WEB DESIGN AND ITS IFLUENCE ON PERCEIVED INTERACTIVITY AND SITE EFFECTIVENESS

by

JI HEE SONG

(Under the Direction of George M. Zinkhan)

ABSTRACT

With the growth of the Internet, both managers and academics are interested in learning how Web design affects consumers' overall judgments and contributes to the achievement of e-objectives. This dissertation examines the following research questions: 1) what are the key features of Web design?, 2) what is Web-site interactivity and how is it perceived?, and 3) what are the relationships among Web-design features, perceived interactivity and Web-site effectiveness? Three related studies are presented in this dissertation.

Chapter 2 is exploratory and identifies key elements of Web design via depth interviews with Web designers. We identify five design principles and fifteen features that guide effective design. It is proposed that the concept of Web design can be broken down into three dimensions: 1) organization, 2) interaction, and 3) display.

In Chapter 3, we examine various definitions of interactivity discussed in the literature of marketing, advertising, and information systems. We create a classification scheme to illustrate different kinds of interactivity and provide consensual definitions of Web-site interactivity. Then, we identify key site features that contribute to interactivity

perceptions and subsequently affect site effectiveness. Specifically, we propose a conceptual model with 17 propositions addressing the relationships among Web-design features, perceived interactivity, and site effectiveness.

In Chapter 4, we test the third objective under a situation where consumers are chatting with an e-store. Grounded on key theories (i.e., social presence theory, service-waits literature, interactivity theory, social presence theory), our empirical findings suggest that clicks, response time, and message type are important antecedents of interactivity perceptions and site effectiveness. Applying cognitive control theory, we found that this relationship is moderated by different tasks (i.e., search, complaint). We also test competing theories examining the relationship between interactivity perception and site effectiveness. The findings imply that there is positive relationship between interactivity perception and site effectiveness.

Managing effective e-encounters becomes a crucial for attracting loyal customers and sustaining competitive advantage. In e-encounters, interface design (e-scape) is crucial success factor. We offer potential understanding of how consumers interact with e-scape and suggest ways to utilize e-encounters to accomplish firms' strategic goals.

INDEX WORDS: Consumer Behavior, Web Design, Interactivity, Telepresence, Social Presence Theory, Cognitive Control Theory, Service-waits, E-scape, E-service encounters, E-tailing

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DEDICATION

To my mom and two sons, Terry and William

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CHAPTER 1

INTRODUCTION

In the 21st century, Web sites serve as an important marketing tool (e.g., for enhancing customer attraction, delivering service, facilitating transactions). For example, recent research by TNS media intelligence shows that total spending on Internet advertising in the United States is expanding at a rapid rate, $5.7 billion in 2002, $6.1 billion in 2003 and $7.4 billion in 2004. Extant marketing research has investigated this medium as interactive communication channel (Hoffman and Novak 1996; Wendel and Dellaert 2005), an e-shopping (Wolfinbarger and Gilly 2003), Business-to-Business platform (Varadarajan and Yadav 2002), and a tool for customer relationship management (Pan and Lee 2003).

With an increasing number of companies taking advantage of the Internet, it is important to understand what makes some sites more effective than others. A recent study by Song et al. (2005) identifies site design is the second most important factor for shaping online shopping experiences (see Table 1-1). Web-site design is discussed as an important dimension contributing to overall site quality and to user satisfaction (Wolfinbarger and Gilly 2003; Szymanski and Hise 2000). Despite the potential importance of Web design in successful Web sites, this topic has received relatively little attention in the marketing literature. Here, we attempt to advance our understanding of Web-design features.

"Interactivity" is an unique feature of the Web. As technology evolves, there is a tendency for the interactive capabilities of the Web to be harnessed. For instance, Barwise and Farley (2005) find that Web site is the most commonly used interactive marketing tool in companies (e.g., public site, selling product, online chatting). Therefore, both marketers and Web designers are interested in how to build interactive Web sites. Here, we seek to expand our knowledge about Web-site interactivity.

What is the best way to enhance users' interactivity perceptions? What are key Web-site features that affect interactivity perceptions? Here, we create a model to explore the relationship among site features, interactivity perceptions and site effectiveness. Thus, there are five main objectives in the study.

1. To advance our understanding of **Web-design features**. Specific research questions include: What are key design principles (e.g., consistency, interactivity)? and What are key design features (e.g., font, search function)? The Chapter 2 addresses this objective.
2. To enhance our understanding of **perceived Web-site interactivity**. In particular, we investigate different kinds of interactivity and seek to provide consensual definitions of interactivity. Next, we investigate the way to increase the level of interactivity perception on Web sites. It is proposed that certain site features positively affect interactivity perception. Key design features that contribute to interactivity perception are identified. Chapter 3 addresses this objective.
3. To provide classification schemes to illustrate two emerging concepts: **1) Web design and 2) Interactivity.** Based on depth interviews with Web designers, the concept of Web design is broken down into four dimensions: 1) organization, 2)

interaction, 3) display, and 4) arousal. Extant literatures suggest that interactivity can be classified into three groups: 1) feature-based interactivity, 2) perception-based interactivity, and 3) combination of both. The Chapter 2 and 3 address this objective.

4. To understand **the relationships among Web-site features, interactivity perceptions, and site effectiveness.** We propose a conceptual model which includes 17 propositions by applying and adopting various theories (e.g., social presence theory, social cognitive theory, structuration theory, technology acceptance model). The Chapter 3 addresses this objective.
5. **To test some relationships identified under the objective 4**. Specific research questions include: 1) What are key design features affecting interactivity perception?, 2) what are the relationships between interactivity perception and various site effectiveness measures (e.g., purchase, loyalty, satisfaction, WOM)?, and 3) what are the roles of personal (e.g., desire for control, CMC anxiety) and situational variables (e.g., tasks) in these relationships? A lab experiment in the Chapter 4 addresses this objective.

Overall structure of the dissertation is shown in Figure 1-1 and research questions explored in each chapter are described in Table 1-2 with key theories.

Table 1-1. Important Dimension of E-shopping

Dimension	Percentage of Total
Price	**21.3%**
Product-related	**40.2%**
Product Selection	33.5%
Product Information/Quality	6.7%
Site Design	**20.8%**
Navigation	9.8%
Ease of Use	6.4%
Site Layout	4.6%
Brand Reputation of the Web site	**4.6%**
Fulfillment	**2.7%**
Privacy and Security	**9.1%**

* Based on 216 emails of consumers' experiences after shopping several sites

Justification for the Study

Key variables in this study (and their interrelationships) are illustrated in Figure 1-2. The key dependent variables are: interactivity perceptions (i.e., two-way communication perception, control perception), purchase, loyalty, satisfaction and WOM behavior. The major moderating and covariate variables are desire for control, CMC anxiety, and shopping motivations. Web design is defined as "all site features that are used to convey content on the Web." There are many kinds of key perceptions of Web sites. Here, we focus on interactivity and investigate the relationship among Web-design features, interactivity perception and site effectiveness.

Specifically, we focus on three stages following Mehrabian-Russell's Stimulus-Organism-Response framework (see Figure 1-2): stimulus (i.e., design features),

perception (e.g., interactivity, consistency), and response (e.g., customer satisfaction, word-of-mouth behaviors). In this context, stimulus (Web design element) causes some consumer response (behavior), mediated by consumers' cognitive state (interactivity). Chapter 2 and 3 examine the stimulus variables such as key design features, and probe variables related to the consumers' perception (i.e., interactive perception, five design principles). Chapter 4 is a lab experiment. The relationship among site features, perception, and behavior are tested. Some moderating variables and covariates are also considered. Three related studies are presented, each focusing on specific questions relating to the overall area of inquiry. Together, the three studies complement each other to provide triangulation in method and theory. The studies are outlined separately in the following sections.

