sup> Edition, CD-ROM*: “fulfillment of a need or want.” Two different studies found conflicting results on satisfaction. Lindgaard and Dudek tested websites for aesthetics. With a control group they did not test for usability, whereas with the experimental group, they did. They found that usability drives satisfaction. They also found that views on aesthetics are formed quickly and do not change with extended exposure (Lindgaard and Dudek, “Aesthetic Appeal” slide 17). Aesthetics appears to be independent of usability when interaction with the website occurs over a long period. However, in another study by the same authors, beauty correlated with satisfaction, but not usability (Lindgaard and Dudek, “User Satisfaction” 429).

In another study, in which students were asked to rank four websites, each differing in color or balance, satisfaction appeared to be independent of aesthetics. However, users ranked perceived usability and aesthetics similarly. The authors suggest as users delve more into a site, their satisfaction depends more on navigation (Brady and Phillips par. 13).

Aesthetics likely contributes to user satisfaction, but it does not change much throughout the entire web experience. Other variables may change the overall impression of the website as it is used more extensively. It is clear from these studies that website variables or features should not be studied in isolation, but holistically (Hoffman and Krauss 207). Similarly, in usability testing, Rosenbaum and Bugental found that visual appeal issues cannot be assessed in isolation,

but must also factor into “visual navigation and information access issues” (Rosenbaum and Bugental 14).

### **Debate over Beauty, Goodness, and Usability**

A recent article by Marc Hassenzahl conflicts with Tractinsky’s earlier findings that aesthetics affected perceived usability. Hassenzahl asked participants to judge 20 mp3 player “skins,” graphic files that change the appearance of an application’s user interface (“Interplay” 325). In the first study, participants looked at four skins and in the second study, they used them. Hassenzahl found, as Linaard and Dudek did, that perceptions of beauty are long lasting, whereas perceptions of usability and goodness (his term for satisfaction) change as one interacts with the product. He found usability to be a strong indicator of goodness, especially with longer-term usage. Beauty “depended on identification: a hedonic attribute group, which captures the product’s ability to communicate important personal values to relevant others” (Hassenzahl, “Interplay” 319). This tendency for beauty to aid in identification corresponds to Postrel’s description of aesthetics as encouraging affiliation not just prestige (106). Goodness depended on hedonic (dealing with pleasure) attributes as well as perceived usability (a pragmatic attribute). Goodness seemed to sometimes coincide with beauty, but was not caused by it (Hassenzahl, “Interplay” 340).

Hassenzahl critiques Tractinsky’s methodologies to suggest that beauty and usability do not correlate. In a response, Tractinsky gives reasons why his methods are sound but agrees the phrase, “What is Beautiful is Usable” (the title for the ATM study that indicated usability was impacted by aesthetics) is an overstatement (“A Few Notes” 352). Other experts reply to



Hassenzahl's research. Frohlich states that beauty should be seen as an experience (a brief feeling) rather than a judgment (359-366); Overbeeke and Wensveen yearn for applications of the study (367-369); Monk critiques Hassenzahl's methodology, asserting the products should be treated as random variables and that averages should be taken across mp3 player skins and not just across users (371-375).

While the issue of the correspondence among aesthetics, satisfaction, and usability is far from settled, one answer may lie in the distinction between classical aesthetics and expressive aesthetics. A "clear" design is a factor for both usability and classical aesthetics. Moreover, classical aesthetics corresponded more highly with usability than expressive aesthetics did (Lavie and Tractinsky 289). Classical aesthetics (sometimes referred to as visual clarity) both indicates and limits how a product may be used. It appears to take into account the visceral and behavioral levels. Norman says at the visceral stage, beauty may be inherent in the object because the only processing possible is "simple pattern recognition through innate mechanisms" and the only judgment involved is bipolar positive or negative feelings (Norman, "Introduction" 315). Expressive aesthetics seem to be more reflective than behavioral, asking for evaluation of creativity and expressiveness (more novelty and appeal than appropriateness and categorization).

Postrel believes that the content of the aesthetics (the visceral) is different than the meaning people infer from the content (the reflective) (109). Expressive aesthetics seems to require more subjective interpretation of meaning, whereas classical aesthetics seems more aligned with the visceral and closest to a "universal aesthetic," if one considers the golden mean that exists in nature and human design. It seems that many techniques, such as dynamic symmetry and quantification of aesthetics support classic aesthetics more than expressive aesthetics. Indeed, the articles I mention in which beauty is replicated experimentally have more

to do with classical or universal aesthetics. Because of the seemingly biological root of classical aesthetics, I hypothesize that there may be more agreement among views on classical aesthetics than expressive aesthetics.

Perhaps the participants who rate mp3 player skins for beauty are emphasizing the appeal factor or expressive aesthetics. For these participants, classical aesthetics may be self-evident or less subject to interpretation; alternatively, these participants may group aspects of beauty that they perceive as related to usability under the usability umbrella and thereby disregard their possible relationship to beauty. Based on ATM studies by Tractinsky et al, we might hypothesize that the less visually rich the product, the more aesthetics correlates with usability. Moreover, how beauty is defined dictates how it is judged. However, Hassenzahl would reply to that beauty cannot be defined because it is in “the eye of the beholder.” Also, Hassenzahl believes visceral reactions are too “diffuse” to be called beauty (“Interplay” 281). My study may shed further light on the subject.

### **Can Aesthetics Be Broken Down?**

As stated before, Hoffman and Krauss believe that aesthetics cannot be broken down into discrete components (207). Additionally Lindgaard and Whitfield seem to believe that aesthetics “cannot be evaluated for correctness,” nor can it easily be identified, deconstructed, or analyzed (75). Perhaps aesthetics is, after all, a holistic perception: the user takes in all aspects at once and does not reflect on which components are at work in his or her assessment. My thesis offers some insight into whether the individual elements of a website are commensurate to the whole.

## **Surface and Substance**

In the *Substance of Style*, Postrel asserts that the surface appearance is not always something deceptively meant to hide an inadequate substance. It can be “the quality and substance of the experience,” the difference between the generic and the distinctive (107). Postrel explains, “beauty itself takes many forms, and aesthetic meaning, signaling identity, is about more than beauty” (107). Things can be attractive in a “universal sense,” but not appealing to an individual. Postrel reminds us “at their most valuable, aesthetic meanings go beyond social signals to personal affiliations of our sense of self”(108). Can this be true of informational websites? Perhaps not to the same extent as mp3 player skins, but computer interfaces can be a reflection of self.

Next, Postrel describes the impersonal definitions of authenticity. An informational website must appear authentic, but what makes something authentic? It doesn't have to be the original to be authentic on the web. Millions of people can access a website or file at a time and each will be loading an “original” digital copy. A website is constantly updated and revamped and it can still remain authentic. Postrel describes authenticity in three ways: “as a formal harmony, balance, or delight,” “as a connection to time or place,” and as “self-expression.” (114-115). These all point to a connection between emotion and cognition. Designing for authenticity means creating affective artifacts that aid in comprehension and satisfaction.

## **Other Ways of Viewing Aesthetics**

As indicated earlier, aesthetics has many definitions. Perhaps my working definition, “visually appealing and appropriate,” is too limited in scope to capture the whole web

experience. Overbeeke et al. introduce “aesthetics of interaction,” which combined with “contexts for experience” produces a functionality that contributes to overall experience. Aesthetics in interaction “requires richness that covers all the senses” (Overbeeke et al. 9-10). Although academic websites are limited by medium and conventions, the aesthetics of interaction is a way to consider enjoyment and satisfaction in a website. In an attempt to account for aesthetics as broadly and comprehensively as possible, I designed a set of heuristics that include visual aesthetics, as well as satisfaction and usability because both the beauty and usability of the site contribute to emotional responses.

### **Designers versus Non-Designers (Users)**

To discover how all these variables correlate, I devised a set of web heuristics. Web heuristics are criteria usually employed by designers and other experts to evaluate websites. They are defined as “all the sets of process guides, principles, criteria, tips and tricks and guidelines that are available to support web designers” (De Jong and van der Geest 311). For best results, they are used in conjunction with other measures, such as usability testing, in which representative members of the target user group test the product under controlled conditions. My challenge was to devise heuristics that are general enough to guide usability tests, yet specific enough for use by designers, whose conceptions of good design are informed by experiences and training. However, I took to heart the Park et al. study of aesthetic fidelity that suggested that aesthetics could be more universal than one expects.

Testing a website for visual appeal is not as common as testing for usability. In fact, many designs are not tested on an audience, but the designers in charge of the visual are

nevertheless able to create successful websites. There are at least two possible reasons for this lack of testing. First, because visual appeal is viewed as idiosyncratic, it may be subordinate to usability. A more likely reason is that commonalities exist between the professional graphic designer and the user: they tend to have similar taste. Many users can appreciate aesthetic quality, although explaining aesthetic preferences can be elusive. My web heuristics are intended to break down this holistic quality into smaller components that can then be reassembled to indicate an overall impression.

### **Goals**

Whereas aesthetics may not improve the effectiveness or efficiency of a product as measured by objective tests, it has been shown to improve perceived usability by engendering a positive emotional response. Satisfaction is the most important component in the definition of usability, but like aesthetics and emotion, it is difficult to measure. As Norman suggests, emotions are components in every aspect of our lives, including the websites we visit (*Emotional Design* 12). Just because aesthetics and emotion are subjective and difficult to understand does not mean we can afford to ignore them.

My study differs from previous work in several important ways. Many authors on web design neglect to mention the importance of aesthetics. However, some authors do pay attention to the visual, the verbal, and the usable together (Powell; Williams and Tollett; Galitz). A primary focus for these authors is functionality, which includes the proper placement of website components for maximum visibility. In general, published studies have not examined the emotional effect engendered by the aesthetics of the web design. Moreover, much of the

attention has been devoted to commercial websites, largely ignoring informational and especially academic nonprofit web sites. I seek to explore the impact that emotion and aesthetics play in informational, especially academic, websites, recognizing context as a major determinant. Finally, some studies focus on overall impressions, whereas others focus on opinions formed after interaction and reflection. My survey will focus on the relationship between the two.

The criteria I developed are meant both to aid the designer and to be employed in usability testing. These criteria can also be used to determine if there is agreement in ratings among casual users, experienced users, and designers. They are also intended to test whether people's initial impressions are consistent with their broken down impressions. While I do not advocate the mechanization of aesthetics, in seeking to articulate the essence of aesthetics, I hope to help bridge the gap between designers and non-designers. When users understand and can articulate why something is appealing to them, designers can feel more confident in creating websites that are simultaneously appealing and usable. True to its nature, aesthetics for this thesis will serve as the bridge between cognition and emotion, usability and satisfaction.

In Chapter Three, I explain the heuristics or criteria I developed with the aid of a designer. In Chapter Four, I report on the results of a pilot survey that tests the heuristics. In Chapter Five, I conclude with a discussion of implications of these heuristics and the pilot study results.

## CHAPTER THREE: DEVELOPMENT OF CRITERIA

In this chapter I describe how I derive the preliminary set of criteria for evaluating academic websites for aesthetics. However, as made clear in Chapter Two, the evaluation of websites cannot be isolated for one variable such as aesthetics. For this reason I will include other principles related to web design as well. First, I will describe existing guidelines for user interfaces, particularly online interfaces. Then I will discuss characteristics of web heuristics in relation to the preliminary heuristics I have devised. Lastly, I will explain how I integrated information from an interview with a web content designer.

