

# A COMPARISON OF OBJECTIVE CHARACTERISTICS AND USER PERCEPTION OF WEB SITES

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**ABSTRACT:** The study reported in this paper employed a combination of web-based content analysis and web-assisted personal interviews to identify key characteristics of Web sites and how consumers perceive them. The extent of site characteristics found via the content analysis showed no major differences among the three designated computer manufacturers' Web sites. On the other hand, the user perception of these site characteristics, obtained through in-depth interviews, provided a different outcome. Discussion on the incongruence between objective Web site characteristics and subjective perception is provided. Theoretical and methodological concerns and suggestions for future research are also addressed.

The Internet revolution and the consequent growth of e-commerce prompted manufacturers and marketers to quickly take advantage of this important technology. Although the Internet industry has experienced a shakeout, it is nonetheless a functioning channel of exchange that is gradually establishing a critical mass of users among average consumers. Reports on the fast growing rate of Internet users among people with lower income and less education, and among ethnic minorities, the older population, blue collar workers and women (IntelliQuest 1999; Pastore 2000, 2001a, b, c, d, e, f) indicate that "the Internet has gone from novelty to utility for many Americans" (Pew Internet and American Life 2002).

This normalization of the Internet population and its accompanying purchase power has attracted research attention to the potential of the World Wide Web as a vital advertising medium. Although the initial investment in Web advertising was mainly driven by Internet hype and a "following the trend" attitude, a growing body of literature now reports favorable outcomes of Web advertising. According to Jupiter Research, U.S. online ad spending will reach nearly \$14 billion in 2007 from \$6.2 billion in 2003 ("Online Advertising" 2003). Such an increase in online ad revenue could be attributable to the synergistic effects of Web advertising, combined with traditional media advertising, on overall advertising campaigns ("Internet is Powerful" 2002).

Although there is little consensus on what constitutes Web advertising (e.g., interstitials and banner ads vs. entire Web sites), researchers tend to agree that Web sites serve as Web advertising space (Bruner and Kumar 2000; Li, Daugherty, and Biocca 2002; McMillan and Hwang 2002; Stevenson, Bruner and Kumar 2000). Research of the Web can be largely categorized into either using a system-centered or a user-centered approach (Unz and Hesse 1999). System-centered

research is mainly concerned with objective characteristics or formal features of Web sites (Bucy et al. 1999; Ghose and Dou 1998; Ha and James 1998; Stout, Villegas, and Kim 2001), whereas research with the user-centered approach tends to focus on user response to the Web site (Chen and Wells 1999; Eighmey 1997; Eighmey and McCord 1998; McMillan and Hwang 2002; Menon and Soman 2002; Wu 1999). Although current research provides useful insights into Web advertising, it is somewhat limited since usually only one perspective is utilized without consideration of the other.

System-centered research is useful to help identify key design factors and industry practices. In contrast, user-centered research facilitates the evaluation of the effectiveness of these design factors and practices. While these two approaches complement each other, they are rarely employed in the same study. Therefore, the present study combines both approaches to gain an understanding of Web content features. Specifically, this study first content analyzes designated Web sites to identify feature characteristics and then conducts in-depth interviews with users of those Web sites to understand their perceptions. Results from this study will provide input to addressing the question of whether objectively defined feature characteristics help explain the effectiveness across Web sites.

## LITERATURE REVIEW

As in most communication processes, there are two main, equally important entities that make the process of advertising on the Web possible: people who design and take ownership of the content of Web site and its advertising (e.g., designers and advertisers) and the intended message receivers (e.g., Web site visitors and consumers). According to Unz and Hesse (1999), depending on which group of people are of interest, researchers employ either a system-centered or a user-centered approach in their study of the Web. The system-

centered approach involves studying Web sites from the perspective of their objective content, which may help site designers or advertisers identify the best design guidelines. The user-centered approach, in contrast, involves studying a Web site from a site visitor's or target audience's perspective in order to find out how a Web site influences its visitors in terms of perception, attitude or purchase intention.

### System-Centered Approach

In the system-centered approach, interactivity, information content, and aesthetics or design have been the key constructs studied.

**Interactivity.** Interactivity is by far the most studied system-centered construct because it is considered as the defining characteristic of the Web. The construct of interactivity had been defined in a variety of ways in many disciplines long before the Web came into being. Focal concepts in defining interactivity included interpersonal communication such as real-time dialogue (Roehm and Haugtvedt 1999), face-to-face communication (Ha and James 1998; Walther and Burgoon 1992); responsiveness of a message (Deighton 1996; Rafaeli 1988; Rafaeli and Sudweeks 1997); interaction between two parties (e.g., interaction with a machine or with other person, Hoffman and Novak, 1996), a person-to-person or person-to-technology exchange (Haeckel 1998); and active user participation and control (Ariely 2000; Cho and Leckenby 1999; Stern, Resnik, and Grubb 1997; Steuer 1992).