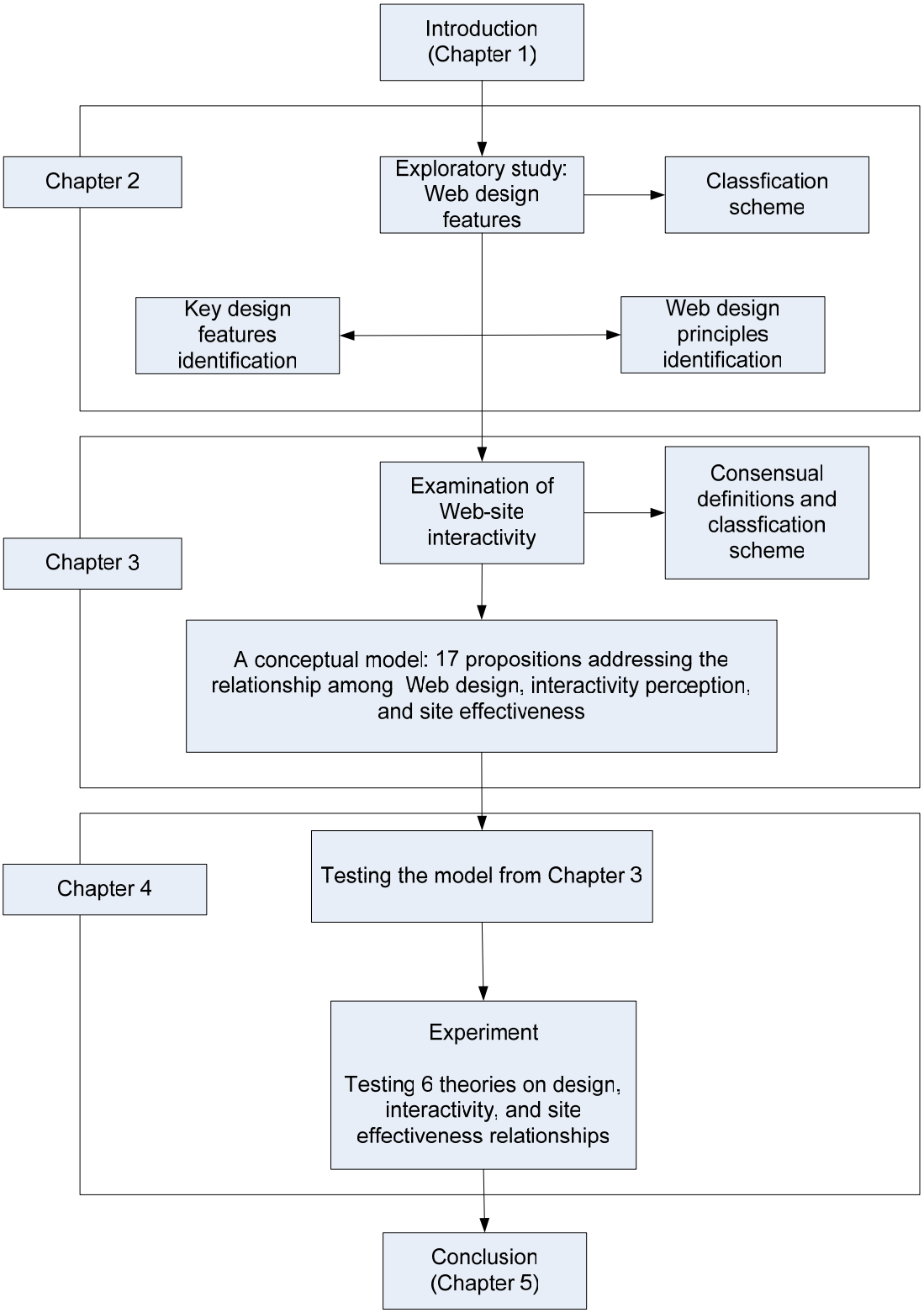

Figure 1-1. Overall Organization of Dissertation

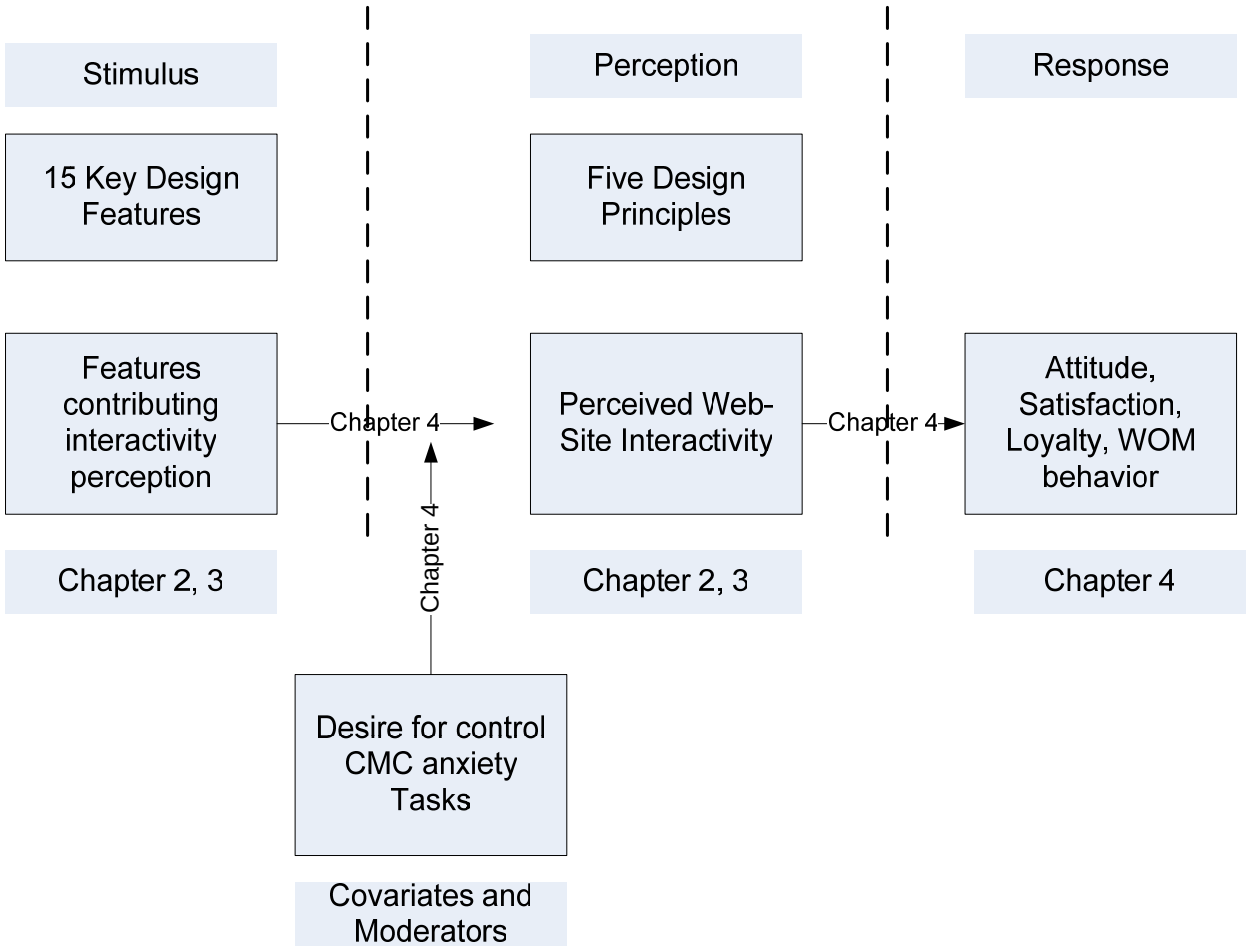

Figure 1-2. Variables and Their Interrelationship

Chapter 2: Exploring Web Design Principles

Although Web design is a critical success factor, our knowledge about Web design is relatively limited. Most studies have discussed Web design elements as predictors of site effectiveness or items to measure site quality. Very few studies have examined Web design itself. Here, we seek to understand Web design from practical point of view. Our objectives of Chapter 2 are three-folds: 1) to identify Web design principles (e.g., consistency), 2) to identify key Web-design features (e.g., menu, font), and 3) to provide a useful classification scheme of Web design elements. To address these issues, depth-interviews are conducted. We identify five design principles (i.e., consistency, efficiency, interactivity, artistic quality, information presentation) and fifteen design features.