### **Existing Aesthetic Guidelines**

Because no comprehensive list of web heuristics exists to address aesthetic concerns, I examined a wide range of published web design guidelines and principles. Most of these primarily address usability, but I specifically sought out those that pay attention to aesthetics. As practitioners' heuristics, most are not based on experimental research. Moreover, published guidelines mainly adhere to principles of the classical aesthetics.

### **Published Guidelines**

Aesthetics can be complementary to functionality, which is what Mullet and Sano emphasize in *Designing Visual Interfaces*. Although they concentrate on graphical user interfaces, many of their principles apply equally well to websites. They describe techniques that are planned and calculated to deliver a satisfactory product and they have reduced the principles

to a series of easy to follow steps. Their major principles include unity, refinement, fitness, clarity, harmony, activity, restraint, grouping, hierarchy, relationship, balance, focus, flexibility, consistent application, immediacy, generality, cohesiveness, characterization, distinctiveness, integrity, comprehensiveness, and appropriateness (Mullet and Sano). These principles can be paired in various ways to achieve specific design goals. For instance, to accomplish refinement through reduction, one must examine every element in a composition and make sure that it serves some explicit purpose. If not, the item can be removed (Mullet and Sano 41).

In *The Essential Guide to User Interface Design: An Introduction to Design Principles and Techniques*, Galitz lists several “Aesthetically Pleasing” guidelines, which include providing meaningful contrast between screen elements, creating groupings, aligning screen elements and groups, providing three-dimensional representation, and using color and graphics effectively. A design aesthetic, according to Galitz,

draws attention subliminally, conveying a message clearly and quickly. Visual appeal makes a computer system accessible and inviting. A lack of visual pleasing compositions is disorienting, obscures the intent and meaning, and slows down and confuses the user. Visual appeal is terribly important today because most human-computer communications occurs in the visual realm (Galitz 41).

Other principles strongly related to aesthetics include clarity, consistency, directness, efficiency, familiarity, predictability, simplicity, and transparency (Galitz 42-46). All the general principles Galitz lists seem to intertwine usability and aesthetics. Galitz says the final design will require trade-offs between all the principles on the list. Instead of a direct trade-off, however, I argue that it is more likely a balance, with all the principles present to some degree. Some of the common usability problems cited by Galitz are related to aesthetics; these include ambiguous menus and icons, visual clutter, impaired information readability, incomprehensible components,



annoying distractions, confusing or inefficient navigation, excessive page scrolling, design inconsistency, and stale design (Galitz 56-59). The design team should include specialists in “development, human factors, visual design, usability assessment, documentation, and training” (Galitz 59). This quote hints at the multidisciplinary nature of designing online and user interfaces. Galitz’s includes a good review of aesthetic concerns such as balance, symmetry, regularity, and predictability (Galitz 119-161).

One of the few web design books that emphasize aesthetics is the *Non-Designers Web Book*. This book, like the original *Non-Designers Design Book*, stresses four main concepts, which are alignment, proximity, repetition, and contrast. A section of the *Non-Designers Web Book* is filled with examples of these principles. This book is unique in that it explains logistical and technical aspects of web design as well as aesthetics, thus reinforcing the correlation between usability and aesthetics.

Another holistic book on web design is *Web Concept and Design: A Comprehensive Guide for Creating Effective Websites*, by Crystal Waters. The book may be slightly outdated by today’s standards, but it offers a rhetorical approach to design, first focusing on goals and audience and then focusing on content. It also discusses creating a unique mood through colors, fonts, and other elements. Another comprehensive book that imparts how to create certain moods is *Principles of Web Design* by Farkas and Farkas. The authors of both books treat each design problem as a rhetorical one. Audience, purpose, and context must be discerned first of all and design flows from that.

*Design Basics Index*, by Jim Krause, is directed towards graphic designers who design for both print and online mediums. The book is divided into composition, components, and concept. Composition is the “way in which the components of a design are visually combined

and arranged” (10). Composition includes placement and divisions, grouping, harmony, emphasis, alignment, and flow. Components are the elements of visual design such as shapes, icons, color, and typography. Concept includes theme, connotation, message, and style (10).

*The Non-Designers Web Book*, *Designing Visual Language*, *Principles of Web Design*, and *Design Basics Index* all come with exercises, suggesting that design can be taught in much the same way as writing, and that practice and experience are more important than innate ability. These books are organized like style manuals in that they are rhetorical, stressing audience, purpose, and situation, and they focus on universal elements. For instance, in comparing Dan Jones’ *Technical Writing Style* with *Design Basics Index*, Jones’ textual elements include diction, sentences, and paragraphs, while comparable visual elements include shapes, icons, color and typography. In place of textual style and tone the visual conveys “theme, connotation, message, and style.” Jones also explains emphasis and flow, which clearly have analogs in visual design. This similarity in approach suggests to me that both visual and verbal ability can be taught in much the same way and that both are important to understanding information design.

The advantages of teaching visual literacy in addition to writing are evident in the classroom. In a study done by Markel and Wilson, students who were given visual communication instruction in addition to written technical communication instruction showed a more developed understanding on assignments than those who did not receive visual communication training (Markel and Wilson 286). Of course, there are differences in how visuals are processed and these differences must also be addressed in the classroom (Williams and Harkus).

I reviewed a large number of graphic design books, but few went into detail on the relationship between aesthetics and emotion. The fields of human factors and HCI offer some

explanations for this oversight. In *Designing Pleasurable Products*, Patrick Jordan describes four types of pleasure: physio-pleasure (derived from the senses), socio-pleasure (derived from relationships with others), psycho-pleasure (derived from cognitive and emotional reactions), and ideo-pleasure (derived from one's values) (13-14). Pleasure from aesthetics would be physio-pleasure, but the source of pleasure is not always detectable. Pleasure in general can be measured more easily than its source.

### **Web Heuristics**

Jakob Nielsen's heuristics for interface design are often the standard by which other heuristics are judged. Nielsen's heuristics have been adapted for the web, but this adaptation is not regarded as comprehensive and comparable to the application of heuristics for user interfaces. Nielsen's Ten Usability Heuristics include

- Visibility of system status
- Match between system and real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help user recognize, diagnose, and recover errors, and help and documentation" (Barnum 38).

These heuristics were adapted for the web by Pieratti and Instone separately (Barnum 380-381). Critics of Instone's adaptation cite a shallow view of usability, unclear validity, and a focus on solutions rather than problems (De Jong and van der Geest 320). Pieratti's adaptation offers some other categories including "respect for users and their skills, pleasurable and respectful interaction, quality of work, privacy, readability, and information structure" (Barnum 378).

Some authors have tried to replace Nielsen's heuristics with those geared more towards aesthetics. In "Heuristic Evaluation of Website Attractiveness," Alistair Sutcliffe describes a Model of Effectiveness for Web Interfaces. Based on a set of heuristics for attractiveness and aesthetic design, he divides these heuristics into generic and content related heuristics. Generic guidelines include "judicious use of color, symmetry and style, structured and consistent layout, depth of field, choice of media to attract attention, use of personality in media to attract and persuade, and design of unusual or challenging images" (Sutcliffe 189-190). Content related heuristics include "consistent visual design, visibility or identity and brand, matching arousal to user's mood and motivation, stimulating users' interest by secondary motivation, and selecting content to suit users' requirements" (190-191). According to Sutcliffe, attractiveness is "an external manifestation of three complex variables: arousal, motivation, and perceived utility gain" (198). The first stage of attraction is to get the user's attention. The next stage is exploration and navigation, where usability is important. Because Sutcliffe was focusing on commercial websites, he describes the last stage as the transaction. For an academic site, the transactional stage could be defined as motivating the person to act: to apply, to attend an event, or to email for more information, for example.

When Sutcliffe asked nine students to rate three airline websites at each of the three stages, Sutcliffe's heuristics were rated a little more highly and were judged easier to use than Nielsen's heuristics. However, there was little agreement in ratings among participants for both sets of heuristics. Although this study is a key source, my survey differs in that I attempt 1) to determine what reflective components contribute to the overall visceral impression and 2) to note which variables correlate with each other. Because of these goals, I also differ in that I do not train the participants to use the heuristics.

The fact this discussion has focused both on usability and aesthetics illustrates that one cannot offer a complete evaluation of design without covering usability as well as, aesthetics, satisfaction, and service quality. Van der Geest and Spyridakis would concur. They introduce a series of articles directed at usability including heuristics for the rhetorical situation (development of personas), navigation, presentation of verbal content, production of effective visual displays, and involvement of users (van der Geest and Spyridakis 304).

A final group of studies, although it is not a group of heuristics, attempts to "develop a measurement instrument of perceived website aesthetics" (Lavie and Tractinsky 269). These studies are recounted in Chapter Two, but are worth mentioning again because the variables from the studies and their description served as the main grouping for my heuristics. The authors conducted four studies to determine how the dimensions of aesthetics correlated with other factors. The four studies included "item generation, scale development using exploratory factor analysis, and validity assessment and replication using confirmatory factor analysis" (Lavie and Tractinsky 278).

As mentioned before, Lavie and Tractinsky identified two dimensions of aesthetics. Classical aesthetics or visual clarity was associated with descriptions such as "pleasant design,"

“clear design,” “clean design,” and “symmetric design, while “expressive aesthetics or visual richness was associated with “creative design,” “fascinating design,” “use of special effects,” “original design,” and “sophisticated design” (Lavie and Tractinsky 285). Usability was associated with “convenient use,” “easy orientation,” “easy to use,” “easy to navigate,” and “clear design” (Lavie and Tractinsky 285). Pleasurable interaction included such descriptions as “feel joyful,” “feel pleasure,” and “feel gratified.” Service quality included “can count on site,” “site contains no mistakes,” and “site provides reliable information” (Lavie and Tractinsky 285). Clear design is a factor both for aesthetics and usability, suggesting that classical aesthetics “may represent the functionalist ideal as perceived by the users, where beauty is determined by the extent to which form follows function” (Lavie and Tractinsky 290).

### **Set of Heuristics**

From the guidelines outlined in this chapter and Chapter Two, I formulated the set of criteria. I divided my heuristics into five sections, corresponding to Lavie and Tractinsky’s work: usability and functionality, credibility and service quality, design and layout (classical aesthetics), expressiveness and creativity (expressive aesthetics), and persona and pleasure (satisfaction). I have used many of their adjectives and made them into statements. I have also added statements that I found from other sources. Many of the deviations from Lavie and Tractinsky concern design and layout or classical aesthetics in that I added several new principles and did not keep all of their adjectives. My set of heuristics is shown on the following page.

### **Usability and Functionality**

1. *Convenience* – Information can be found and used within a few clicks of the mouse.
2. *Ease of use* – It is self-evident how to use the site.
3. *Legibility* – The fonts are appropriate in size, color, and style. The user can easily locate and read the text.
4. *Navigability* – It is easy to maneuver from one link to the next. The links are in a logical order.
5. *Simplicity* – Every element seems to perform a clear function.

### **Credibility and Service Quality**

1. *Credibility* – The site appears believable and convincing.
2. *Reliability* – The site can be depended upon to offer current information and work at all times.
3. *Accuracy* – The information appears factual and free of inaccuracies or grammar errors.
4. *Professionalism* – The site appears to adhere to technical and ethical standards of professionals.