While the above definitions may have captured the essence of interactivity from various perspectives in different disciplines, some researchers considered the unidimensional definition of interactivity insufficient in explaining the complexity of interactivity on the Web. Instead, they proposed a multidimensional conceptualization of interactivity (Ghose and Dou 1998; Ha and James 1998; Stout, Villegas, and Kim 2001). For example, Ha and James (1998) defined interactivity along five dimensions: playfulness, choice, connectedness, information collection, and reciprocal communication. Ghose and Dou (1998) tried to further relate interactivity to quality of the Web sites. They content analyzed 101 Web sites based on the presence/absence of 23 key interactive functions and found that the more interactive functions a Web site employed, the more likely the site was to be included in the Lycos' Top 5% Sites list.

This multidimensional conceptualization provides a useful framework to examine interactivity in a comprehensive manner. It also facilitates the operationalization of the

construct for subsequent content analysis studies (Ghose and Dou 1998; Ha and James 1998; Stout, Villegas, and Kim 2001). On the other hand, some researchers have pointed out that the multidimensional approach may obscure certain effects of interactivity because while considering many variables simultaneously, the effects from a particular variable are difficult to single out (Villegas 2002).

**Information Content.** In an attempt to apply traditional advertising models in Web advertising research, a few researchers have looked into other constructs of Web advertising. One such construct that has been investigated by a fair number of researchers is information content. There is little doubt that the Web allows for substantially more content-rich product information than traditional advertising media due to less space and budget constraints. Schlosser and Kanfer (1999), in their assessment of 65 Web sites, found that most sites made use of the content richness of the Web to elaborate on product features.

Information content has been studied extensively in various contexts of traditional media. Resnik and Stern (1977) conducted a pioneering study in which they analyzed the information content of television commercials. They defined information as "cues that enable viewers to better achieve their own personal sets of purchase objectives" (Resnik and Stern 1977, p. 50-51) and developed 14 evaluative criteria to judge the informativeness of ads. Resnik and Stern's analytic framework and evaluative criteria have since served as the basis for most traditional advertising research on information content.

Dholakia and Rego (1998) adopted Resnik and Stern's framework in their examination of the relationship between the information content (number of copy points) and the effectiveness of the sites (daily hit rate). They found that commercial Web pages resembled print advertisements rather than broadcast media and that commercial home pages were informative in nature. However, the effect of informativeness on the site's popularity, measured by daily hit rate, was not significant. In other words, the amount of information presented on the home page did not play a significant role in attracting visitors to the Web site. This could be due to the fact that a Web site's hit rate may not be a valid measure for effectiveness. A more comprehensive and detailed scheme for measurement of Web site information content and effectiveness may need to be developed.

**Design.** Graphics are often used on Web sites to help navigation, lighten a text-heavy information-rich page or to

include images of products (Collin 1999). It is commonly believed that in order to attract visitors, Web sites should have eye-catching elements in terms of layouts, colors, and graphics. Therefore, Web designers often attempt to make their Web sites fancy and attractive with the use of various technologically supported design tools such as flash, Java script, and colors. However, the idea that "the more elements you put in Web pages, the more you can attract visitors" may not always be true. Stevenson, Bruner, and Kumar (2000) found that more complicated and detailed Web page backgrounds were not necessarily better in terms of advertising effectiveness. The simplest background in their study scored high on several measures of effectiveness such as attitude toward the ad, brand attitude, purchase intention, and attitude toward the Web site.

Web design elements are closely interwoven with elements of interactivity, making it hard to separate the two. For instance, clicking on a hypertext link changes the color of the text. Since the color changes as a result of users' action, it can be considered as an interactive function. Simultaneously, what color to use for the unvisited or visited links and how to change colors are design considerations. Furthermore, there is little consensus among researchers and practitioners on the definition of "design" in Web advertising. Levitt (1998) considered having contact information of a company or a Webmaster, following two-click rules (i.e., getting the target information within two mouse clicks from the home page), and offering text-only versions as design issues. However, these elements were studied as interactivity functions by other researchers (e.g., Ghose and Dou 1998; Stout, Villegas, and Kim 2001).

### User-Centered Approach

An individual's perception of an object may be independent of the object itself. Researchers in Web advertising have employed user-centered approach to investigating issues related to effectiveness. Most recently, Macias (2003) defined interactivity as having dimensions of range ("number of possibilities for action at any given time"), machine interactions ("features which allowed the individual to interact with the Web site"), connectedness ("hypertext links") and reciprocal/recursive communication ("email, chat rooms, comment forms"), and measured consumer's perceived interactivity as a Web site's interactivity. She found that interactivity had a positive influence on consumer's comprehension of and attitudes toward Web advertising. However, she did not provide further discussion on how these

two measures—the interactivity defined by researchers and the one perceived by consumers—are different.