What is better way to classify various design features? In traditional retail store research, Baker (1986) categorizes various store environment elements (e.g., temperature, color, music, other customers) into three groups: ambient factor, design factor, and social factor. However, little effort has been done in providing a classification scheme of Web design elements. Based on five design principles and fifteen design features identified in depth-interviews, it is proposed that the concept of Web design can be broken down into four dimensions: 1) organization, 2) interaction, 3) display and 4) arousal. The study's findings have important implications for researchers and managers. Two methods are used in this chapter: 1) in-depth interviews with seven Web designers and 2) qualitative analysis of these interviews.

Chapter 3: Conceptual Model of Web-Site Interactivity

In this chapter, we examine Web-site interactivity. First, we identify three different approaches (i.e., feature-based, perception-based, and combination of both) for understanding the concept of interactivity, and we suggest two consensual definitions: one is based on a feature emphasis, and the other is based on a perception emphasis. Feature-based interactivity is defined as the degree to which a Web site creates a mediated environment where participants can communicate with each other and modify forms and messages in real time. We define perceived interactivity as the degree to which users perceive that a Web site facilitates interpersonal communication, gives control over online experiences, and responds to human actions quickly.

Next, we examine relationships among Web features, interactivity perceptions and site effectiveness. Store atmosphere literature, social presence theory, social cognitive theory, and technology acceptance model are used as theoretical backgrounds in building a conceptual model and 17 propositions. In particular, we identify key site features (e.g., navigation, feedback functions) that contribute to interactivity perceptions and subsequently affect site effectiveness (e.g., loyalty, future purchases). We propose that individual characteristics and situational variables (e.g., involvement, desire for control, Internet experience, tasks) play important roles in the relationship between site features and interactivity perceptions. The main output of this chapter is a conceptual model with 17 propositions.

Chapter 4: A Lab Experiment on Web Features, Interactivity Perceptions, and Site Effectiveness

Overview

A lab experiment is designed to study how different Web-design features affect consumers' interactivity perception and site effectiveness. In particular, three Web-design features (i.e., click, message response time, message type) are considered. We focus on three dimensions of interactivity perception: 1) communication, 2) control, and 3) responsiveness. Site effectiveness includes attitude, loyalty, satisfaction, site quality, repurchase and word-of-mouth behavior. In brief, we seek to understand the relationship among site design features, interactivity perceptions, and site effectiveness. Questions about the role of personal characteristic variables (i.e., CMC anxiety, desire for control) and situational variable (i.e., tasks) are also raised.

Theoretical perspectives and hypotheses

In chapter 3, we define perceived interactivity as the degree to which users perceive that a Web site facilitates interpersonal communication, gives control over online experiences, and responds to human actions quickly. Perception-based interactivity consists of three dimensions: two-way communication, control, and responsiveness. We test how different Web-design features affect consumers' interactivity perceptions and site effectiveness. There are at least 20 site features that influence interactivity perception (consider Table 4-2). It is not realistic to test all features in one study. Therefore, we focus on three key features, which are strongly supported by three four key theories (i.e., telepresence theory (Steuer 1992), service waits literature (Taylor 1994), interactivity theory (Rafaeli 1998), social presence theory

(Short et al. 1976)). In our empirical setting, we use a communication scenario under different service inquiries (i.e., subjects send instant messages to an e-store asking a specific question). This setting is particularly appropriate in measuring interactivity perception (the scenario induces high level of communication) and site effectiveness (the scenario induces strong experience with the store). The four theories suggest three sets of hypotheses:

Based on telepresence theory,

H1-1: As the number of clicks required to reach a "Live Chat" button decreases, interactivity perception increase.

H1-2: As the number of clicks required to reach a "Live Chat" button decreases, Web-site effectiveness increase.

Based on service waits theory,

H2-1: As a store's response time to consumers' messages decreases, interactivity perceptions increase.

H2-2: As a store's response time to consumers' messages decreases, site effectiveness increases.

Based on interactivity theory and social presence theory,

H3-1: When sites send messages which are related to former messages and include a social presence cue, consumers' interactivity perceptions are enhanced.

H3-2: When sites send messages which are related to former messages and include a social presence cue, site effectiveness is enhanced.

We are interested in the relationship between interactivity perception and site effectiveness. Two theories (i.e., S-O-R framework, optimal stimulation level theory) predict different relationships.

H4-1: As interactivity perceptions increase, Web-site effectiveness increases (a linear relationship, based on S-O-R theory)

H4-2: Web-site effectiveness is greater for Web sites with moderate interactivity than for Web sites with a low- or high-interactivity (inverted-U relationship, based on optimal stimulation level theory)

We examine the role of situational variable (i.e., tasks) in the relationship among site features, interactivity perception, and site effectiveness. That is, are the effects of site features the same when consumers have different tasks? In our empirical setting, each subject is assigned to one of two tasks (i.e., search, complaining). Cognitive control theory (Averill 1973) suggests that under a stressful situation, consumers perceive that the situation more acceptable and controllable when they are given more information. Therefore, we hypothesize that,

H5-1: When messages are personalized (i.e., the message contains a social cue and is related to former messages), site effectiveness is greater for the complaining task (most stressful situation) than search task (least stressful situation).

H5-2: When messages are standardized (i.e., message contains no social cue and is not related to former messages), site effectiveness is lower for complaining task (most stressful situation) than for the search task (least stressful situation).

Two covariate variables are considered: 1) desire for control and 2) CMC anxiety. According to Burger (1992), people with high desire for control tend to seek more control in interacting with media, whereas people with low desire for control do not tend to process control relevant features/information, and thus, control features are not likely to make any difference for them.

H6: Desire for control is positively related to interactivity perception. That is, people with high desire for control are more likely to show higher perception of control on the site.

Computer-mediated communication (CMC) anxiety is also another factor affecting the relationship between interactivity features and interactivity perceptions. Liu and Shrum (2002) propose that people with high level of computer-mediated communication anxiety tend to avoid interaction in computer-mediated environment and less likely to enjoy two-way communication features (e.g., chat room) on the Internet.

H7: CMC anxiety is negatively related to two-way communication perception. That is, people with high CMC anxiety are likely show lower perception of interactivity on the site.

Design

The experiment employs a 2 x 2 x 2 x 2 between-subjects full factorial design (sample size = 336). A fictitious store is created for use in the experiment, and different Web pages (treatment levels) are constructed. Multivariate analysis of covariance is used to reveal main effects for the three independent variable (i.e., click, message response time, message type) and the interaction effects (e.g., task*message type). The dependent variables in the experiments are interactivity perceptions, attitude

toward the site, loyalty, satisfaction, overall site quality, repurchase behavior and WOM communications. Established scales are used to measure these constructs.