### **Design and Layout (Visual Clarity--Classical Aesthetics)**

1. *Use of Color* – The colors used are in agreement with the content of the site and with each other.
2. *Balance* – The visual weight of elements on either side of the web page are approximately equal.
3. *Conformity* – The site follows conventions of other academic websites.
4. *Grouping* – Related items are grouped close to each other. Unrelated items are further apart.
5. *Unity* – The site is composed of a relation of parts in pursuit of a common goal.
6. *Consistency* – The visual elements are applied consistently throughout the site.
7. *Clarity* – The intent, organization, and appearance of the site is unambiguous and directed.

### **Expressiveness and Creativity (Visual Richness--Expressive Aesthetics)**

1. *Originality* – The site takes an unorthodox approach and is distinguishable from other websites.
2. *Sophistication* – The site appears developed and complex.
3. *Intrigue* – The site captures my interest.
4. *Special effects* – The site includes animation, sound, or other unique forms of interactivity.

### **Persona and Pleasure (Satisfaction)**

1. *Enjoyment* – The site is enjoyable to interact with.
2. *Ability to Gratify* – The site meets my expectations and is fulfilling.
3. *Ability to Motivate* – The site encourages me to act.
4. *Persona or Image* – The image of the visual and verbal elements is consistent and appealing.
5. *Social Satisfaction* – There is a sense of community on the site, allowing for interaction with others.<sup>1</sup>

### **Criteria by Which to Evaluate Web Heuristics- Explaining my Heuristics**

In this section, I discuss my heuristics in relation to “Characteristics of Web Heuristics” by De Jong and van der Geest. As noted in Chapter Two, a web heuristic is a “discovery aid” and includes “all the sets of process guides, principles, criteria, tips and tricks and guidelines that are available to support web designers” (De Jong and van der Geest 311). Website heuristics can vary almost as much as websites. Each set of heuristics has limitations and benefits. De Jong and van der Geest characterize and evaluate web heuristics in terms of information covered, validity, presentation format, and use (312).

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<sup>1</sup> This heuristic was added after an interview with the designer.



## **Information Covered**

Specificity and exhaustiveness can be thought of as two extremes of the criterion “information covered”. The level of specificity of heuristics ranges from those intended for general use to genre- or feature-specific heuristics. Feature-specific heuristics apply to certain site characteristics such as navigation or graphics and layout (De Jong and van der Geest 312). Genre-specific heuristics are intended for a certain type of website such as an academic website. Exhaustiveness refers to comprehensiveness of the material covered, ranging from “at least the most important aspects of the domain, to a more or less arbitrary selection of items” (De Jong and van der Geest 312). Arbitrariness of the selection can be reduced through empirical research, interviews, or a systematic approach that is genre- or feature-specific.

With respect to specificity and exhaustiveness of content covered by my heuristics, I note that my heuristics were developed specifically for academic websites; however, the categories are broad enough to apply to a wide range of informational websites. To make the heuristics usable by both designers and testers, the concepts are general. During pilot testing, my heuristics did not yield exhaustive results because of limited time to complete the surveys, a small number of participants, and limited ethnic and racial diversity. As much as possible, my heuristics address all the main areas of web design, but individual dimensions may not be covered extensively because I was committed to using previously tested heuristics whenever possible. Finally, my heuristics do not attempt to measure usability in great detail, because heuristics concerning usability are already in existence.

## Validity

The second category by which heuristics are evaluated is validity, which includes foundations, novelty, room for interpretation, and validation research. Foundations include standards-based heuristics (agreed upon rules that may lead to certification), theory-based heuristics (adapted from general, well-known, and accepted theories), research-based heuristics (adapted from empirical studies), and practitioners' heuristics (reflecting the views and experiences of professional web designers). Another aspect of validity is the degree of novelty (adding insights for experienced web designers or reviewing known basics for beginners) (De Jong and van der Geest 312).

Most of my heuristics are practitioners' heuristics. I adapted some heuristics from research, such as balance, use of color, clarity, ease of use, and convenience. However, in applying the heuristics, I define these terms for the user, which is not always done in previous research. I do not expect my heuristics to add much novelty, unless statistical manipulations reveal surprising correlations.

Room for interpretation refers to the extent to which the heuristics are subjective; that is, the extent to which they vary depending on intuition, insight, and experience. Some heuristics are mechanistic while others depend on expertise or subjectivity. Interpretation may introduce tradeoffs between the reliability and the validity of the heuristics (De Jong and van der Geest 313). My heuristic statements leave room for interpretation, but I have removed some leeway by clarifying the descriptors with a defining statement. These heuristics are not mechanistic, so there may be little reliability among evaluators.

Lastly, heuristics are assessed by how extensively they have been evaluated through validation research. I selected and adapted heuristics that had already been tested; further studies should further demonstrate the benefits of the heuristics. According to De Jong and van der Geest, the most convincing proof of heuristics' validity occurs when a website designed with the heuristics scores higher than one designed without heuristics (313). Another validation is to compare the number of problems found with other forms of evaluation such as usability testing. My heuristics will be tested in part by the pilot study, but there is no way to know whether the websites were designed with particular heuristics in mind.

### **Presentation Format**

In assessing the presentation format of the heuristics, evaluators examine structure, formulation of items, types of answers, and whether the heuristics are high-level or low-level. Structure can vary from random to meaningful. Formulation of items refers to the manner in which instructions, questions, or requirements are presented. Heuristics require different types of answers, usually defined as open or closed. High-level heuristics present designers with possible problems, while low-level heuristics present specific design guidelines (De Jong and van der Geest 314). Low-level heuristics can be too prescriptive whereas high-level heuristics can leave too much room for interpretation (De Jong and van der Geest 314).

My heuristics are low-level statements that are to be rated on whether the respondent agrees or disagrees. They resemble requirements, but focus more on ways to gauge the website holistically than on specific solutions to problems. They are structured into categories. Some of the statements, such as conformity and originality, may appear to conflict with one another, but

many websites do contain both aspects. Because most statements in my set of heuristics describe a positive aspect of design, if participants rate a website low on a given element, it should be clear what type of problem the website has.

### **Use**

The final broad criterion of heuristics is how the heuristics will be used. The phase in the design process refers to the stage(s) at which the heuristics can be applied. Planning-oriented heuristics are used during the design and production process. Evaluation-oriented heuristics are for “evaluating and improving a draft or an existing website” (De Jong and van der Geest 316). Either type of heuristic can be process-oriented or product-oriented, and can address the design tasks of troubleshooting as well as verifying. Lastly, there are assumptions about actual use. Some heuristics can be easily memorized and are internalized whereas others are meant as a checklist and are externalized (De Jong and van der Geest 317).

My heuristics may be used primarily for evaluation, but I believe that further testing could confirm their usefulness as part of the planning process as well. For example, with the heuristics, a designer can employ a rhetorical approach, planning every design element instead of expecting the design to simply “fall into place.” The heuristics can be memorized, but they are best used in a survey format.

My heuristics will be genre-specific, broadly covering the major considerations of design of informational websites, with particular emphasis on aesthetics. They are low-level heuristics based on empirical research or practitioner’s guidelines and used primarily for evaluation of a

product. In the final section of this chapter, I apply my heuristics to a website and then ask the designer of the website how the heuristics can be improved.

### **Interview with Designer of Academic Websites**

I interviewed a designer of academic websites to attain feedback on my heuristics and to gain insight into how the design process works. In one case he handled the navigation while another designer was responsible for the aesthetics. This division of labor suggests that during the design process, design elements can be separated, whereas the evaluation takes a more holistic approach. The designer says many websites are designed in teams, with each type of designer having a specialty.

The designer believes that even academic websites should be constructed with enjoyment in mind. Although academic websites may be subject to more conventions and marketing rules than other types of websites are, a user-centered focus helps ensure that the product (academic website) will be pleasurable.

Regarding the survey, the designer believed most of the descriptors and their accompanying statements were adequate, but helped clarify a few of them. He also suggested that a category such as social satisfaction should be included to capture the sense of community that a user feels when browsing a site. The designer believed that this survey should be used as an evaluation tool during the design process. However, instead of the designer applying the heuristics in relative isolation, he or she should conduct usability testing to reach a consensus and then design accordingly. Experienced designers could be expected to use this survey, as they would not be bogged down with learning all the technical aspects as well. The designer thought

it would be worthwhile to make the survey more genre-specific by focusing on academic aspects as opposed to just informational sites in general. However, the designer felt that my set of heuristics was also adequate for testing academic websites. He considers most of the heuristics from the survey when designing a site, suggesting that the survey reinforces concepts rather than introducing new ones.

The designer's input was important because it gave me a better understanding of the design process and led to several revisions. The revised heuristics account for both design and evaluation. In Chapter 4, I discuss a pilot test of the survey and report on the results.

## **CHAPTER FOUR: SURVEY PILOT STUDY**

Once the heuristics have been devised, drafted, and analyzed, testing the heuristics is the next step in the process. The purposes of the pilot study were as follows 1) test whether the heuristics, derived mainly from Lavie and Tractinsky's model, would reveal similar correlations in an academic website, in particular differences between classical and expressive aesthetics; 2) test whether aesthetic and overall impression correspond to the individual heuristics averaged together; 3) test whether the participant's ratings agree (to see how subjective or reliable the heuristics are); 4) determine whether possible designers would find the survey helpful. These questions will be addressed mainly in the results and discussion section. Because this is a pilot study with a small number of participants, the results are preliminary and more testing is needed.

### **Method**

#### **Selection of Websites**

The three academic websites were all of similar genre and purpose. Three technical communication program websites were chosen from a pool of colleges that offer a Master of Arts or Master of Sciences in a technical communication related program, such as professional/technical communication/writing, information design, or rhetoric, and were found at the Society for Technical Communicators (STC) website. A total of 21 were evaluated. I selected the three websites based on my application of the heuristics to assess their aesthetic appeal. Utah State University rated poorly for classical and expressive aesthetics. Washington University rated

highly for aesthetics, and New Jersey Institute of Technology rated highly for expressive aesthetics, especially special effects.

### **Participants**

Eight graduate students (four males and four females) in the UCF Technical Writing Master's track took this survey. The average age was 35 (min 25, max 55). Two participants did not have web design experience and six participants did. The survey was done during the first hour of class using the computers in the UCF English Technical Writing lab. The participants received no compensation.

### **Procedure**

At the beginning of class, participants were given consent forms and a survey. The steps for completing the survey were as follows:

1. Participants filled out background information and moved to a computer. The participants evaluated the websites in one of two orders (Washington, USU, NJIT) or (USU, NJIT, Washington) to limit any ordering effects.
2. Participants browsed the website for five minutes.
3. Participants located and noted each college's master's program completion requirements and a contact person.
4. Participants rated each website for overall impression.
5. They then employed the heuristic (qualifier and statement) to rate each website on a scale of 1 to 7 in the categories of usability and functionality, credibility and



service quality, design and layout, expressiveness and creativity, and persona and pleasure (See Appendix A).

6. Participants then followed the same directions for the next two websites.

### **Hypotheses**

Similarly to Lavie and Tractinsky, I tested seven hypotheses associated with four major measures of aesthetics: aesthetic impression, visual clarity (classical aesthetics), visual richness (expressive aesthetics), and the average of visual and expressive aesthetics. Aesthetics is the general term used in these hypotheses to refer to a combination of all four types.