Friestad and Wright (1994) have maintained that an individual's perception of message effectiveness does not always coincide with objective effectiveness of messages as defined by marketers or researchers. Studies on demographic and psychological profiles of users and shoppers on the Web further suggest that differences in an individual's use and perception of the Web as a tool would result in different online behaviors (Donthu and Garcia 1999; Stellan 2001).

Notwithstanding the lack of consensus as to what constitutes design in Web advertising, practitioners make recommendations on the use of color, shape, and typography while delineating users' psychological responses to these elements (Bacheldor 2000; Holzschlag 1999). Academic researchers, on the other hand, drew on design principles of traditional advertising and analyzed Web sites with a similar method or investigated the effects of design elements of Web sites on such outcome measures as time spent on a site and number of Web pages accessed in experimental settings (Bucy et al. 1999; Dreze and Zufryden 1997). Collectively, they found that Web sites were more similar to print ads than broadcast ads due to its under-utilization of interactive tools such as dynamic texts or images. However, frequent use of stationary and static ads was found to have differential effects on time spent on a site and number of Web pages accessed (Bucy et al. 1999; Dreze and Zufryden 1997).

Studies on advertising's effects in the traditional media have shown that attitude toward the ad influences brand attitudes and purchase intentions (Aaker and Stayman 1990; Batra and Ray 1986; Brown and Stayman 1992; MacKenzie, Lutz, and Belch 1986; Shimp 1981). In terms of the new media, attitude toward the Web site is often measured to determine its effectiveness (Chen and Wells 1999; "Georgia State University" 2000).

### RESEARCH QUESTIONS

The above literature review reveals that previous studies on Web advertising tended to utilize either the system-centered approach or the user-centered approach to address the same issues. System-centered research yields insights into elements of Web sites, while the user-centered approach probes how these Web elements are perceived by users. It seems necessary to understand key elements of Web sites from both system-centered and user-centered perspectives. Therefore, the

following study was designed to address three key research questions.

The first research question is: to what extent do Web sites employ objectively defined features along the dimensions of interactivity, information content, and design? To answer this question, a content analysis of designated Web sites was carried out to measure the extent to which interactivity, information content, and design elements were present. Since all three key features have been found to be prominent design elements among Web sites, it was expected that the selected Web sites in this study would have all three present and this would help provide comparable references when consumers were queried about their perceptions.

From the point of view of designers and advertisers, whether and how users perceive the various features of the Web site are important issues. Therefore, the second research question is: do user perceptions of site interactivity, information content, and design correspond to objectively measured characteristics? While user responses to the Web site have often been studied using quantitative methods (Chen and Wells 1999; Eighmey 1997; Eighmey and McCord 1998; Wu 1999), a qualitative approach was used in this study to understand the underlying reasons that users perceive objectively defined characteristics of a Web site the way they do. Therefore, in-depth interviews with users of designated Web sites in this study were conducted to obtain their responses. Specifically, the following general questions were posed for each Web site that participants in this study visited: (1) what is most informative about the site and why; (2) what is most attractive about the site and why; and (3) what is most interactive about the site and why.

Critics of content analysis have argued that the method puts too much emphasis on comparative frequency of different symbols' appearance. In some instances, the presence of even a single particularly important feature may be crucial to a message's impact (Riffe, Lacy, and Fico 1998). Also, more fundamentally, content analysis focuses only on the message, assuming that audiences unconditionally receive and process the message. By assessing a user's perception of features of Web sites with in-depth interviews, this study seeks to provide valuable contextual information to help improve the quality of interpretation. Thus, findings from both quantitative content analysis and qualitative interviews were compared and interpreted to answer the third research question: are there similarities and differences between objectively evaluated Web

site characteristics and user's perceptions of those objective Web site characteristics?

## METHOD

This study employed two main methods to address the three research questions raised above: content analysis and in-depth interviews. For the content analysis, three computer manufacturers' sites?Apple ([www.apple.com](http://www.apple.com)), Compaq ([www.compaq.com](http://www.compaq.com)) and Dell ([www.dell.com](http://www.dell.com))?were selected based on a survey prior to the study. The survey queried 52 college students about Web sites they frequently visited for a computer. The three designated computer manufacturers' Web sites were found to be the top three frequented sites among respondents. For in-depth interviews, 39 college students enrolled in a southwestern state university were recruited to participate in a hands-on online shopping task involving the three manufacturers. Subsequently, participants were asked to evaluate the Web sites they had visited.