Contribution to Knowledge

Managerial Implications

Designing effective Web sites is critical for companies. By focusing on Web design, the current study provides a useful tool for evaluating and analyzing Web sites. In particular, our five design principles and fifteen key design elements may stimulate managers to evaluate their sites in new ways. Many companies invest their resources to build interactive Web sites to accomplish various e-objectives (e.g., satisfaction, loyalty). Our model gives a number of ways to increase interactivity perceptions. For example, we propose 20 different site features that may contribute to interactivity perception and test some of these features. We propose that interactivity perception serves as a mediator between site features and site effectiveness. This supports the argument that creating and managing interactivity is very crucial for marketers and e-tailers. Our model also suggests that Web designers and practitioners should consider the role of tasks (e.g., search, complaining) and personal characteristics (e.g., internet experience, desire for control) in the formation of interactivity perception.

Theoretical Contributions

Despite the increasing number of companies considering the Internet as an important marketing tool, much is yet to be learned about key concepts of this new medium: 1) Web-design features and 2) interactivity perception. The proposed study provides some useful tools for studying Web design and interactivity, and tests broad theoretical models and a wide range of variables that explain the relationship among

Web design, interactivity, and patronage behavior. We provide classification schemes of Web design and interactivity. Such classification schemes could be useful in variety of ways. First, they may provide a way to generalize findings from e-marketing studies. Very often, patterns of results vary and its is not clear whether or not this variations are due to difference in industry, difference in measurement, differences in variables in the study, and so forth. Second, such classification schemes conserve as foundation for future theoretical development (Hunt 2002). Third, such classification schemes would make future study and manipulation of the design interface and interactivity a more visible and manageable works (Baker 1986). The current study suggests some useful ways to measure interactivity and site effectiveness. For example, our model suggests a variety of measures for objective site effectiveness (e.g., repurchase, WOM behavior). By contrasting theories (e.g., social presence theory, telepresence theory, cognitive control theory) and presenting competing models (based on S-O-R theory and optimal stimulation level theory), we strive to enhance our knowledge about the relationship between design features and interactivity perceptions.

General Organization of the Study

As mentioned previously, this chapter presents the overall structure of the dissertation. An organizational summary of this dissertation is shown in Figure 1-2, and research questions explored in each study are presented in Table 1-2. The following chapters explain the key foundation of each three studies and generate detailed research questions and hypotheses.

Chapter 2 discusses Web design. Chapter 3 is designed to examine Web site interactivity perception and propose a conceptual model with 17 propositions examining

the relationship among site design features, interactivity perception, and site effectiveness. In particular, a lab experiment (chapter 4) is conducted to investigate the effects of three Web-design features on interactivity and site effectiveness. The dissertation concludes with a concluding chapter (chapter 5), integrating three studies and developing a framework for future research. Managerial and academic implications, limitations, and future research directions are provided in chapter 5.

Table 1-2. Research Questions and Theories

Chapter 2: Exploring Web Design Principles	Theories
● Understanding Web Design ● What are the Web design principles? ● What are the key Web-design features? ● What is a better way to classify different kinds of Web design elements?	Web Design Literature
Chapter 3: Conceptual Model of Web-Site Interactivity: A Literature Review	
● Focusing on perceived Web-site Interactivity ○ What are some efficient ways for classifying different kinds of interactivity? ○ What are the best consensual definitions of interactivity? ● Examining the relationship among Web-site features, interactivity perception and site effectiveness ○ What are the key Web-site features that contribute to interactivity perceptions? ○ How are interactivity concepts operationalized and measured? ○ What are the relationships among Web-site features, interactivity perception and site effectiveness?	Interactivity Literature Technology Acceptance Model Mehrabian-Russell's Stimulus-Organism-Response framework
Chapter 4: Lab Experiment on Web Features, Interactivity Perceptions, and Site Effectiveness	
● What are the key design features that contribute to the interactive perceptions (i.e., two-way communication perception, control perception) and subsequently affect site effectiveness (e.g., satisfaction, loyalty, WOM) ● What is the relationship between interactivity perception and site effectiveness (i.e., linear, inverted U)	Telepresence Theory Interactivity Literature Service Waits Literature Interactivity Theory Social Presence Theory

● What are the role of some personal variables (i.e., desire for control, CMC anxiety) and situational variable (i.e., task) in these relationships?	S-O-R Theory Optimal Stimulation Level Theory Cognitive Control Theory

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CHAPTER 2

EXLPORING WEB DESIGNE PRINCIPLES: INTERVIEW WITH DESIGNERS

Introduction

The notion of “design” is very crucial for many marketing activities. For instance, we design advertisements, products, corporate logos, and other things. As Web sites play important marketing tool in organization (e.g., customer attraction, service delivery, word-of-mouth marketing, transaction), organizations are more and more interested in the concept of Web- design. To date, there is considerable research to examine the relationship between various Web design elements (e.g., navigation, speed) and site effectiveness (e.g., satisfaction, loyalty, intention to revisit) or site quality. For example, Web design has been considered as an important factor contributing to site quality (Wolfinbarger and Gilly 2003), satisfaction (Szymanski and Hise 2000), and repeat visits (Palmer 2002). Although Web design is a critical success factor, our knowledge about the topic is relatively limited. Most studies have discussed Web design elements as predictors of site effectiveness or items to measure site quality. Very few studies have examined Web design itself. For example, Rosen and Purinton (2005) develop a Website Preference Scale to evaluate effective Web design. Here, we seek to understand Web design from practical point of view. As discussed in Song et al. (2005), a consumer-based view does not provide a complete understanding of Web design since consumers are likely to be influenced by limited aspects of design (e.g., navigation, easy to use, functionality). Specifically, we are interested in identifying a set

of design principles and design features that guides Web-site design. Conducting depth interviews with seven Web designers, we identify five design principles (e.g., consistency, interactivity) and fifteen key design features (e.g., speed, font, menu).

Following the traditional store-design literature, Baker (1986) classifies various design features (e.g., music, smell, other customers, light) into three groups (i.e., ambient, design, and social factors). In the same way, some studies (Kim et al. 2002; McKinney et al. 2002) in IS (Information Systems) literature seek to categorize various Web-design features into several groups. For instance, Kim et al. (2002) suggested three dimensions (i.e., firmness, convenience, delight) of site features based on the architectural literature. However, in marketing, little progress has been made in classifying Web-design features. Here, based on five design principles identified in the qualitative interviews, we seek to classify key design features into four groups, and provide a useful classification scheme. This classification scheme is evaluated using the Hunt (2002)'s five criteria.

Therefore, our objectives of this chapter are three-folds: 1) to identify Web design principles (e.g., consistency), 2) to identify key Web-design features (e.g., menu, font), and 3) to provide a useful classification scheme of Web-design elements. We first review relevant marketing, advertising and IS literatures. Following this review, issues related to data collection and analysis procedures are presented. Five design principles and fifteen key design feature are identified and used for classifying design features into four groups. Managerial and research implications are discussed in the final section.

Research on Web design

Web-site design or site interface have been discussed in the Marketing, IS, and advertising literatures. Often, Web design has been examined as a predictor of system effectiveness (e.g., satisfaction, intentions to purchase, loyalty) or as a measure of Web-site/system quality. Table 2-1 shows key design elements that affect Web-site effectiveness (e.g., e-satisfaction, Web quality). Some studies have identified key site design features that influence site effectiveness such as satisfaction (Szymanski and Hise 2000; Palmer 2002; Muylle et al. 2003), effective B2C site (Ranganathan and Ganapathy 2002), and attitude toward the site (Childers et al. 2001). For example, Szymanski and Hise (2000) suggest that Web design (e.g., unclutter screens, fast presentation) is a predictor of e-satisfaction. In contrast, other studies have focused on measures for evaluating Web site such as eTailQ (Wolfinbarger and Gilly 2003), e-service quality (Zeithaml et al. 2004), and Web-site quality (Aladwani and Palvia 2001; Loiacono et al 2002; McKinney et al. 2002). In these studies, Web-design features are considered important items/dimensions of measuring site quality/e-service quality. For instance, visual appeal and response time are found important constructs to measure Web-site quality (Loiacono et al. 2002). Table 2-2 summarizes most frequently discussed design features in past research. These include 1) navigational structure (e.g., links, site structure, search function), 2) response time (e.g., speed), 3) aesthetic design (e.g., visual appeals, look-and-feel, use of image), and 4) personalization function (e.g., customized language). Each dimension is discussed in the following section.