*H1: Aesthetics correlates with usability.*

*H2: Aesthetics correlates with credibility.*

*H3: Visual richness correlates with visual clarity.*

*H4: Aesthetics correlates with persona and pleasure.*

*H5: Aesthetics correlates with overall impression.*

*H6: Aesthetic impression correlates with aesthetics broken down into components.*

*H7: Overall impression correlates with the average of usability, credibility, visual clarity, visual richness, and satisfaction broken down into components.*

*H8: There is no difference in the ratings from person to person.*

### **Results**

The results section gives an account of the raw findings, which again are preliminary. The discussion section gives implications for these findings. In the pilot study, differences

between the websites were significant at the  $p = .05$  level, which indicates that there were pronounced differences among website ratings in some of the categories. The average website ratings are shown in Figure 1 for each heuristic.

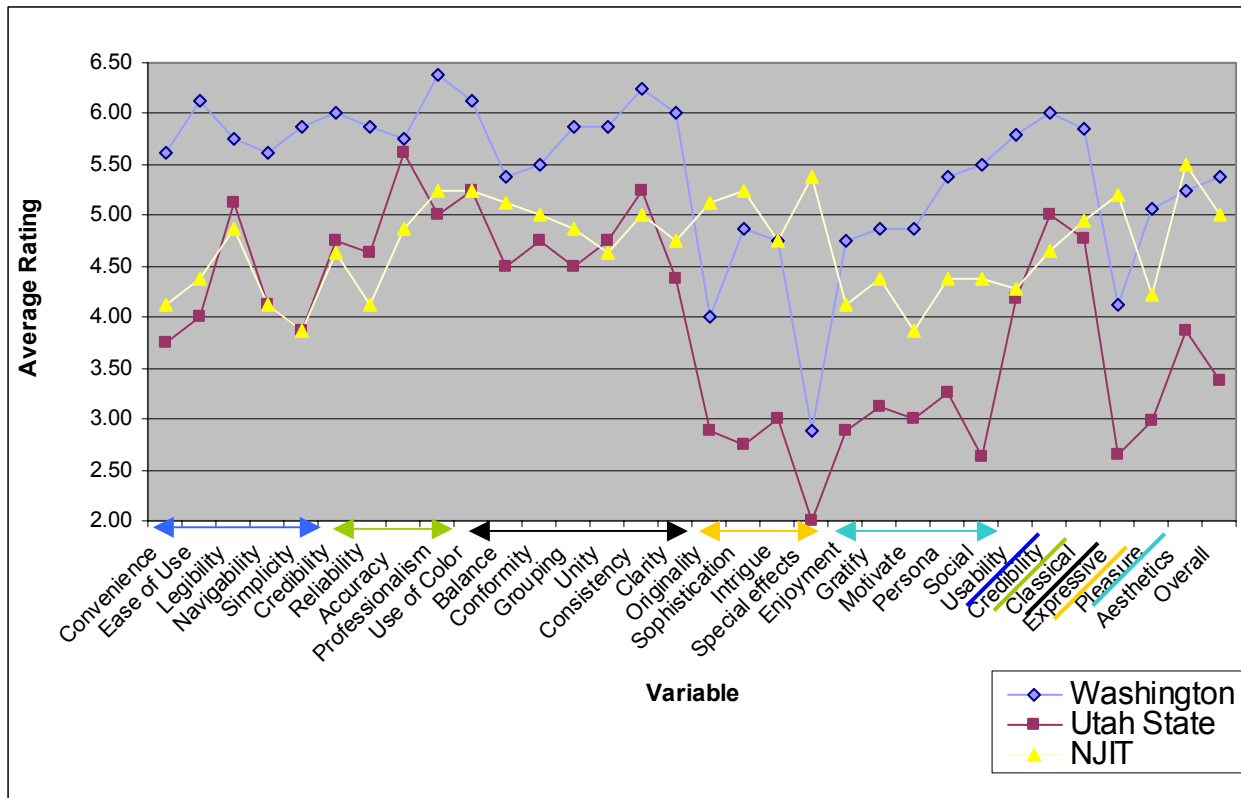


Figure 1 Website Rating Averages

Figure 2 indicates the average scores among categories. An ANOVA with website as within-subjects factor and aesthetic impression as a dependent variable suggested a main effect ( $F(2, 21) = 4.53, p = .023$ ), indicating that there were significant differences among web sites. USU scored significantly lower than both Washington and NJIT ( $p = .031$  and  $.030$  respectively). The significant difference between USU, which I had tagged as the least aesthetically pleasing of the three sites, and the other two websites indicates that student’s evaluations agreed to some extent with my original evaluations and with each other’s evaluations regarding aesthetics. There was not a significant difference in ratings between NJIT and Washington, indicating that special

effects alone, an aspect of expressive aesthetics, may not determine the overall aesthetic rating. This tendency for special effects not to correlate with aesthetic rating is indicated more below under “Correlations.”

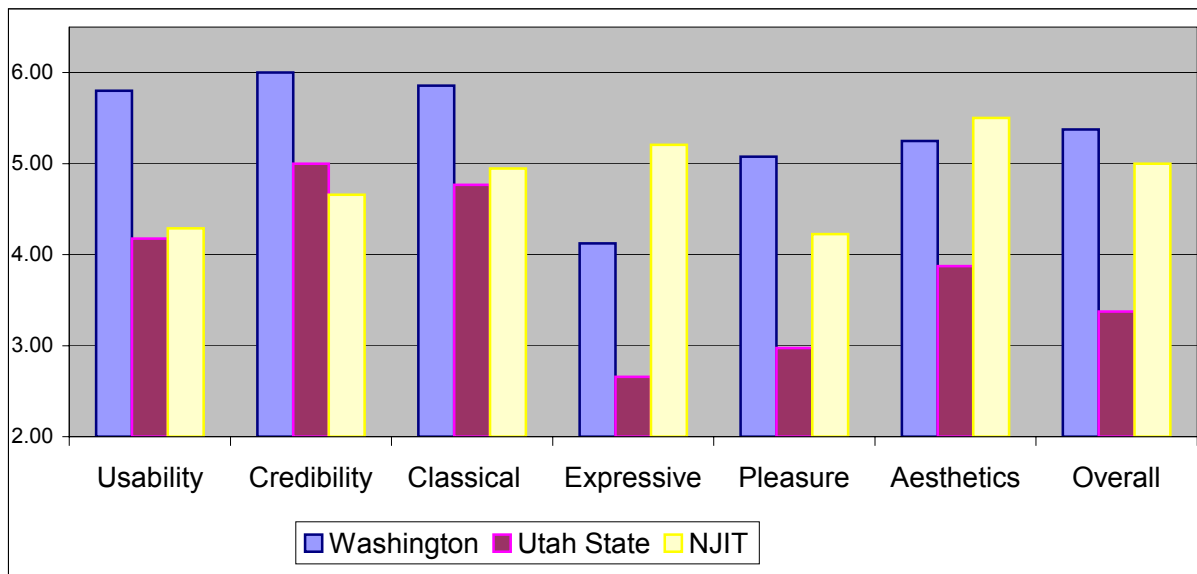


Figure 2 Category Averages

Figure 1 and Figure 2 indicate that Washington is rated superior in usability, credibility, classical aesthetics, and pleasure, and overall impression. NJIT is rated superior in expressive aesthetics and aesthetic impression. Utah State is rated lowest in nearly all categories. With ANOVA, there is no significant difference between classical aesthetics ratings for the three websites, but expressive aesthetics rating did have a significant difference ( $p < .01$ ) according to the ANOVA. The difference between Utah State and NJIT was significant  $F(1,14) = 15.562$ , but there were no other significant differences in expressive aesthetics. For overall rating, as with aesthetic impression rating, both Washington and NJIT scored significantly higher than USU. These results suggest aesthetic rating may have an impact on overall impression, but also that highest aesthetic rating does not necessarily mean highest overall impression.

## Correlations

Table 1 shows a correlation matrix for all three websites combined. Correlation is a measure of the linear relationship between two variables. A high correlation indicates a high positive linear relationship between variables, meaning that as one variable increases the other variable also increases. Table 1 can be used to test the hypotheses listed at the beginning of the chapter. To find a correlation, look at the column and row that matches up with the two variables you are curious about. A correlation with an asterisk next to it is significant, which means that it is probably not due to chance. A correlation with two asterisks next to it is very significant. Again, the number of participants was small, so these findings would have to be corroborated by further studies.

Table 1  
Correlation Matrix (Reliabilities) for All Three Websites

	<i>Usability</i>	<i>Credibility</i>	<i>Classical</i>	<i>Expressive</i>	<i>Satisfaction</i>	<i>Aesthetics</i>	<i>Overall</i>	<i>AesCombo</i>	<i>OverCombo</i>
Usability	(0.934)								
Credibility	0.811**	(0.903)							
Classical	0.648**	0.535**	(0.928)						
Expressive	0.067	-0.026	0.213	(0.905)					
Satisfaction	0.720**	0.511*	0.538**	0.502*	(0.943)				
Aesthetics	0.400	0.217	0.327	0.645**	0.714**	1			
Overall	0.761**	0.483*	0.507*	0.555**	0.847**	0.722**	1		
AesCombo	0.409*	0.279	0.711**	0.839**	0.660**	0.647**	0.682**	(0.342)	
OverCombo	0.842**	0.724**	0.768**	0.524**	0.881**	0.641**	0.855**	0.805**	(0.786)

\**p* <=.05      \*\**p* <=.01  
*r* >= .404      *r* >= 0.515

The reliabilities (Cronbach's alpha) are given in parentheses. A high number indicates high reliability within categories, which indicates that the heuristics for a category were rated

similarly. For example, the usability heuristics of convenience, ease of use, legibility, navigability, and simplicity were all highly correlated, as indicated by the .934 reliability rating. The high reliabilities imply that organizing of related heuristics into categories may be appropriate. However, one reason for the high reliabilities may be proximity in the survey. I grouped the heuristics into categories as opposed to randomizing the list of heuristics because I desired a unified, structured set of heuristics as opposed to a random list and because Lavie and Tractinsky had already used factor analysis to formulate categories. I made a tradeoff between having a highly structured set of heuristics or a non-structured list of items. Another notable finding is that classical and expressive aesthetics averages have low reliability ( $r = .342$  for AesCombo), indicating they seem to be measuring separate things.

***H1: Aesthetics correlates with usability.***

Visual clarity or classical aesthetics had a .648 correlation with usability, which is significant. Visual richness or expressive aesthetics was not found to correlate with usability to a significant degree. This lack of correlation may in part be due to the special effects question. My study indicates that the incorporation of special effects does not generally increase usability. (In fact, the correlation between special effects and usability was slightly negative, suggesting special effects can actually decrease usability ratings). Aesthetic impression did not quite reach the significant correlation level. Aesthetics combined did correlate with usability at the .05 level, largely due to classical aesthetics.

***H2: Aesthetics correlates with credibility.***

Classical aesthetics correlated with credibility ( $r = .535$ ) at the .01 level. However, expressive aesthetics was not found to correlate with credibility ( $r = .067$ ). Aesthetic impression

also did not correlate with credibility perhaps because participants emphasized expressive aesthetics in their ratings. Finally, aesthetic combined did not correlate with credibility.