### Web-Based Content Analysis

Content analysis was conducted to determine three objective characteristics, namely, interactivity, information content, and design. These constructs were operationalized as the presence or absence of relevant elements. Three coders who were blind to the research questions independently coded the Web sites to confirm each of the 131 coding items. While most of the Web content analysis studies examined only home pages (e.g., Bucy et al. 1999; Ha and James 1998), this study analyzed the entire Web site. All three Web sites were recorded by software on the same date and time to ensure equivalence in coding and comparison.

Interactivity was operationalized as the presence or absence of 88 interactive tools, largely adapted from Stout, Villegas, and Kim's (2001) study. These interactive tools were used to represent five interactive dimensions that were frequently identified in the literature: (1) accessibility (ease of accessing information), (2) navigability (ease of finding information), (3) relationship (facilitation of relationship building between users and a Web site as well as between users), (4) media richness (multimedia capability), and (5) entertainment (entertainment enhancing capability).

Information content was operationalized as the presence or absence of 36 pieces of information. Among the four dimensions of information content, items to measure comprehensiveness of information were borrowed from Resnik and Stern's (1977) evaluation criteria. Items for the remaining three dimensions, namely, source credibility,

timeliness of information, and marketing information, were created based on review of the literature and an informal assessment of Web sites.

Finally, design was operationalized as the presence or absence of eight design tools. Adopted from Bacheldor's (2000) guidelines for Web design, these eight items were used to measure two major dimensions of design: color (3 items) and typography (5 items). Appendix A lists all of the items used in the content analysis.

The overall average of intercoder reliability across all the dimensions measured was .76. The relatively low intercoder reliability could be due to the fact that the sample Web sites contained complex and sophisticated elements, with a number of pages linked internally and externally. Disagreements between coders were resolved by discussion with the researchers based on the coders' comments and the URLs they wrote down in the coding questionnaire. For the analysis of data, coding answers that reflected the resolution of intercoder disagreements were used.

#### **Web-Assisted In-Depth Interviews**

In a separate study, a hypothetical shopping situation was created where participants were requested to recommend a personal computer to their College Dean to be instituted as a requirement for students. Participants were given a budget limit of \$1,400-2,400. Personal computers are particularly relevant to college students because almost all students are required to use computers for work both in and outside of the classroom. Computer hardware sales via the Web reached \$10.1 billion as a second largest product category, next to \$30.2 billion on travel industries in 2002 ("Online Shopping" 2003). This is also a product category with an abundance of information on the Web. Therefore, it was considered appropriate to use a computer as a hypothetical product for the purchase task.

Each participant was given 30 minutes to surf the Web and shop for a personal computer. The 30-minute online shopping sessions were conducted in a laboratory. All of the Web surfing activities such as cursor movements, click history, page selection, and so forth, were captured by observation software. The room was configured for 10 participants per session. Each station was equipped with a laptop computer with Ethernet connection. At the end of the surfing, participants were asked to indicate which computer they would recommend.

After the shopping task, one-on-one in-depth interviews were conducted by trained interviewers. These interviews were

semi-structured, focusing on the three key questions described earlier. Interviews were carried out while playing back each participant's surfing behavior captured earlier in order to facilitate his/her recall. Finally, all audio tape-recorded interviews were transcribed by the interviewers for further analysis.

## **RESULTS**

### **Objective Web Site Characteristics**

All interactivity items present in the site were divided by the total number of interactivity items measured to yield an interactivity ratio score. Results showed that although the Apple site tended to use a few more interactive tools than other sites, there was no clear difference among the three sites (Apple=47.8%, Compaq=43.2%, Dell=42%). It appeared that Web sites traded off some interactive functions for other types of interactive functions and no Web site used all of the interactive functions to a similar extent.

In order to compare the information content of the three Web sites, an information content ratio was developed using the same calculation method as the interactivity ratio. Results also showed that there was no clear leader among the Web sites that contained more information than other Web sites (Apple=66.7%, Compaq=61.1%, Dell=69.4%). Overall, all Web sites incorporated a majority of the information content items.

Finally, since the measure of the design items were codified by the use of color and typography, there were mutually exclusive occurrences of an event (e.g., use of dark background and light letters vs. use of light background and dark letters). Therefore, the results showed little difference among the sites. It appears that these sites were similarly well developed in terms of information content, design, and site interactivity.

Overall findings from the content analysis suggest that there is often a trade-off among the different components of interactivity, information content, and design depending, perhaps, on the communication goal of the site. It is not possible to suggest that one site is "better" than the other by simply analyzing the frequency of features used. Consistent with past studies, the content analysis of the three major computer manufacturer Web sites indicated that they were rather similar in terms of objective characteristics.