Table 2-1. Key Web design Elements Discussed in Literature

Authors (Year) *Publication*	Dependent Variables/Measures	Key Design Elements	
Szymanski and Hise (2000) *Journal of Retailing*	e-Satisfaction	Unclutter screens, Easy search paths, Fast presentations	
Liu and Arnett (2000) *Information and Management*	Web Site Success	Links, Help function, Customized search engine, Speed, Order tracking function, Balanced payment method, Customized information presentation	
Huzingh (2000) *Information and Management*	Web Design	Navigation structure, Search function, Protected content, Quality of structure, Image, Presentation style	
Barnes and Vidgen (2001) *International Journal of Electronic Commerce*	Web Quality	Aesthetics (attractive appearance, audio-visual experience), Navigation	
Aladwani and Palvia (2001) *Information and Management*	User-perceived Web Quality	Navigation, Valid links, Search facilities, Personalized function, Speed, Font, Color, Multimedia features, Look-and-Feel (attractive, organized)	
Childers et al. (2001) *Journal of Retailing*	Online shopping attitude	Navigation	
Loiacono et al. (2001) *AMA Proceedings*	Web Site quality	Navigation, Response time, Visual appeals	
Lynch et al. (2001) *Journal of Advertising Research*	Site quality	Search Engine, Pictures, Graphs	
Yoo and Donthu (2001) *Quarterly Journal of Electronic Commerce*	Site Quality	Speed, Aesthetic design (colorful, creative, use of good pictures)	
Ranganathan and Ganapathy (2002) *Information and Management*	Effective B2C site	Easy of navigation, Speed, Visual presentation aids (e.g., graphic, audio, video)	
McKinney et al. (2002) *Information Systems Research*	Web-System Quality	Access	Responsive, Loads quickly
		Usability	Simple layout, Easy to use, Well organized, Visually attractive, Fun, Clear Design

		Navigation	Adequate Links, Clear description for Links, Easy to Locate, Easy to Go back and forth, a few clicks
		Interactivity	Customized product, Search Engine, Create list of items, Change list of items, Find related items
Kim et al. (2002) *Information Systems Research*	Metrics for Architectural Quality	Firmness	Link structure, Loading time
		Convenience	Information searching, Convenient order processing
		Delight	Screen layout, Navigation, Communication interface (e.g., chat room)
Palmer (2002) *Information Systems Research*	Satisfaction, Likelihood of Return, Frequency of use	Speed, Links, Layout, Arrangement, Sequence, Customization, Feedback function	
Wolfinbarger and Gilly (2003) *Journal of Retailing*	eTailQ	Navigation, Information search function, Appropriate personalization, Product selection	
Muylle et al. (2003) *Information and Management*	Web Site User Satisfaction	Layout, Ease of use, Structure, Hyperlink Connotation, Speed, Language Customization, Entry Guidance	
Zeithaml et al. (2004) *MSI Report*	e-Service quality	Easy to find, quick transaction, well-organized site, fast, simple, well-organized information	

Table 2-2. Summary of Key Design Features Discussed in Sixteen Papers

Design Elements		Number
Navigational Structure	Navigation	8
	Search (search function, easy to use)	7
	Layout (site organization)	6
	Links (valid, adequate)	6
Response time (e.g., speed)		11
Aesthetic Design	Visually appealing (attractive)	5
	Use of image/pictures	2
Customization function		6

Navigation: Navigation is an important design element, making the information easier to find. According to Nielson (2000), navigation interface needs to answer three basic questions: Where am I?, Where have I been?, and Where can I go? Navigation includes various elements such as links, layout, and searching function. For example, Mckinney et al. (2003) suggest that links are most important in navigation. They measured "navigation" construct with items such as "adequate links," "clear description for links" and "easy to locate." Palmer (2002) suggests that navigation is associated with layout, sequencing and arrangement. According to him, navigation is defined as well organized layout and consistent navigation protocols. Searching function is a key element in navigation (Szymanski and Hise 2000; Aladwani and Palvia 2001; Lynch et al. 2001;

Wolfinbarger and Gilly 2002). Although some consumers find the information or product with browsing menu or links, most of consumers are likely to find the information as fast as possible. Web page is more independent than print publication in terms of going directly to the specific information without reading preface.

Response time: Many researchers have discussed that response time (speed) is a critical design element affecting site (or system) quality (Aladwani and Palvia 2001; Loiacono et al. 2002; Ranganathan and Ganapathy 2002; Yoo and Donthu 2001; McKinney et al. 2002; Kim et al. 2002) and user satisfaction (Palmer 2002; Muylle et al. 2003). According to Nielsen (2000), response times should be as fast as possible, and ten seconds is about the limit for keeping the users' attention focused on the task. However, speed depends on the eyes of users, not system itself. For example, Muylle et al. (2003) define "speed" as the degree to which the user perceives the site to be slow or fast. Some studies measure speed in terms of site responsiveness (Yoo and Donthu 2001; McKinney et al. 2002). They define speed as the promptness of online processing and interactive responsiveness to a consumer's requests.

Aesthetic Design: Many Web sites are using visual presentation aid such as pictures, animation, video, and music to attract customers and users. Specifically, graphic image is very important for B2C sites selling aesthetic products such as cloths (Yoo and Donthu 2001; Ranganathan and Ganapathy 2002). Just as overall store atmosphere is important for traditional store, general look-and-feel of sites is critical design element of Web sites. Many studies suggest that overall look-and-feels such as attractive and organized (Aladwani and Palvia 2001), colorful and creative (Yoo and Donthu 2001),

and consistent and fun (McKinney et al. 2002) are important elements of Web-site quality.

Personalization function: Web site's ability to provide a personalized, customized function is important in terms of differentiating product and service offerings (Palmer 2002) and improving site quality (Aladwani and Palvia 2001; Wolfinbarger and Gilly 2003). Often, personalized function is considered an important dimension of interactive Web design. For example, Palmer (2002) suggests that interactivity includes the ability to customize the site's look, feel, and content. Effective shopping carts design (e.g., ability to change items from a shopping cart) and site's capability to create a customized product are important elements affecting interactivity perception of Web sites (Muylle et al. 2003).

Method

Long structured interviews that focused Web design were conducted with seven Web designers. Depth interviews are preferred methodology when the project demands intensive probing of respondents, or reactions to ideas without influence from peers (Mariampolski 2001). The participants were all Web designers who were designing and managing one or more site. Five designers are working to create and update organizational Web sites. The others work in Web design companies and are involved in designing various Web sites (e.g., hospital, academic institution, e-commerce). Although seven appears to be a small number, a review of transcripts of seven interviews indicates that ideas presented in these seven interviews are pretty much saturated and no new information would be collected with further interviews. Furthermore, Patton (p.245) suggests that the validity, meaningfulness, and insights

generated from qualitative inquiry have more to do with the information richness of the cases selected than with sample size. Snowball technique was used to recruit interview participants. Snowball technique is an approach for locating information-rich key informants or critical cases (Patton 2001, p 237). This process begins by asking well-situated people: “Who knows lot about ____ ?” Therefore, each participant nominates next participants.