***H3: Visual richness correlates with visual clarity.***

Classical aesthetics and expressive aesthetics were not found to correlate with each other ( $r = .213$ ), indicating that if something is viewed as visually rich it is not necessarily visually clear.

***H4: Aesthetics correlates with persona and pleasure (satisfaction).***

Both classical and expressive aesthetics correlated with satisfaction. Aesthetic impression was highly correlated with satisfaction ( $r = .714$ ). Naturally, aesthetics combined also correlated with satisfaction ( $r = .660$ ).

***H5: Aesthetics correlates with overall impression.***

The correlation between overall impression and aesthetic average was .805. Also aesthetic impression correlated with overall impression ( $r = .722$ ). These two correlations indicate that as aesthetics rating increases, so does overall impression.

***H6: Aesthetic impression correlates with aesthetics broken down into components.***

Aesthetics correlates with expressive aesthetics more than with classical aesthetics ( $r = .645$  to  $r = .327$ ). This difference suggests that participants may have emphasizing expressive aesthetics over classical aesthetics in their ratings. The average of aesthetic scores (AesCombo) correlates with aesthetics ( $r = .647$ ). This correlation indicates that the combination of aesthetics increases as aesthetic impression increases.

***H7: Overall impression correlates with the average of usability, credibility, visual clarity, visual richness, and satisfaction broken down into components.***

OverCombo indicates the average score of all the categories of the heuristics. This was the second highest correlation at .855, indicating that the heuristics may be sufficient at breaking down overall impression into discrete components.

***H8: There is no difference in the ratings from person to person.***

To test whether ratings varied from person to person, I calculated Kendall's Coefficient of Concordance for each variable. The coefficient ranged from .145 to .717.

- The concordance was significant at the .05 level for overall impression, convenience, ease of use, navigability, simplicity, reliability, sophistication, consistency, clarity, ability to motivate, persona, and social satisfaction. The raters were more likely to agree on these heuristic ratings.
- The concordance was insignificant for aesthetic impression, legibility, credibility, accuracy, professionalism, conformity, grouping, balance, color use, unity, special effects, intrigue, originality, enjoyment, and ability to gratify.
- The website with the least concordance was NJIT ( $W = .1419$  compared to  $W = .408$  for Washington and  $W = .414$  for USU), indicating that participants did not agree as much on the ratings of this website. This lack of agreement may be partially due to the participant's reaction to the special effects.

## Individual Heuristic Correlations

In order to see how the main categories correlated, I averaged ratings for the heuristics among categories. However, Table 2 gives a correlation matrix for aesthetic impression and overall impression with all the individual heuristics listed.

Table 2  
Correlation Matrix for Aesthetic and Overall Impression

		<i>Aesthetic</i>	<i>Overall</i>
	Aesthetic	1	
	Overall	0.722**	1
U S A B I L I T Y	Convenience	0.415*	0.778**
	Ease of Use	0.340	0.771**
	Legibility	0.236	0.345
	Navigability	0.390	0.694**
	Simplicity	0.363	0.718**
C R E D I B I L I T Y	Credibility	0.199	0.403
	Reliability	0.038	0.388
	Accuracy	0.031	0.323
	Professionalism	0.489*	0.593**
C L A S S I C A L	Use of Color	0.378	0.285
	Balance	0.456*	0.413*
	Conformity	0.159	0.436
	Grouping	0.048	0.313
	Unity	0.195	0.467*
	Consistency	0.405*	0.387
	Clarity	0.362	0.694**

	Contd.	<i>Aesthetic</i>	<i>Overall</i>
E X P R E S S I O N	Originality	0.409*	0.298
	Sophistication	0.741**	0.606**
	Intrigue	0.728**	0.701**
S A T I S F A C T I O N	Special effects	0.456*	0.405*
	Enjoyment	0.772**	0.748**
	Gratify	0.714**	0.834**
	Motivate	0.539**	0.764**
	Persona	0.633**	0.693**
	Social	0.582**	0.790**

*p <=.05 r >= .404	**p <=.01 r >= 0.515
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- Aesthetic impression correlated with convenience, professionalism, balance, consistency, originality, sophistication, intrigue, special effects, enjoyment, ability to gratify, ability to motivate, persona, and social satisfaction.
- Overall impression correlated with convenience, ease of use, navigability, simplicity, professionalism, conformity, balance, unity, sophistication, intrigue, enjoyment, ability to gratify, ability to motivate, persona, and social satisfaction.

Many of the credibility heuristics and the classical aesthetics heuristics did not seem to correlate with overall impression or aesthetic impression. However, there were only eight respondents, so the credibility and classical aesthetics heuristics may still be important and further testing may reveal correlations.

### **Discussion**

In general, despite the small sample number of participants, the ratings across heuristics seemed to correlate similarly to Lavie and Tractinsky's test. Some of the participants agreed on the heuristics, but many of the heuristics seemed to be too subjective to have high reliability. The aesthetic and overall impressions were indicated by the averages of the respective components. Many participants thought the survey was useful for reaching consensus on a web page, but they had suggestions for improvement.

### **Correlations among Variables**

Despite the limitations in sample size, the correlations seem to indicate that with academic websites, aesthetics matters. When the definition of aesthetics incorporates beauty,

attractiveness, visual appeal, and appropriateness, expressive aesthetics may be privileged. Since there was not a significant difference in website ratings of classical aesthetics, perhaps the difference in aesthetic impression rating was due to expressive aesthetics ratings. In other words if classical aesthetics is treated as a constant, the only variable is expressive aesthetics. “The eye of the beholder” is possibly more reliant on expressive aesthetics in these types of websites.

The results indicate that the classical aesthetics heuristics that I devised do correlate with usability. The heuristics have two of the elements common to Hassenzahl’s pragmatic quality: simplicity and clarity. Some might say that these elements have overlap with both aesthetics and usability (Lavie and Tractinsky loaded clarity in both classical aesthetics and usability), so it depends on how they are classified as to whether a correlation is indicated. Beauty ratings alone (in the case of my heuristics, aesthetic impression) do not always correlate with usability. However, there seem to be elements common to both usability and beauty. Again, the users were browsing rather than actively completing tasks, so the correlation between usability and classical aesthetics may be lower with prolonged or purposeful use. Although clarity and unity ratings corresponded strongly with usability heuristic ratings, I must stop short of saying that my findings indicate that aesthetics makes something more usable. Indeed, in pure usability testing, Spool et al. found that elements of classical and expressive aesthetics do not seem to improve the finding and processing of information (85).

Notably, classical aesthetics correlated with credibility and usability, but the other measures of aesthetics did not, indicating that use of color, balance, conformity, grouping, unity, and consistency may be better indicators of credibility and usability than originality, sophistication, intrigue, or special effects. These correlations seem intuitive and are supported by the data.

Because the two types of aesthetics were not found to correlate, one could conclude that they are not two dimensions of the same factor. However, Lavie and Tractinsky found a correlation between the two dimensions, so perhaps a test with a larger sample size would yield a larger correlation. Also, I took some liberty in devising the classical aesthetics heuristics, as they are not identical to the attributes that Lavie and Tractinsky's study yielded.

Another surprising correlation was between satisfaction scores and aesthetics. This high correlation with aesthetics means that a website's enjoyment, ability to gratify, ability to motivate, persona, and social satisfaction may be related to aesthetics. Intrigue and clarity had the highest correlations between the satisfaction heuristics. This finding suggests that one way to reach someone emotionally is by adjusting the aesthetics of a website. Perhaps Spillers is right that aesthetics acts as an affective artifact, increasing or decreasing one's ability to accomplish a task, which in turn drives emotion. Because this study focused on heuristics more than usability testing, this theory of cognitive artifacts can not exactly be corroborated, but it is suggested. These findings correspond to Lindgaard and Dudek's findings that beauty and satisfaction are correlated ("User Satisfaction"). However, in the study with a usability test, satisfaction did not correlate with aesthetics (Brady and Phillips).

Satisfaction seemed to correlate with every variable. The satisfaction heuristics correlated highly with overall impression as well, which suggests that enjoyment, ability to motivate, ability to gratify, persona, and social satisfaction are important heuristics that may be impacted by the other heuristics.

Aesthetics seemed to correlate with overall impression. Again, it is not a direct linear relationship and may not be very reliable with extended usage. Participants used the websites for five to seven minutes and only performed two usability tasks. Additionally, the question on

overall impression was in close proximity to the question on aesthetic impression. Usability had a slightly higher correlation with overall impression, but the correlation between aesthetics and overall impression was also strong.

### **Breaking Down Aesthetic and Overall Impression**

Aesthetic impression seemed to correlate most with expressive aesthetics, although the average of the two aesthetic ratings also correlated with aesthetic impression, indicating that aesthetics can be broken down into components. Changes in the heuristics, such as removing heuristics with little agreement, may better approximate aesthetics. Also, correlation does not indicate that one variable is causing the other.

The second highest recorded correlation was between overall impression and the averages of all the other variables ( $r = .855$ ). This high correlation indicates that the average ratings of credibility, classical aesthetics, expressive aesthetics, and satisfaction may be a good predictor of overall ratings. Perhaps an overall rating can be broken down into heuristic components. These heuristics averaged together may be able to predict overall impression. However, it is too early to tell.

### **Inter-Rater Reliability**

The users did not always agree in their ratings, and this was most pronounced for NJIT, which employed special effects. Perhaps there is more agreement for good or bad websites, but not for average websites or websites that offer special effects. The raters received no training as to how to apply the heuristics, because I did not want to reveal too much about the purpose of the

pilot study. Many of the heuristics appeared to be more subjective than originally thought. I expected that participants could rate the pages similarly without formal training because statements were given to clarify the meaning of each qualifier. At least with these heuristics, the ratings were not universal. I did not test differences between people who had designed before and people who had not because there were only two people who had no web design experience.

The most agreement was in the categories of usability and satisfaction. There was not much agreement among aesthetic ratings, either aesthetic impression or aesthetics broken down into components. Clarity and consistency were two classical aesthetic elements with inter-rater agreement. Sophistication was the only element from expressive aesthetics that had inter-rater agreement. This lack of agreement may indicate that beauty is indeed in the “eye of the beholder.” My hypothesis that classical aesthetics would show more agreement than expressive agreement did not prove true for this aspect of the pilot study. The lack of agreement among participants may be because classical aesthetics interpretation occurs more at the visceral level and thus is not easily analyzed consciously. Alternatively, it may be that classical aesthetics is no more universal than expressive aesthetics.

### **Evaluators’ Assessment in Focus Group**

After the study was complete, I led a focus group where I asked students to write suggestions for improvement on a blank survey. I also asked them to give suggestions orally. The pilot study participants indicated that the heuristics could serve as a tool for evaluating a website and could be useful both as a guide for the designer and as a survey for potential users. Some measures seemed difficult to judge based on a brief interaction with the site.

- The wording of reliability contained “work at all times.” which would be difficult to judge without visiting the site multiple times.
- Usability measures such as convenience, ease of use, and simplicity would also be better judged with repeated exposure and with more usability tasks.

Another student had trouble with the terminology. The student felt that simplicity, ease of use and navigability were too similar. One student suggest that instead of just asking for a contact person’s name, I should ask for an email address or just ask whether or not they found some means for contacting the school. Some other comments dealt with the design of the survey (making sure indentation is consistent, use of commas).