### **Subjective Perception of Web Sites**

In-depth interviews provided another interpretation of those Web site characteristics from a consumer's perspective. Regardless of the existence of certain site characteristics,

consumers may differentially perceive each site. Although content analysis did not reveal major differences among the three sites, in-depth interviews with consumers tell a somewhat different story. A preliminary review of transcripts generated lists of words or phrases typically used for answering to the questions. The number of these words or phrases was then counted for further analysis of in-depth interviews.

**What Is Most Interactive and Why**

The most interactive site considered by study participants was the Dell site. Twenty-five out of the 34 who visited the Dell site (74%) used interactivity-related words such as "click," "link to other pages," "feedback," "personalized," and "construct own computer" in answering the question, while 21 of 33 (64%) for Compaq and 14 of 30 (47%) for Apple did so. Table 1 shows the respective breakdown of responses.

**Table 1. Percent of Participants Mentioning Interactivity**

	Apple		Compaq		Dell	
	N	%	N	%	N	%
Interactivity	14 <b>(5)*</b>	46.7	21 <b>(9)*</b>	63.6	25 <b>(18)*</b>	73.5
Total	30		33		34	

According to Roehm and Haugtvedt (1999), interactivity has the potential to increase consumer involvement with the medium and ultimately with the marketer by allowing consumers to participate in the formation of the content of the communication and its presentation. As a consequence, marketers should customize messages presented to their consumers. From this perspective, customization, mentioned as "to customize or personalize the computer," "build your own computer," "guide based on your profile," or "select your option," were considered as higher level interactive features. Therefore, the mentioning of these higher level interactivity words/phrases was specifically noted. Results showed some differences among the three sites. Eighteen out of 25 participants mentioned the customization or personalization function of the Dell site, while only 9 participants mentioned customization for the Compaq site and 5 for the Apple site. As an illustration of high interactivity mentioning, participants indicated the following:

"The **construction** of the computer, adding gigs or whatever... I have **control of what goes in the computer**. It's not just an R600, it's whatever I want in it" (Dell Site)

"It gives you four different categories with different options and you **personalize** how they should **build your computer**. It allows you to **personalize based on your pricing needs**, based

on what you actually need it for. It makes you feel like you're **more involved** than just clicking, clicking, clicking" (Dell Site)

**What Is Most Informative and Why**

Regarding the information content question, about 23 out of 30 participants (76.7%) who visited the Apple site mentioned the information provided; 20 out of 33 (60.6%) Compaq visitors and 19 out of 34 (55.9%) Dell visitors mentioned information capacity of the sites respectively (see Table 2).

**Table 2. Percent of Participants Mentioning Information**

	Apple		Compaq		Dell	
	N	%	N	%	N	%
Information	23 <b>(7)*</b>	76.7	20 <b>(11)*</b>	60.6	19 <b>(8)*</b>	55.9
Total	30		33		34	

\*( # ) indicates the number of participants mentioning higher level of information

However, in terms of the depth of information, Compaq was mentioned most frequently as the site that provided detailed, comprehensive, specific product-related information, and information enabling comparisons with other products. The three sites somewhat differed in this respect (11 out of 33 for Compaq; 7 out of 30 for Apple; and 8 out of 34 for Dell). For example, some participants provided the following comments:

"They show all the different brands, then you can go into **more detail**. Like it has a quick **summary... The way they have it set up**, you can go in and look at **comparisons** more easily" (Compaq Site)

"It was all pretty informative I suppose... just because they give a **general product description**" (Apple Site)

Interestingly, about a third of the participants who visited the Compaq and Dell sites mentioned interactivity-related functions (e.g., categorization, navigation, and customization functions) while being queried about the site's informativeness. Perhaps, it could be that the interactive functions helped facilitate the retrieval of product-related information. Some comments below may help illustrate the point:

"The shopping cart was most informative because it cut it down to the price... and then **change the configurations**, like from a P3 to Celeron" (Compaq Site)

"Actually what was the best was just going to the **customization** and seeing the breakdown of what it has. You just want to get that **established** if you can" (Dell Site)

### What Is Most Attractive and Why

Table 3 shows the respective responses from respondents when queried about the attractiveness of site design. It appears that study participants considered the Apple site most attractive among the three sites. Visitors to the Apple site mentioned design-related words more often than any of the other sites. The Apple site was considered to have utilized various design tools such as color, layout, and graphics. It also received positive evaluation in general such as clean, visual, and having personality.

**Table 3. Percent of Participants Mentioning Design**

	Apple		Compaq		Dell	
	N	%	N	%	N	%
Design	25	83.3	4	13.3	13	38.2
Total	30		33		34	

"The *graphics*, the front page had big *pictures*, they were *colorful* and they had *easy to read* tabs. The iMac colors were attractive and the pictures were attractively displayed. It was very *inviting* and *visually attractive*" (Apple Site)

"Apple is really, really good at *showing off* their products... because it's just a different style. Only Apple's computer uses a lot of *color*, or gives their product a *personality* as opposed to just being a tool" (Apple Site)

However, among Compaq site visitors, 13 out of 33 (38%) participants mentioned its interactive features such as click, links, categorization, and navigation, while responding to the question about attractiveness. Although less than did Compaq site visitors, Dell site visitors also mentioned interactive features when asked about the site's attractiveness. Perhaps when queried about Dell and Compaq sites' attractiveness, lesser design and visual elements came to mind among participants. Some comments are listed below.