The interviews were characterized by a combination approach of standardized open-ended interview and think-aloud protocol interviews. In structured open-ended interviews, all interviewees were asked the same basic questions in the same order. However, it suffers from little flexibility and naturalness in relating to the particular individuals and circumstances (Patton 2001, p 349). Specifically, without being exposed to particular Web sites, it may be limited to elicit participants’ thoughts or experiences about Web designing. To overcome these shortcomings, we applied think-aloud interviewing approach which seeks to elicit the inner thoughts of participants during the performance of a given task. Think-aloud method has been used a lot in information systems research, particularly for usability studies (e.g., Benbunan-Fich 2001). The advantage of this method is that since the participants think aloud when interacting, lots of points that the participants would not remember in ordinary interviews can be found in this session. Therefore, first, participants are asked to answer pre-determined questions about Web design. Then, they logged on several Web sites and were asked to provide their opinion about specific sites.

The author conducted all interviews personally. All interviews took place at the organization where each participant is working. The length of the interviews is about

one-hour. Each interview was conducted in a private office or quiet place with only the participant and the research present. The interview began by obtaining background information about the participants (e.g., background, job) and sites they are designing (e.g., objective of sites, main users). Following these, general questions about Web design were asked such as “What is Web design?” and “What is the relationship between Web design and Web-site effectiveness?” In these open-ended questions, participants provided their general thought/philosophy of Web design. After these phases, participants logged on several Web sites including ones they designed. They were asked to list key design elements and to discuss principles they consider in Web-design. Specifically, participants were asked to speak aloud each and every thought that entered their mind as they performed tasks relative to navigating various Web sites.

All interviews were recorded on tapes. Each interview was transcribed by one person. Following MCracken (1988), five-stage process was used for data analysis. First, from the seven transcripts, we eliminated materials that are not relevant for our research questions. In the second and third stages, we developed the meaning of interviews based on each transcript, researchers’ own understanding and in relation to other observations/literature. Then, we find any patterns or themes in each transcript. In our case, design principles and key design features were identified in this stage. Finally, by taking all themes in each interview, we subject them to a final process of analysis and suggest general patterns or themes in our research questions.

Table 2-3. Five Design Principles: Definitions and Descriptions

Principles	Definitions	Descriptions
Consistency	1) Cognitive consistency: the consistency in what the user knows. 2) Display consistency: the consistency in the layout of screen display.	1) Consistent use of font and color 2) Consistent site structure in every page 3) Consistent look-and-feel in every page 4) Same menu in every page
Efficiency	The relation between (1) the accuracy and completeness with which users achieve certain goals and (2) the resources expended to achieving them.	1) Site structure, menu, and site map: easy to navigate and easy to find information 2) Organized links 3) Loading time: fast 4) Search function 5) Go back function
Interactivity	The extent to which a site and users respond to, or are willing to facilitate each other's communication goals.	1) Feedback function (e.g., email links) 2) Customized functions: choices (e.g., language, font) 3) Information collection (e.g., use of cookies) 4) Unrestrained navigation: search function, clickable links, site map 5) Speed
Information Presentation	The extent to which text and writing style are readable, logical, and concise enough to inform consumers properly of contents.	1) Readable information (e.g., writing style, relevant language, font size) 2) Same information exist once 3) Logical information placement (how to read) 4) Links: appropriate amount of links and information on the front page
Artistic quality	The extent to which a site has visually appealing design elements and is professional looking.	1) Balanced use of picture and image 2) Look-and-feel: professional looking 3) Use of font, color, picture and image: visually appealing, professional looking

Results

The major objective of depth interviews in our research is finding key elements or principles in design process. We discover five design principles (i.e., consistency, efficiency, interactivity, artistic quality, information presentation) and fifteen key design elements (e.g., font, color, site map) from seven interviews. Based on these findings, a framework that classifies various Web design elements is developed. It is proposed that Web design can be broken down into four basic dimensions (i.e., organization, interaction, display, arousal).

Web design Principles

Five design principles are identified. The definition and description of each principle are shown in Table 2-3. Each principle is discussed in the following section.

Consistency

It has been shown that increasing level of interface consistency in computer system or Web site results in reduction of task completion time and errors, and subsequently increases in user satisfaction (Tanaka et al. 1991; Nielsen 1993; Ozok and Salvendy 2000). Tanaka et al. (1991) classified two different kinds of consistency of Web-sites' interfaces: 1) cognitive consistency and 2) display consistency. Cognitive consistency can be defined as the consistency in what the user knows. Display consistency can be defined as the consistency in the layout of screen displays. For example, if a site provides design functions that user expects based on prior experience on the site, the site has cognitive consistency. If a Web site has different look in every single page, it is against display consistency. In the interviews, both cognitive and display consistency are found as important principles in designing successful sites:

Other things I'll mention, it is important to incorporate a logo and top left is a common place in terms of consistency, it's important that you design the site, even though you want to be creative to some degree, you also want to stick some standards that are constantly developing because people get used to working with a website a certain way. If you have to try and re-teach them to use the web every time they go to your site, a lot of people are going to become frustrated, aren't going to be able to navigate as easily. So certain standards like the logo on the top left, keeping the page width, so that those monitors can view it without having to scroll sideways (participant #7).

I am surprised that the look and feel changed from this to this. It is a combination of different looks that really clutters up everything. When you click around, the basic layout should be kept. So cohesiveness and consistency is one principle (participant #1).

When you look at the main page, it's like, wow this is a new and fancy and you have all this nice navigation, very professional looking and then you go to the second page, which the design is totally different (participant #2).

As seen in several designers' narratives, maintaining consistent look-and-feel in each page of a site is very important for users' experiences with a site. In some cases, a corporate/organizational site is managed by different departments since each department has a different look and probably wants their own identities. However, as participant 4 mentioned, "what's most important is the user experience." Inconsistent look-and-feel makes users harder to use. Sometimes, inconsistent function of design features increases the need for users to rethink and remember. For instance, as seen in the following narratives, it is very confusing that same features (e.g., links, picture) have different meaning or function:

You have a lot of pictures, but I don't see the links very well. Well that picture's a link, but this one is not. That's very confusing…you would think that if one picture is a link they should all be links (participant #2).

…..I can't tell what's a link and what's text because there's some bold here. That's a link, but these links aren't bold, these are headings and they are not links. Here again, you've got bold and non-bold but doesn't really indicate anything. So that's inconsistency (participant #6).

According to Nielsen (1993), consistent interface design means the same information should be in same location on all screens. Compared with traditional printed media (e.g., newspaper), Web users can start at any point, depending on the information they are looking for. Therefore, site structure or navigation system (e.g., menu bar) should be same format in same location in each page:

…..redundant links are important and also making sure that the links, the navigation that you have is in an obvious place and that it stays on the same place every time and you'll notice this menu never changes from page to page…these buttons up here, every page you go to the buttons change, the navigation changes, you don't really know where you are in the site (participant #6).

I think navigation having a really clearly laid out navigation such that when you click on a link or navigation bar the entire navigation bar on the new page is not completely different. I think consistency. It's really confusing when you jump to a new page and the entire navigation structure changes and the links available to you are completely different (participant #5)

Efficiency

The second principle addressed by designers is efficiency. Efficiency is defined as the relation between (1) the accuracy and completeness with which users achieve certain goals and (2) the resources expended to achieving them (Teo et al. 2003). That is, though a Web site provide functions the users need to do their tasks, a Web site cannot achieve efficiency unless it is not easy to use (Goodwin 1987). According to Technology Acceptance Model (Davis 1989), ease of use is an important element in predicting system use. As a participant pointed out, Web-site users already have objectives (e.g., searching information, transaction) in mind when they come to the site. Therefore, it is important to design a site that helps them easy to find their way or fulfill their jobs:

And I try and design without too much clutter. Because I think the people already have an objective in mind when they come to any Website and the more content there is, the more things there will be on the site because you have to capture it all somehow. The biggest quest is to be able to help the user who already has something in mind when they get there, get what they want as fast as they can. One of the most important elements is probably getting a search box where they are going to notice it quickest. Even watching myself using websites, the more experienced people have on the web, the quicker they go to search and type in what they want to save having to go through all the navigation bars (participant #4).