### **Limitations**

The small sample number of participants limits the validity of the study. Also, the three websites were not chosen randomly, meaning these three websites may not be a representative sample. However, I did rate them myself using the heuristics to ensure a balance of characteristics. The participants were part of the target population of prospective students, but most of them had web design experience, which might not be typical for prospective students. Also, although they varied by age and gender, they did not vary significantly by race, culture, or education level. Lavie and Tractinsky originated the categories that I used and they received higher correlations with their much larger sample size and population. I departed from their study by offering heuristics statements describing the qualifier and by offering additional principles. Also I organized the heuristics by category as opposed to random order, so there may be more agreement among categories because of this.

## Further Study

To improve the survey, there are several possibilities. I would eliminate or reword heuristics that had little agreement among users or reliability among similar heuristics. I would remove “work at all times” from the “Reliability” statement and possibly think of another adjective for “Simplicity” that is not so close to “Ease of use”. I would also change “Navigability” from “easy to navigate” to “can readily navigate.” I would condense the language where possible. For example, under “Grouping,” I would change “close to” to “near” and “a relation of” to “related.” If I were testing just one website I would add more usability questions or accompany this survey with a usability survey.

To prove correlations, I would, of course, survey more people with more diversity and have them review a greater numbers of websites. There may be a better way to assess credibility, usability, aesthetics, and satisfaction than averaging across heuristics for each category. I also might try giving the heuristics in random order, so they are not correlated simply because of proximity. Because my goals were to test a list of heuristics and to test for correlation, I had to make some tradeoffs.

There are many directions to go from this pilot study. One idea is to include many websites in the survey, but survey more people, with each person evaluating one website. In this way, both groups will be treated as random variables, so the survey will have validity. Correlations will be more definite. Another idea is to develop two websites, one that employs the heuristics on testers and goes through revision, and one that does not and then survey a separate group of users to see which website is preferred. A third idea is to develop a study to determine situations or web genres where classical aesthetics or expressive aesthetics is a

stronger predictor of aesthetic impression. In an ATM study, such as the one conducted by Tractinsky, Katz, and Ikar cited in Chapter Two, there is little room for expressive aesthetics. However, different genres of websites might be graded for their dependence on classical or expressive aesthetics.

Although aesthetics impression tended to correlate with overall impression, this study did not account for intention to use, which is an important factor. In actual practice, overall impression may depend less on aesthetic impression and more on the ability to find the information. One trend is for users to no longer become attached to websites they visit, but to use search engines to find the information they want when they want it. How pretty the site is becomes less important under such circumstances. However, for a graduate program in technical writing, it would seem Sutcliffe's attraction stage would be important.

In Hassenzahl's study of mp3 player skins, he asserts that beauty as a judgment is rare, meant to be shared, and not changed by experience. Because beauty is about identification, he believes beauty in preferences is more important when the object is to be owned. Beauty serves as a bond between product and user (Hassenzahl, "Interplay" 342). More can be done to indicate whether aesthetics matters in websites or objects that are not owned by the user. While perceptions of true beauty may be rare, there may be different gradations of it that may factor into overall impression. Visual appeal and appropriateness are likely favored in most situations.

### **How the Survey Can Be Used**

This survey or a variation can be used in one of three ways. The first way is for a designer to have these heuristics in mind when designing a website and design accordingly.



Secondly, later on in the process, the designer can poll users with an early version of a website. The designer can use Excel or another program to find averages. Heuristics that do not receive the desired average or that are described unfavorably can be improved upon. Finally, once the website is up, it can always be improved. The third way would be to have a similar survey for users that could be filled out online. An online survey may yield the most accurate results because users will have the opportunity to use the site extensively before they take the survey.

## CHAPTER FIVE: CONCLUSION

This thesis indicates that aesthetics matters even in informational web page design. However, aesthetics is not the only factor. Usability, credibility, and satisfaction are also important. The four factors tend to correlate, at least according to this pilot study.

Another question of interest was whether people's initial reactions to aesthetics match their assessment after extended reflection. Both in terms of aesthetics and overall reactions, this thesis indicates that initial responses and more extended reflections on individual heuristics tend to correlate. While there is no magic formula that works for every website or even every informational website, it appears that one can come up with criteria under the categories of classical aesthetics, expressive aesthetics, usability, and satisfaction that when averaged together may provide a systematic indication of overall impression. Further research may reveal other categories, such as playfulness.

By extending Lavie and Tractinsky's work on the two aesthetic dimensions, I developed a hypothesis that certain genres of user interfaces rely more on either classical or expressive aesthetics. I also connected these two dimensions to Whitfield's categorical-motivational model, which includes conventionality and novelty. I believe classical aesthetics corresponds more to conventionality (appropriateness) and expressiveness corresponds more toward novelty (appeal), as evidenced by two studies of aesthetic appeal of ATMs and mp3 skins.

ATMs do not allow for expressive aesthetics or visual richness, so classical aesthetics or visual clarity concepts, such as symmetry or balance and clarity, may be most important in such interfaces. This lack of expressive aesthetics explains in part the high impact of aesthetic rating on usability with ATMs (Tractinsky, Katz, and Ikar). Conversely, mp3 player skins require

expressive aesthetics. It seems that technical writing graduate school websites still allow for some expressive aesthetics, as evidence by the correlation between expressive aesthetics and aesthetic impression.

The pilot study does not indicate how important aesthetics is in a document, but based on its correlations with overall impression, usability, satisfaction, and credibility, aesthetics is a factor. Aesthetics may not make or break a technical writing graduate program website, but it should not be ignored either. Many technical communicators have started to focus on visual appropriateness and appeal in order to get their point across. According to Virginia Postrel, we are living in an age of aesthetics, and technology, especially information technology (IT), is one of the factors making this possible (51-59). While technical communication may not always emphasize the expressive aesthetics that Postrel discusses, classical aesthetics or visual clarity is essential to conveying a message. As with writing, all visual design has a style and that style must match the context at hand to be successful.

The pilot study indicates that aesthetics alone is not enough, but it is important. Griffin and Portewig both describe how technological changes are making visual literacy crucial. Griffin also summarizes helpful guidelines for creating effective visuals that aid comprehension (55-59). Stultz argues that attending to the aspects of affective design in online help systems can make a program more attractive, and thus more enjoyable. This thesis extends this previous research by proposing how aesthetics is related to both emotion and cognition and thus facilitates both satisfaction and usability. This thesis also tests this relationship between aesthetics, satisfaction, and usability.

Even if it is not yet clear how much aesthetics influences usability or satisfaction, Tractinsky argues, similarly to Whitfield and Haig and Jordan, the field of information

technology may begin to pay more attention to enhancing users' experiences rather than attending solely to improving functionality. Functionality is becoming a given, as hardware and software prices are decreasing, consumers are becoming more savvy. As a result, IT products are becoming commodities (Tractinsky, "Aesthetics in IT" 13). If IT products have a unique aesthetic, then the accompanying documentation and websites must also reflect this because as all writers learn; context is key. An audience demanding a more beautiful product is also likely demanding a more beautiful user guide.

The need for expressive aesthetics has been said to apply only to documentation meant for a consumer. However, context, audience, and purpose always matter; one cannot apply these heuristics uniformly across all informational web pages. Classical aesthetics, on the other hand, is important in most situations. I argue that balance, grouping, unity, consistency, and clarity are desired in most interfaces.

Another aspect to think about is designing for emotional satisfaction. Hassenzahl, in discussing the difficulty of designing for emotions, reminds us that emotions most related to product use are "ephemeral" and what delights in one situation, might annoy in another (Hassenzahl, "Emotions" 46). One may argue that there are certain universal aesthetics that occur at the visceral level and that some impressions of beauty are long lasting, but Hassenzahl reminds us that different situations call for different designs for different people at different times. The heuristics I propose in this thesis represent some of the elements that can be scored and reflected upon by a designer. Based on these heuristics, a designer can come up with her own list of heuristics and create a similar survey for users to gauge audience response.

The gulf between users and designers need not be as great as it sometimes seems. Designers may have special skills, but a user is the ultimate judge. This thesis seeks to empower

both designers and users by helping them break down their web experience into measurable components. As to whether anyone can be a designer, many books are devoted to helping novices apply design principles. These books offer exercises that empower aspiring designers (Kostelnick and Roberts; Williams and Tollet; Krause). This study indicates that classical aesthetics, following guidelines and formulas to achieve visual clarity and appropriateness, is not always enough. In many situations creativity is needed, suggesting that experienced designers may be invaluable for fostering visual appeal and thus increasing overall impression and satisfaction.

The gulf between the user and the designer is similar to the gulf between the object and the subject. There is no magic formula for how many artistic abilities are innate and how many depend on one's relationship with the environment. Similarly, we do not yet know how much of a visual is intrinsic in the object and how much depends on the subject. Some who believe properties are inherent in the object have created computer programs, formulas, and guidelines to quantify and qualify aesthetics. Others who believe "beauty is in the eye of the beholder" still think there is a common set of properties that describe the "content" of beauty (Hassenzahl, "Interplay" 378). These designers believe that user testing is best. Still others believe that only designers can use their finely tuned skills to create a product and no testing is necessary. It seems to me that all these approaches have validity. They all relate back to Aristotle's three modes of rhetoric: the logos of the visual presentation, the pathos of the users, and the ethos of the designer.

My thesis 1) explained the importance of aesthetics and put aesthetics in context with other factors including usability and emotion; 2) described a short, but fairly comprehensive list of heuristics that address aesthetics and can be used by both users and designers; 3) preliminarily

tested which of these factors appear to correlate and which may be helpful in determining overall impression; 4) recommended a way of using and extending these heuristics. This thesis contributes to the discussion in HCI over the importance of aesthetics and links this discussion to the field of technical communication to offer insight and foster more research and possible applications.

**APPENDIX A**  
**IRB APPROVAL FORM**



Office of Research & Commercialization

February 17, 2005

Carrie Avery  
219 Iowa Woods Cir. W.  
Orlando, FL 32824

Ms. Avery:

With reference to your protocol entitled, "More Than Screen Deep: Judging Aesthetics in Academic Websites" I am enclosing for your records the approved, expedited document of the UCFIRB Form you had submitted to our office.

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur. Further, should there be a need to extend this protocol, a renewal form must be submitted for approval at least one month prior to the anniversary date of the most recent approval and is the responsibility of the investigator (UCF).

Should you have any questions, please do not hesitate to call me at 407-823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

*Barbara Ward*

Barbara Ward, CIM  
IRB Coordinator



**APPENDIX B**  
**SURVEY**

4/22/2005

Dear Student:

My name is Carrie Avery and I am a graduate student working under the supervision of Dr. Kitalong. You are being asked to participate in an experiment designed to gather information on what design aspects make an academic website successful. This research project was designed solely for research purposes and no one except the research team will have access to any of your responses. All responses will be kept confidential. The survey is anonymous.

Your participation in this project is voluntary. You do not have to answer any question(s) that you do not wish to answer. Please be advised that you may choose not to participate in this research, and you may withdraw from the experiment at any time without consequence. Non-participation will not affect your grade. There is no direct benefit or compensation for participation. This experiment will take approximately 40 minutes during your regularly scheduled class time. There are no anticipated risks associated with participation.