"The product part gave you a good looking at the product, the *variety of pricing*. You could click on whichever you were looking and *see the specs* about it" (Compaq Site)

"Product tour part was attractive. You *click* on a quick overview and it *gives a few key features* and if you *click* on 360-degree view, it shows the computer turning around" (Dell Site)

"The part I could *customize* the computer I chose, that I could *choose colors* for the computers and I could see what it looked like" (Dell Site)

In response to all three questions concerning interactivity, information content and attractiveness of design, people seemed to maintain a holistic view of the site's characteristics. The objective criteria set up by the researchers did not seem to be clearly distinct from the consumer's perspective. In fact, the three constructs—interactivity, information content, and design elements—seemed to overlap with each other in many participants' minds.

Overall, from participants' point of view, the Apple site was an attractive site that focused on design elements. The Compaq site, on the other hand, was considered as an informative site that provided rich product-related information. In addition, the Dell site was an interactive site that provided various interactive tools to the users. Table 4 shows the perceived characteristics of each site from interview data, regardless of specific question asked.

**Table 4. Overall Site Perception**

	Informativeness	Attractiveness	Interactiveness	Total (%)
Apple	28 (8)	<b>27</b>	19 (5)	74 (82.2)
Compaq	<b>33 (17)</b>	6	44 (11)	83 (83.8)
Dell	28 (13)	14	<b>44 (26)</b>	86 (84.3)

\*( # ) indicates the number of participants mentioning higher level of Interactivity, Information Content, and Attractiveness of Design respectively.

More than 80 percent of interview responses included mentions of information content, design, and interactivity for site evaluation. If this percentage is assumed to represent the overall subjective perception of site characteristics, the three sites seem to be fairly close to each other (Apple=82.2; Compaq=83.8; Dell=84.3). In this way, the objective and subjective site characteristics appear to converge on the same outcome. However, in-depth interviews provided an opportunity to interpret these results from a different perspective. Altogether, they showed how these evaluations were "put together" in participants' minds. From in-depth interviews, it was revealed that subjective perceptions of the three dimensions—interactivity, information content, and attractiveness of design—was different for different sites. In other words, the three dimensions disproportionately composed the overall site perception.

Therefore, results from in-depth interviews rendered a somewhat different picture from that of the content analysis. Although it is not possible to conclude that the differences between these two sets of results were statistically significant, it is important to note that the presence of certain objective measures may not be perceived as such in the user's

perception. Individuals tend to view the message through their personal perceptual "lens." By and large, the comparison between content analysis and in-depth interviews indicated that although the three computer manufacturer's sites were very similar in terms of objective site characteristics, this was not reflected in consumers' perceptions.

### DISCUSSION AND SUMMARY

This study examined and compared objectively identified Web site characteristics with consumers' subjective perception of those characteristics. A content analysis of three computer manufacturer's sites found no major differences in terms of interactivity, information content, and attractiveness of design. However, subsequent in-depth interviews with study participants found different results. Specifically, participants perceived the Apple site as design-oriented; the Compaq site as rich information-oriented; and the Dell site as interactive feature-oriented.

It is common practice for commercial Web sites to employ various features in an effort to increase site effectiveness. From the results of the content analysis in this study, major computer manufacturers seem to build in as many features as possible for their Web sites. Given the nature of their business, this appears a rather reasonable outcome. How a Web site is perceived, though, remains with the consumers. Even if the sites have similar features, subjective perception of the sites may distinguish one from the rest as evidenced from this study.

There could be several possible explanations of why the results of the two approaches are different. From the perspective of content importance, visitors to Web sites tend to mention those content characteristics that are most important to them personally. For instance, users could focus on an interactive dimension of the site because that is what they like most about the site. Considered this way, it would suggest that future research should look into factors such as personal characteristics and relevance to help explain differences in perceptions. As can be observed from this study, the definition of informativeness and interactiveness of a Web site varies from individual to individual. The conceptualization of constructs from the consumer's perspective is a much needed area for future research.