I don't really care so much what a website looks like in terms of color and font, as long as its readable and I can easily get the information I want (participant #5).

Let's see this jump menu, this is a great idea, because it lets you usually jump to the main categories, seems helpful……I went to this one section, I'm not sure how to get out to, maybe I just click here, no that's not a link. This is a little confusing, I would just like to jump over to one of the other sections. One of the problems with flash is the back button, it doesn't always work (participant 7).

Important design features to make users easy to find information include 1) site/links structure, 2) menu (navigation) system, 3) search function, and 4) site map. Site structure and menu system are related to organization (how the information of a site is organized), whereas search function and site map are related to users' control (the extent to which users can move from one page to the other page with minimum efforts, unrestrained navigation). For example, search box should be located in prominent place, and links and menu should be well organized:

I think the search box should probably be placed more prominently, a lot of people miss those (participant #1).

My search function should have been on the top. You should be able to search immediately on the top of your page (participant #3).

…they've got all these links over here, these are blue on black, hard to read, they're not in any organized kind of manner, they don't mean anything to me (participant #6).

However with this site the focus was on presenting a lot of information but doing it in a way that is easily accessible. In this example, we have the links broken up into two categories, two main categories. We have these six links mainly for the bottom, but then we have these quick links at the top… (participant #7)

Left links, seem good, but again, I just wonder if the navigation could be a little bit better, especially since there's so much information, it seems like a little bit more one tiered, you click here, go places, then you have to do a lot of scrolling versus having sub-content immediately available would be nice (participant #7).

Efficient site design will make users take little effort to find information or fulfill their jobs. For example, Zeithaml et al. (2004) suggest that efficient sites minimize the amount of information to be input by the customer. As shown in following narratives, there are maximum numbers of clicks or seconds that uses are willing to spend to get information. If a user needs to spend more than that, he/she will leave the site. In the same way, the least amount of stuff users have to type over and over again, the better.

On e-commerce sites, if I have to click 5 times to get to a page I'm looking for, I'm probably going to leave. I don't have that much patience. So it better be easy to get to the information I am looking for (participant #6).

People have three seconds to get the information, or you have 3 seconds to have somebody to log onto your Web page and to this is what I want, and to click on a link and go somewhere else. If they can't find it quickly, they will go away usually, unless it's a very particular thing they are looking for (participant #2).

Ease of shopping, the ability to add things to your cart, how easy it is to check out, and how easy it is to change shipping or billing information if you made a mistake without having to start all over, and I've seen some sites where you have to start over. As a matter of fact, yesterday I was shopping on an e-commerce site, and I didn't have an account, so I added stuff to my cart and I started going through the account process and I realized, oh, no, my shipping address is wrong. There wasn't an option to edit it, but I went back to the shopping cart, I deleted it out, added it back, went back through the process (participant #6).

Interactivity

Our interview results reveal that interactivity is a key design principle. There are many ways to define interactivity. According to Ha and James (1998), interactivity is defined as the extent to which communicator and the audience respond to, or are willing

to facilitate each other's communication goals. Research indicates that there are three features of interactivity: 1) control/choice (Cho and Leckenby 1999), 2) reciprocal communication (Rafaeli 1988), and 3) speed (McMillan and Hwang 2002). According to Cho and Leckenby (1999), with interactive media, users can manipulate and customize the messages by alternating colors, shapes, graphics, sounds, and order to message content. Also, users have more control over the messages. They can select, search, and modify the content of a site. These are found as important design elements in our interviews:

You put the text in there and then with style sheets you can give the user a little more control over the font size, although a user could always go to text size, but if it's been hard coded to a certain pixel size, some browsers don't allow you to change it. But it is good to be able to allow the user to be able to change the size, especially if the people can't see all that well (participant #4).

On the Web, if you purposely go and visit a coca-cola site, and there's a little piece of information that makes you curious, you could also go to a search engine and look that up. So I think with the Web it gives you more of an opportunity to do more research. And I think as a result, the consumer, whether it's looking for a school to attend or something to buy, are much more educated today than they were five years ago (participant #1).

You have to have a process in place that makes it easy for someone to either update their own website or you could do it quickly (participant #1).

We built in different features, smart features that allow customers to go and find specific things that they are looking for rather than rely solely on the navigation to get what they want. Give them multiple options to access the information (participant #7).

To achieve reciprocal communication, a site should know about its audience. According to Ha and James (1998), with more information about audience, an organization can tailor messages to the interests and prior knowledge levels of the audience. On the Web, this information collection can be more advanced than traditional media using various methods such as registration and cookie files:

You can put it on your server and when a computer requests your page, there's information sent in that. They say what kind of computer it is, whether it's a pc or mac, what browser they're using, and where they are going to and when they come into your site they show where they go to. So they started here, then they went here, then they went here, then they left. But you can find out mainly why are they coming to your site, what do they want, and how fast is their, not how fast is their connection, but what browser are they using, which is a huge issue, because the pages display so differently on every browser (participant #2).

Other important features that facilitate reciprocal communication are feedback functions (e.g., email links, chat room, bulletin board, contact information) (McMillan 2000).

Well that link down here called feedback goes straight to me and I save them. I saved some of my email, its hard to share some of them, some of them were really rough (participant #3).

I'll point out that at the bottom of every page, we put the phone number and two ways to contact. One is a feedback form that I showed you previously, the other is a contact link that lists all the main contacts, phone numbers, another way for people quickly find who they are looking for (participant #7).

Information presentation

Information presentation emerged as a design principle in the interviews. Information presentation principle is defined as the extent to which text and writing style are readable, logical, and concise enough to inform consumers properly of contents. (Nielsen 2000). Designers should develop or revise content specifically for Web use and involve real users in design process (Nielsen and Tahir 2002). To make Web pages readable, designers consider how their main target users read the content of page, what kinds of languages they are familiar with, and what kinds of font and colors they are comfortable with:

Designers need to be very sensitive to how do people read and I think that came from newspaper design, for me it did. That whole, it was just like the little light bulb went over my head to say you've got a page of print, you've got, you literally have to get eyeballs from the top of the page to the bottom of the page. And you read the information this

way and Beth down the hall, the faculty, staff, reads the information this way, so this website, in a way want to offer all sorts of way how would you, what's the easiest way you find information (participant #3).

I see academics, but that word is tailored toward academics not toward students. The major problem with most educational websites is that their main audience is students but their language is for academics (participant #6).

I don't really care so much what a website looks like in terms of color and font, as long as its readable… (participant #5)

I think the other thing I chose was a font that was easily legible and could be changed. So if you go into, you could change the size of this, increase or decrease (participant #1).

Users rarely read Web pages word-by-word. They will look over the pages and find information they want. Therefore, presenting information concise and objective is very important in terms of writing style. For example, as several designers mentioned, sometimes it makes users too overwhelmed if there are so many information or links on pages:

It's okay to have a whole bunch of different ways to get to one piece of information but it's essential to only have that information to exist once. So no matter how many ways you can get to it if you have that same information loaded somewhere else in two or three places, its going to get confusing (participant #5).

We have a lot of people that want to build sites that try to put too much text on the front page. Or they will have thirty links that they want on the front page, so we have to help them target down. You know the rule with seven plus or minus two, so that's the rule that we have to educate people about (participant #6).