If you have any questions or comments about this research, please contact Carrie Avery or Dr. Kitalong, College of Arts and Science, Orlando, FL. Questions or concerns about research participants' rights may be directed to the UCFIRB office, University of Central Florida Office of Research, Orlando Tech Center, 12443 Research Parkway, Suite 207, Orlando, FL 32826. The phone number is (407) 823-2901.

Sincerely,

Carrie Avery

\_\_\_\_\_ I have read the procedure described above.

\_\_\_\_\_ I voluntarily agree to participate in the procedure.

\_\_\_\_\_ I would like to receive a copy of the procedure described above.

\_\_\_\_\_ I would not like to receive a copy of the procedure described above.

\_\_\_\_\_/\_\_\_\_\_  
Participant Date

## I. Background Information

Please provide the following information.

Gender \_\_\_\_\_ Age \_\_\_\_\_

Have you designed a website before? Y N

If so, how many and what type(s) of website have you designed, i.e. personal, corporate, academic, etc.?

## II. Website 1 Browsing

Start Time: \_\_\_\_\_

- Go to the following website: <http://www.njit.edu/old/MSPTC>
- Browse through the site for about five minutes.
- Aesthetics is defined as beauty, attractiveness, visual appeal and appropriateness. Please rate your aesthetic impression of this website. Circle the appropriate number.  

1	2	3	4	5	6	7
Inferior			Average			Superior
- Locate the Technical Communication (Writing) Master's Program completion requirements. If you find them, name one of the required courses.

- Locate and note a contact person to email questions.

- Rate this website for overall impression. Please circle the appropriate number.

1	2	3	4	5	6	7
Inferior			Average			Superior

End Time: \_\_\_\_\_

## III. Reflections on Website 1

Rate the degree to which you agree with each statement regarding each aspect of design. You may browse the site. Circle the appropriate number.

### A. Usability and Functionality

- Convenience* – Information can be found and used within a few clicks of the mouse.

1	2	3	4	5	6	7
Inferior			Average			Superior

- Ease of use* – It is self-evident how to use the site.

1	2	3	4	5	6	7
Inferior			Average			Superior

- Legibility* – The fonts are appropriate in size, color, and style. The user can easily locate and read the text.

1	2	3	4	5	6	7
Inferior			Average			Superior



3. *Conformity* – The site follows conventions of other academic websites.

1	2	3	4	5	6	7
Inferior			Average			Superior

4. *Grouping* – Related items are grouped close to each other. Unrelated items are further apart.

1	2	3	4	5	6	7
Inferior			Average			Superior

5. *Unity* – The site is composed of a relation of parts in pursuit of a common goal.

1	2	3	4	5	6	7
Inferior			Average			Superior

6. *Consistency* – The visual elements are applied consistently throughout the site.

1	2	3	4	5	6	7
Inferior			Average			Superior

7. *Clarity* – The intent, organization, and appearance of the site is unambiguous and directed.

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

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#### D. Expressiveness and Creativity (Visual Richness)

1. *Originality* – The site takes an unorthodox approach and is distinguishable from other websites.

1	2	3	4	5	6	7
Inferior			Average			Superior

2. *Sophistication* – The site appears developed and complex.

1	2	3	4	5	6	7
Inferior			Average			Superior

3. *Intrigue* – The site captures my interest.

1	2	3	4	5	6	7
Inferior			Average			Superior

4. *Special effects* – The site includes animation, sound, or other unique forms of interactivity.

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

---



---

## E. Persona and Pleasure

1. *Enjoyment* – The site is enjoyable to interact with.  

1	2	3	4	5	6	7
Inferior			Average			Superior
  
2. *Ability to Gratify* – The site meets my expectations and is fulfilling.  

1	2	3	4	5	6	7
Inferior			Average			Superior
  
3. *Ability to Motivate* – The site encourages me to act.  

1	2	3	4	5	6	7
Inferior			Average			Superior
  
4. *Persona or Image* – The image of the visual and verbal elements is consistent and appealing.  

1	2	3	4	5	6	7
Inferior			Average			Superior
  
5. *Social Satisfaction* – There is a sense of community on the site, allowing for interaction with others.  

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

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## IV. Website 2 Browsing

Start Time: \_\_\_\_\_

1. Go to the following website: <http://uwtc.washington.edu>
2. Browse through the site for about five minutes.
3. Aesthetics is defined as beauty, attractiveness, visual appeal and appropriateness. Please rate your aesthetic impression of this website. Circle the appropriate number.

1	2	3	4	5	6	7
Inferior			Average			Superior

4. Locate the Technical Communication (Writing) Master's Program completion requirements. If you find them, name one of the required courses.

5. \_\_\_\_\_  
 Locate and note a contact person to email questions.

6. \_\_\_\_\_  
 Rate this website for overall impression. Please circle the appropriate number.

1	2	3	4	5	6	7
Inferior			Average			Superior

End Time: \_\_\_\_\_

## V. Reflections on Website 2

Rate the degree to which you agree with each statement regarding each aspect of design. You may browse the site. Circle the appropriate number.







2. *Sophistication* – The site appears developed and complex.

1	2	3	4	5	6	7
Inferior			Average			Superior

3. *Intrigue* – The site captures my interest.

1	2	3	4	5	6	7
Inferior			Average			Superior

4. *Special effects* – The site includes animation, sound, or other unique forms of interactivity.

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

---



---

### E. Persona and Pleasure

1. *Enjoyment* – The site is enjoyable to interact with.

1	2	3	4	5	6	7
Inferior			Average			Superior

2. *Ability to Gratify* – The site meets my expectations and is fulfilling.

1	2	3	4	5	6	7
Inferior			Average			Superior

3. *Ability to Motivate* – The site encourages me to act.

1	2	3	4	5	6	7
Inferior			Average			Superior

4. *Persona or Image* – The image of the visual and verbal elements is consistent and appealing.

1	2	3	4	5	6	7
Inferior			Average			Superior

5. *Social Satisfaction* – There is a sense of community on the site, allowing for interaction with others.

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

---



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### VI. Website 3 Browsing

Start Time: \_\_\_\_\_

- Go to the following website: <http://techcomm.usu.edu>
- Browse through the site for about five minutes.





6. *Consistency* – The visual elements are applied consistently throughout the site.

1	2	3	4	5	6	7
Inferior			Average			Superior

7. *Clarity* – The intent, organization, and appearance of the site is unambiguous and directed.

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

---



---

#### D. Expressiveness and Creativity (Visual Richness)

1. *Originality* – The site takes an unorthodox approach and is distinguishable from other websites.

1	2	3	4	5	6	7
Inferior			Average			Superior

2. *Sophistication* – The site appears developed and complex.

1	2	3	4	5	6	7
Inferior			Average			Superior

3. *Intrigue* – The site captures my interest.

1	2	3	4	5	6	7
Inferior			Average			Superior

4. *Special effects* – The site includes animation, sound, or other unique forms of interactivity.

1	2	3	4	5	6	7
Inferior			Average			Superior

Additional Comments: \_\_\_\_\_

---



---

#### E. Persona and Pleasure

1. *Enjoyment* – The site is enjoyable to interact with.

1	2	3	4	5	6	7
Inferior			Average			Superior

2. *Ability to Gratify* – The site meets my expectations and is fulfilling.

1	2	3	4	5	6	7
Inferior			Average			Superior

3. *Ability to Motivate* – The site encourages me to act.

1	2	3	4	5	6	7
Inferior			Average			Superior



**APPENDIX C**  
**WEBSITE SCREEN SHOTS**

Welcome to  
**Professional and Technical Writing**  
at Utah State University

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#### Featured Content:

#### Shirin Tabrizi: TC Bachelor's Student



As a senior in the Technical Communication department, I have learned a great deal about what technical communication really is and how I

can incorporate it into my future goals. My main interests in the department include a variety of topics such as design, page layout, project management, web development, and recently: print production. Studying the many different aspects of technical communication has effectively allowed me to explore a number of career options. Also, learning from professionals who are either currently in the industry

#### News & Events

Updated: Wed Mar 2

**April 27: Evening Masters/UCD**  
info session, Loew Hall 111, 6:30 - 7:30.

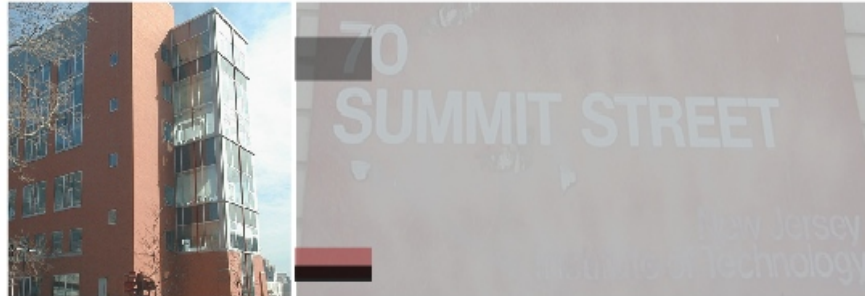
**April 28: Evening Masters/UCD**  
info session in Bellevue, 6:30 - 7:30. Location TBD.

**May 9: Reception for Alumni and Friends of UWTC**

Join us at the STC Annual Conference: Sheraton Seattle Hotel, Suites 422-424. Monday, May 9, 5:30-7:00.

Check out UWTC's showing at the Society for Technical Communication Puget Sound Chapter's Annual Competition.





Information design and development  
**Online publishing and text encoding**  
Multimedia presentations

>> skip intro

## LIST OF REFERENCES

- Barnum, Carol M. "Other Methods for Getting Feedback About Product Usability." Usability Testing and Research. The Allyn and Bacon Series in Technical Communication. New York: Longman, 2002. 31-53.
- Brady, Laurie and Christine Phillips. Aesthetics and Usability: A Look at Color and Balance. 2003. 5 Nov. 2004 <http://psychology.wichita.edu/surl/usabilitynews/51/aesthetics.htm>.
- Carliner, Saul. "Physical, Cognitive, and Affective: A Three-Part Framework for Information Design." Technical Communication: Society for Technical Communication, 2000. 561. Vol. 47.
- Ch'ng, Eugene and David Chek Ling Ngo. "Screen Design: A Dynamic Symmetry Grid Based Approach." Displays 24 (2003): 125-35.
- De Jong, Menno and Thea van der Geest. "Characterizing Web Heuristics." Technical Communication 47.3 (2000): 311-25.
- Dragga, Sam and Gwendolyn Gong. Editing: The Design of Rhetoric. Amityville, N.Y: Baywood, 1989.
- Dumas, J. S. and Redish, J. C. A Practical Guide to Usability Testing. Norwood, NJ: Ablex Publishing, 1993.
- Farkas, David K and Jean B. Farkas. Principles of Web Design. Allyn & Bacon Series in Technical Communication. Boston: Longman, 2002.
- Fogarty, James, Jodi Forlizzi, and Scott E. Hudson. "Aesthetic Information Collages: Generating Decorative Displays That Contain Information " Proceedings of the 14th Annual ACM Symposium on User Interface Software and Technology Orlando, Florida ACM Press, 2001 141-50.
- Fowler, Susan and Victor R. Stanwick. *The GUI Style Guide*. Boston: AP Professional, 1995.
- Frohlich, David M. "Beauty as a Design Prize." Human-Computer Interaction 19.4 (2004): 359-66.
- Galitz, Wilbert O. "Characteristics of Graphical and web user Interfaces" and "Understand the Principles of Good Screen Design." *The Essential Guide to User Interface Design: An Introduction to Design Principles and Techniques*. New York, NY: Wiley Computer, 2002. 41-161.
- van der Geest, Thea and Jan H. Spyridakis. "Developing Heuristics for Web Communication: An Introduction to This Special Issue." Technical Communication 47.3 (2000): 301