Another explanation could be that users organize Web sites by focusing on a few salient characteristics. The impact of these salient characteristics makes users either ignore or interpret other characteristics to be similar to those salient ones. For

instance, some users mentioned "interactivity" components, even when they were being asked about "information." This could be because interactivity functions such as custom-design capabilities were what stood out in their minds and they consequently associated everything else with this salient characteristic. The content salient perspective differs from the content importance perspective in that users might not think the salient characteristics are important except that they are the ones that stand out. For example, the Apple site were rated high on "design," but low on "interactivity" not because it has insufficient interactive capability, but because the "design" factors stand out so dramatically. The highly creative "design" might have, in fact, obscured the interactive features for the Apple site.

The third explanation could be considered from whether users perceive the content features holistically or separately. It is likely that users perceive Web sites based on their overall impression and experience, rather than on each feature separately. For example, as the objective system-centered analysis indicates, the Dell site is simultaneously interactive, informative, and attractive. However, it delivers these characteristics together in such a unique manner that people associate it with "interactive." This outcome could also be due to each manufacturer's marketing communication effort in image positioning. At the time just prior to the study, the computer industry, in particular, has increased advertising spending for branding campaigns both in the off-line and on-line markets. For example, Dell Computer Corp. spent \$51.1 million on TV advertising in 1999; Compaq Computer Corp. spent \$29.5 million and Apple Computer Corp. spent \$33.6 million on TV advertising in order to position themselves as relevant for the Internet economy (Swoyer 2000). Therefore, it may be possible that the images built by the three manufacturers are reflected in how consumers evaluated their respective Web sites in this study.

Although this study contributes to the understanding of how Web sites are constructed and perceived, it has limitations. First, as mentioned earlier, this study employed existing Web sites in the study. Thus, predispositions that participants already possessed may influence their perceptions of the Web sites. Second, the student sample used for the study provided homogeneity of sample characteristics in terms of psychographics and demographics. It was kept relatively small for the interpretive nature of the study. As such, this convenience sample was not intended to be representative of the population as a whole. Third, the artificial setting in which the study was conducted may influence the outcome.

Participants may have behaved differently if it were a real purchase situation in which they were to use their own money. Finally, participants were asked how "informative," "attractive" and "interactive" each Web site was to them. These words, used by the researchers, may not coincide with words participants would have thought of using in describing the sites.

By combining content analysis of Web sites of computer manufacturers and in-depth interviews with visitors to those sites, this study attempted to add depth to our understanding of Web site evaluations. The purpose of this exploratory effort is to understand what is occurring in the new media environment and what outcomes may be relevant and important for future studies. In order to further explore Web site characteristics and their effectiveness, future efforts may need to continue the practice of combining several research methods to simultaneously study consumer responses. This may also help bridge the gap between system-centered and user-centered research findings. In addition, the issue of how key Web site features interact with one another and how this interaction impacts on consumer's perception remains a fruitful area for future research.

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## APPENDIX A

### Items used to Code Computer Web Sites

#### Interactivity\*

##### 1) Accessibility\*

1. Does the Web site require a registration process when opening the site for the first time?
2. Does the Web site require a registration process to obtain data/documents/information?
3. Does the Web site require a registration process to interact with other users or the company (the site owner)?
4. Does the Web site require additional software to navigate or access data/documents/information?
5. Does the Web site provide links to the additional software to navigate or access data/documents/information? (e.g., Flash plug-ins, Acrobat reader)
6. Is the Web site designed based on a frame?
7. Does the Web site offer a text-only option for all pages?
8. Does the Web site offer options/instructions to enlarge texts or graphics?
9. Does the Web site offer information in language other than English?
10. Does the Web site offer glossary for the terms used in the site?

##### 2) Navigation

11. Does the first page of the Web site fit in your computer monitor (so that you don't have to scroll down to see the entire page)?
12. Does the Web site have a menu or subject categories?
13. Is the menu or subject categories located:
  - 13-a. On the top of the site
  - 13-b. Left side of the site
  - 13-c. Right side of the site
  - 13-d. Bottom of the site
14. Does the Web site have pull-down menus?
15. Does the Web site offer a site map/outline/index?
- 16-a. Does the Web site offer a search engine?

- 16-b. Does the search engine offer advanced search options?
- 16-c. Does the search engine allow for misspelled words?
- 16-d. Is the search engine located:
- 16-d-1. On the top of the site
- 16-d-2. Left side of the site
- 16-d-3. Right side of the site
- 16-d-4. Bottom of the site
- 17-a. Does the Web site have any kind of help (e.g., request form, FAQ, Help)?
- 17-b. Is the help located:
- 17-b-1. On the top of the site
- 17-b-2. Left side of the site
- 17-b-3. Right side of the site
- 17-b-4. Bottom of the site
18. Does the Web site offer links to explore an issue deeper?
19. Does the Web site offer external links on a topic to explore the issue deeper?
20. Do you have to navigate one level of depth (one click) to get to a particular topic?
21. Does the Web site provide an internal link(s) to navigate in the same page/document?
22. Does a single topic/document divide into multiple pages?
23. Does the Web site change the color of visited links?
24. Does the Web site have dead links (e.g., Page Not Found)?
25. Does the Web site have links to pages under construction?
26. Does the Web site enable users to go back to the home page (the site's first page) with one click?
- 3) Relationship**
27. Does the Web site end in ".asp" or a series of numbers or symbols?
28. Does the Web site offer the possibility of personalizing the first page?
29. Does the Web site recommend personalized options for the user?
30. Can you contact the Webmaster through:
- 30-a. Phone number
- 30-b. Fax
- 30-c. Mailing address
- 30-d. Anonymous email
- 30-e. Personalized email
- 30-f. Chat
- 30-g. Face time
- 30-h. Other (Specify)
31. Can you contact the company (the site owner including customer service) through:
- 31-a. Phone number
- 31-b. Fax
- 31-c. Mailing address
- 31-d. Anonymous email
- 31-e. Personalized email
- 31-f. Chat
- 31-g. Face time
- 31-h. Other (Specify)
32. Can you contact other Web user(s) through:
- 32-a. Message board
- 32-b. Mailing list
- 32-c. Chat
- 32-d. Newsgroup
- 32-e. Goody
- 32-f. Other (Specify)
33. Does the Web site allow users to send its page(s) to other user(s)? (e.g., "Send this page to your friend.")
34. Does the Web site offer newsletter via email?
- 35-a. Does the Web site allow users to input personal information?
- 35-b. Does the Web site allow users to view personal information?
- 35-c. Does the Web site allow users to update personal information?
36. Does the Web site invite the users to participate in a survey(s)?

37. After completing the survey, does the Web site offer feedback (e.g., result of survey) other than "Thank you"?

38. Does the Web site offer a calendar making capability?

39. Does the Web site solicit participants for a research study?

40. Log off and log in again. After the second interaction, does the Web site welcome users with a personalized message?

#### **4) Media Richness**

41. Does the Web site present information using video?

42. Does the Web site present information using audio?

43. Does the Web site present information using 3D animation?

44. Does the Web site have Virtual Reality capability?

45. Does the Web site have push media?

#### **5) Entertainment**

46. Does the Web site have a radio-like capability?

47. Does the Web site have a TV-like capability?

48. Does the Web site offer games?

49. Are the games played against:

49-a. the computer

49-b. other players

50. Does the Web site have quizzes that are not taken seriously?

51. Does the Web site allow users to send e-post cards to other users?

52. Does the Web site allow users to post messages with entertainment purposes?

53. Does the Web site include a list of links to entertaining sites?>

#### **Information Content**

##### **1) Comprehensiveness/Completeness**

54. Does the Web site contain information about products, such as:

54-a. Price/value

54-b. Quality

54-c. Performance

54-d. Components/contents

54-e. Availability

54-f. Special offers

54-g. Taste

54-h. Nutrition

54-i. Packaging/shape

54-j. Guarantees/warranties

54-k. Safety

54-l. Independent research

54-m. Company-sponsored research

54-n. New idea

55. Does the Web site offer comparison with other company's products?

##### **2) Currency/Timeliness**

56. Does the Web site have a date that information/site is last updated?

57. What is the date of last update?

##### **3) Source Credibility**

58. Does the Web site indicate:

58-a. Authorship

58-b. Attribution

58-c. Disclosure

58-d. Privacy policy

58-e. Disclaimer

##### **4) Marketing**

59. Does the Web site offer:

59-a. Cross promotions (e.g., banner ads)

59-b. Special offers

59-c. Sweepstakes

59-d. On-line orders

60. Does the Web site offer a list or maps of nearest retail stores that carry the company's brand?

61-a. Does the Web site offer a shopping cart?

61-b. Does the Web site enable users to add or drop a product in their shopping cart?

61-c. Is the shopping cart located:

61-a-1. On the top of the site

61-b-2. Left side of the site

61-c-3. Right side of the site

61-d-4. Bottom of the site

62. Does the site allow for more than one payment method?

63. Is the company's name or logo clearly visible on the first page of the Web site?

64. Is there similarity between the company's name and the site's URL?

### Design/Aesthetics

#### 1) Color

65. Does the Web site use the overall tone of

65-a. Warm colors

65-b. Cool colors

66. Does the Web site use:

66-a. A dark background and light letters

66-b. A light background and dark letters

67. How many colors were used in the first page?

#### 2) Font Type

68. Does the Web site use decorative font types (e.g, other than Times New Roman/Arial or equivalent)?

69. Does the Web site use all capital letters?

70. Does the Web site use reverse type?

71. How many typefaces does the Web site use?

72. How many type sizes does the Web site use?

\* The names of elements and dimensions were not displayed in the coders' code sheets in order to blind them to the research questions.

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