- Griffin, Nicole Monica. "Constructing Visual Literacy through Technology." University of Central Florida, 2000.
- Haig, A. and A. Whitfield. "Predicting the Aesthetic Performance of Web Sites: What Attracts People?" Smart Graphics AAAI 2001 Spring Symposium. Hawthorne, NY, 2001. 6 Nov. 2004 [www.dfki.de/~krueger/sg2001/schedule/haig.pdf](http://www.dfki.de/~krueger/sg2001/schedule/haig.pdf)
- Hassenzahl, Marc. "Emotions Can Be Quite Ephemeral; We Cannot Design them " interactions 11 5 (2004 ): 46-48.
- . "The Interplay of Beauty, Goodness, and Usability in Interactive Products." Human-Computer Interaction 19.4 (2004): 319-49.
- van der Heijden, Hans. "Factors Influencing the Usage of Websites: The Case of a Generic Portal in the Netherlands." Information & Management 40.6 (2003): 541-49. Elsevier. 12. Sept. 2004 [http://dx.doi.org/10.1016/S0378-7206\(02\)00079-4](http://dx.doi.org/10.1016/S0378-7206(02)00079-4)
- Hoffmann, Ralf and Kirstin Krauss. "A Critical Evaluation of Literature on Visual Aesthetics for the Web " Proceedings of the 2004 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists on It Research in Developing Countries Stellenbosch, Western Cape, South Africa South African Institute for Computer Scientists and Information Technologists, 2004. 205-09.
- Horton, William. "Visual Rhetoric for Online Documents." IEEE Transactions on Professional Communication 33.3 (1990): 108-13 IEEE Xplore. 15 Oct. 2004 <http://ieeexplore.ieee.org/iel1/47/2150/00059084.pdf?tp=&arnumber=59084&isnumber=2150&arSt=108&ared=114&arAuthor=Horton%2C+W.%3B>
- Instone, Keith. "Site Usability Heuristics for the Web." 1997. 5 Apr. 2005 <http://user-experience.org/uefiles/writings/heuristics.html>.
- Johnson, Steven. Interface Culture : How New Technology Transforms the Way We Create and Communicate. 1st ed. San Francisco: HarperEdge, 1997.
- Jones, Dan. Technical Writing Style. The Allyn and Bacon Series in Technical Communication. New York: Longman, 1997.
- Jordan, Patrick W. Designing Pleasurable Products: An Introduction to the New Human Factors. New York: Taylor & Francis, 2003.
- . "Human Factors for Pleasure in Product Use." Applied Ergonomics 29.1 (1998): 25-33. Science Direct. 8 Sept. 2004 [http://dx.doi.org/10.1016/S0003-6870\(97\)00022-7](http://dx.doi.org/10.1016/S0003-6870(97)00022-7)
- Karvonen, Kristiina. "The Beauty of Simplicity." 2000 Conference on Universal Usability. Arlington, VA: ACM, 2000. 85-90. 18 Oct. 2004 <http://doi.acm.org/10.1145/355460.355478>

- Kostelnick, Charles and David D. Roberts. Designing Visual Language : Strategies for Professional Communicators. The Allyn and Bacon Series in Technical Communication. Boston: Allyn and Bacon, 1998.
- Krause, Jim. Design Basics Index. Cincinnati: HOW Design, 2004.
- Lavie, Talia and Noam Tractinsky. "Assessing Dimensions of Perceived Visual Aesthetics of Web Sites." International Journal of Human-Computer Studies 60.3 (2004): 269.
- Lindgaard, Gitte and Cathy Dudek. Aesthetic Appeal Versus Usability: Implications for User Satisfaction. Presented Aug. 2003. 19 Apr. 2005  
[http://www.ucd.smartinternet.com.au/Docs/RMIT\\_satisfaction\\_&\\_aesthetics.ppt](http://www.ucd.smartinternet.com.au/Docs/RMIT_satisfaction_&_aesthetics.ppt)
- . "What Is This Evasive Beast We Call User Satisfaction?" Interacting with Computers 15.3 (2003): 429-5.
- Lindgaard, Gitte, and T.W. Allan Whitfield. "Integrating Aesthetics within an Evolutionary and Psychological Framework." Theoretical Issues in Ergonomics Science 5.1 (2004): 73.
- Lynch, Patrick and Sarah Horton. "Interface Design." *Web Style Guide Basic Design Principles for Creating Web Sites*. 2<sup>nd</sup> Ed. New Haven: Yale University, 2001. 17-35.
- Mahajan, Rohit and Ben Shneiderman. "Visual and Textual Consistency Checking Tools for Graphical User Interfaces " IEEE Trans. Softw. Eng. 23.11 (1997 ): 722-35.
- Markel, Michael H. and Kevin S. Wilson. "Design and Document Quality: Effects of Emphasizing Design Principles in the Technical Communication Course." Technical Communication Quarterly 5.3 (1996): 271-94.
- Martin, Alexander and David Eastman. *The User Interface Design Book for the Applications Programmer*. New York, NY: John Wiley and Sons, 1996.
- Merriam-Webster's 11th Edition Collegiate Dictionary & Thesaurus, CD-ROM. Fogware, 2003.
- Monk, Andrew. "The Product as a Fixed-Effect Fallacy." Human-Computer Interaction 19.4 (2004): 371-75.
- Mullet, Kevin and Darrell Sano. Designing Visual Interfaces: Communication Oriented Techniques. Englewood Cliffs, NJ: SunSoft, 1995.
- Ngo, David Chek Ling, Lian Seng Teo, and John G. Byrne. "Modelling Interface Aesthetics." Information Sciences 152 (2003): 25.
- Nielsen, Jakob. Designing Web Usability. Indianapolis, Ind.: New Riders, 2000.
- Norman, Donald A. The Design of Everyday Things. 1st Basic paperback Ed. New York: Basic, 2002.

- . "Introduction to This Special Section on Beauty, Goodness, and Usability." Human-Computer Interaction 19.4 (2004): 311-18.
- . *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic, 2004.
- Olsen, Gary R. "Eideteke: The Professional Communicator in the New Visual Culture." IEEE Transactions on Professional Communication 34.1 (1991): 13-19.
- Overbeeke, Kees and Stephan Wensveen. "Beauty in Use." Human-Computer Interaction 19.4 (2004): 367-69.
- Overbeeke, Kees, Tom Djajadiningrat, Caroline Hummels, Stephan Wensveen, and Joep Frens. "Let's Make Things Engaging." Funology: From Usability to Enjoyment. Ed. Mark A. Blythe, Kees Overbeeke, Andrew F. Monk, and Peter C. Wright. Dordrecht ; Boston: Kluwer Academic Publishers, 2003. xix, 293.
- Park, Su-e, Dongsung Choi, and Jinwoo Kim. "Critical Factors for the Aesthetic Fidelity of Web Pages: Empirical Studies with Professional Web Designers and Users." Interacting with Computers 16.2 (2004): 351-76.
- Pieratti, Denise. "Usability and the Web." Intercom. June (1998): 20-23.
- Portewig, Tiffany Craft. "Making Sense of the Visual in Technical Communication: A Visual Literacy Approach to Pedagogy." Journal of Technical Writing & Communication: Baywood Publishing Company, Inc., 2004. 31-42. Vol. 34.
- Postrel, Virginia I. The Substance of Style: How the Rise of Aesthetic Value Is Remaking Commerce, Culture, and Consciousness. 1st Ed. New York, NY: HarperCollins, 2003.
- Powell, Thomas A. Web Design the Complete Reference. 2nd Ed. New York: McGraw-Hill/Osborne, 2002.
- Riley, K and Parker, F. "Parallels between Visual and Textual Processing." IEEE Transactions on Professional Communication 41.3 (1998): 175-85. IEEE Xplore. 20 Oct. 2004 <http://ieeexplore.ieee.org/xpl/tocresult.jsp?isNumber=15440> .
- Root-Bernstein, Robert S. "Aesthetic Cognition." International Studies in the Philosophy of Science: Routledge, Ltd., 2002. 61-77. Vol. 16.
- Rosenbaum, Stephanie and J.O. Bugental. "Measuring the Success of Visual Communication in User Interfaces." Technical Communication 45.4 (1998): 517.
- van Schaik, Paul and Jonathan Ling. "The Effects of Screen Ratio and Order on Information Retrieval in Web Pages." Displays 24.4/5 (2003): 187.
- Schenkman, Bo N. and Fredrik U. Jönsson. "Aesthetics and Preferences of Web Pages." Behaviour & Information Technology 19.5 (2000): 367-77.

- Society for Technical Communication. Academic Programs. 15 Apr. 2005  
<http://www.stc.org/academic.asp>.
- Spillers, Frank. Emotion as a Cognitive Artifact and the Design Implications for Products That Are Perceived as Pleasurable. 1 Mar. 2005  
[http://www.experiencedynamics.com/articles/published\\_works/index.php](http://www.experiencedynamics.com/articles/published_works/index.php).
- Spool, Jared M., Tara Scanlon, Will Schroeder, Carolyn Synder, Terri DeAngelo. Web Site Usability: A Designer's Guide. The Morgan Kaufmann Series in Interactive Technologies. San Francisco: Morgan Kaufmann, 1999. 83-96.
- Stultz, Robert C. "It's All in the Rhetoric: Using Affective Design to Change Users' Perceptions of Online Help." University of Central Florida, 2003.
- Sutcliffe, A. "Assessing the Reliability of Heuristic Evaluation for Web Site Attractiveness and Usability." System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on, 2002. 1838-47.
- Tractinsky, N. "Aesthetics and Apparent Usability: Empirically Assessing Cultural and Methodological Issues." The 1997 Conference on Human Factors in Computing Systems, CHI; Atlanta, GA; USA; 22-27 Mar. 1997. New York, NY, (USA): ACM, 1997. 115-22. Vol. Atlanta, GA; USA.
- . "A Few Notes on the Study of Beauty in HCI." Human-Computer Interaction 19.4 (2004): 351-57.
- . "Toward the Study of Aesthetics in Information Technology." Proceedings of the International Conference on Information Systems, ICIS 2004. Washington, DC: Association for Information Systems, 2004.
- Tractinsky, N., A. S. Katz, and D. Ikar. "What Is Beautiful Is Usable." Interacting with Computers 13.2 (2000): 127-45.
- Waters, Crystal. Web Concept & Design: A Comprehensive Guide for Creating Effective Web Sites. Indianapolis: New Riders, 1996.
- Williams, Robin. The Non-Designer's Design Book : Design and Typographic Principles for the Visual Novice. Berkeley, CA: Peachpit Press, 1994.
- Williams, Robin and John Tollett. The Non-Designer's Web Book: An Easy Guide to Creating, Designing, and Posting Your Own Web Site. 2nd ed. Berkeley, Calif.: Peachpit, 2000.
- Williams, Thomas R. and Harkus, Deborah A. "Editing Visual Media." Professional Communication, IEEE Transactions on 41.3 (1998): 33-46. IEEE Xplore. 4 Nov. 2004  
<http://ieeexplore.ieee.org/xpl/tocresult.jsp?isNumber=14477>