The text, we gave the client guidelines of how many words to use because clients do tend to make the text too heavy on the home page. A lot of people don't realize too. It's very different from print design where you design a brochure, have a lot of information there, because people read at their leisure. On the Website people tend to be a lot less patient, they just want to get on there, find the information they need, maybe read a sentence here and there, but they tend not to read everything that's out there, especially if there is big blocks of text, then they skip right over it, so we tried to keep the content

short and include a nice picture that conveyed happiness, safety, a place to come and heal, feel better (participant #7).

Artistic Quality

The last principle identified in our research is artistic quality. However, most designers suggested that artistic quality is next to efficiency and information presentation principles. For example, one participant said "…then the visuals are next, you want it to look nice, but if looking nice affects functionality, then you have to back off of looking nice." Artistic quality principles include two sub elements: 1) overall look-and-feel and 2) attention (visual appealing). Overall feeling of Web users has been discussed as important predictor of site quality (Aladwani and Palvia 2001; Yoo and Donthu 2001; McKinney et al. 2002). Specifically, it is found that conveying balanced and professional look is very important for attracting and satisfying users (customers). As participant 1 pointed, overall looking of a brand or company's Web site is key factor affecting customers' overall satisfaction to the company/brand:

You know Coke has been around since 18 century or something. Like you said, you probably have brand loyalty with coca-cola since you were a child. So their website isn't going to make much of an impact. But with a new product, I think the game has changed. If you don't satisfy the customer by providing information or looking professional, then the chances of that new brand or new item becoming successful, I think, has real roadblocks than somebody who has already a 100 year old established brand (participant #1).

I like the fonts they choose here. I think typography is very important when you are trying to convey a professional image along with every other design element. I think it looks crisp and professional (participant #1).

Extant research on Web-site quality and design suggest that visual appeals is very important in getting users' attention (Yoo and Donthu 2001; Ranganathan and Ganapathy 2002). We found that use of graphics/image and color are good for getting attention of users:

Many websites will use, because I think it needs a good photo, or something nice and appealing graphically on the site. Even if it were in something like this, but with other things around it to do away with these logos, I think it could be more effective. You always need something graphically appealing (participant #4).

I like their graphics, I like their round edges, it's a little, it has got a fresh look because the fonts are nicer, but it's no really flashy either (participant #5).

Even if that image was the only thing you saw, you could get a sense of what the story is, from beginning to the end. So by mixing photographs, for example, last week we choose a student from Clark Central, elementary school student. Then we mixed the paint, scientific images in the background, with the student in the foreground because the story was using art to explain science (participant #3).

Color wise, there a pretty good use of colors, soft blues are comforting, friendly, and this peachy color that's calming, easy to look at, a still somewhat calming feeling, probably good for a health care website such as this (participant #7).

Key Web-design Features

In exploring important design principles, at least fifteen key design features are identified. Fifteen features and their illustrative examples are shown in Table 2-4. These include font, color, look-and-feel, image/pictures, site structure, menu, links, site map, speed, search function, legible text, information placement, feedback function, cookie, and choices. We compare the set of features identified in our study with others that have emerged in the extant literature. As mentioned in the literature review section, the key design dimensions mentioned in prior research include (1) navigation, (2) response time, (3) aesthetic design, and (4) personalization function. In our research, these dimensions emerge as key elements in Web design. In addition, our results show that information presentation features (e.g., font, writing style, language, information placement) and feedback function are important in Web design.

Table 2-4. Fifteen Key Design Features and Illustrative Examples

Key Design Features	Illustrative Examples
Font	Font size (easy to read), consistent use of fonts, visually appealing fonts
Color Scheme	Consistent use of color, use of visually appealing and professional looking color
Look-and-Feel	Consistent look-and-feel, balanced look, professional look
Site structure	Consistent site structure, organized structure, easy to navigate a site
Menu system	Same menu in every page, easy to navigate menu
Links	Organized links, interactive links (connect to interesting pages), appropriate amount of links
Site map	Presence of a site map
Speed	Fast loading, quick response
Search function	Presence of a search function, placed in prominent place
Legible text	Writing style- easy to read, use of customized language
Information placement	Concise and objective information, Logical information placement
Use of Images/Pictures	Visually appealing images/pictures, balanced use of text and images
Feedback function	Email links, contact information, bulletin board, chat room
Cookie	Use of cookie for collecting customer information
Choice options	Customized option (e.g., choice of language, choice of font)

Classification of Key Web-design Features

Studies of Web design have considered a large number of elements including response time, site map, search function, color, links and pictures. What is better way to classify various design features? In traditional retail store research, Baker (1986)

categorizes various store environment elements (e.g., temperature, color, music, other customers) into three groups: ambient factor, design factor, and social factor. However, little effort has been done in providing a classification scheme of Web design elements. Classification schemes play a fundamental role in the development of a discipline in that they are the primary means for organizing phenomena into classes or groups that are amenable to systematic investigation and theory development (Hunt 2002, p 222). Some studies (e.g., McKinney et al. 2002; Kim et al. 2002; Liang and Lai 2002) attempt to categorize Web-design features into several groups. McKinney et al. (2002) suggests there are four categories under Web design: 1) access (e.g., loading time), 2) usability (e.g., site structure), 3) navigation (e.g., links), and 4) interactivity (e.g., search engine). Liang and Lai (2002) have divided online store design elements into three groups: 1) motivator (e.g., search engine), 2) hygienic (e.g., security), and 3) media richness (e.g., chat room). While dimensions of Web design have been described, a definition and comprehensive framework that classifies these dimensions have not been developed. Here, we seek to provide better way to classify key design elements. For purpose of this, Web design is defined as “all Web-site features that are used to convey content on the Web. First, based on design principles and key features identified in this chapter, we divide design elements into two groups based on their purpose (i.e., functional, aesthetic), namely 1) functional factor and 2) aesthetic factor. The functional factor includes layout / structure of site and convenient functions for customer processing of their activities (e.g., transaction, search). For example, cognitive consistency, efficiency and interactivity principles are associated with functional design elements such as site structure, menu system, searching function, and feedback functions. Aesthetic factor

includes architecture of sites, color scheme, style, and shape. Artistic quality, display consistency and information presentation principles include aesthetic design elements such as font, color, look-and-feel, and image/pictures (see the Figure 2-1). Functional features are then classified into two dimensions based on the level of users' control: 1a) interaction and 1b) organization. That is, if certain functional design features (e.g., customized function) allow users to control over where they are doing or to manipulate the messages, we classify them into "interaction" group. In contrast, if some functional features (e.g., site structure, menu system) allow relatively lower level of users' control and mainly related to how to organized and arrange contents of the site, these features are included in "organization" group. In the same way, aesthetic features are divided into two groups: 2a) arousal and 2b) display based on the level of sensory appeals. For example, some features such as animation, sound and game activate more senses of users and stimulate them. These features are classified into "arousal" group. However, some aesthetic features (e.g., overall look-and-feel, color, font) activate less level of sense and are associated with how the information is displayed on the screen. These features are included into "display" group. Therefore, it is proposed that the Web design can be broken down into four basic dimensions: 1) organization (e.g., site structure), 2) interaction (e.g., search function, feedback function), 3) display (e.g., font, color, text) and 4) arousal. Table 2-5 shows the classification table of four groups and example design features. Each group is discussed in the following section.

Table 2-5. Classification of Dimensions

Dimensions	Definitions	Example Design Elements
Organization	features organizing and arranging contents into a design that serves site's goals	site structure menu system links structure
Interaction	features that enable users to control over what they are doing and fulfill their jobs with their minimum effort	Links site map speed search function feedback function cookie choice option transaction related features
Display	features determining how the information is displayed on the screen	Font Color look-and-feel links text image/pictures information placement
Arousal	features that activate higher level of senses (sensory complexity)	Animation Game virtual model multimedia technologies

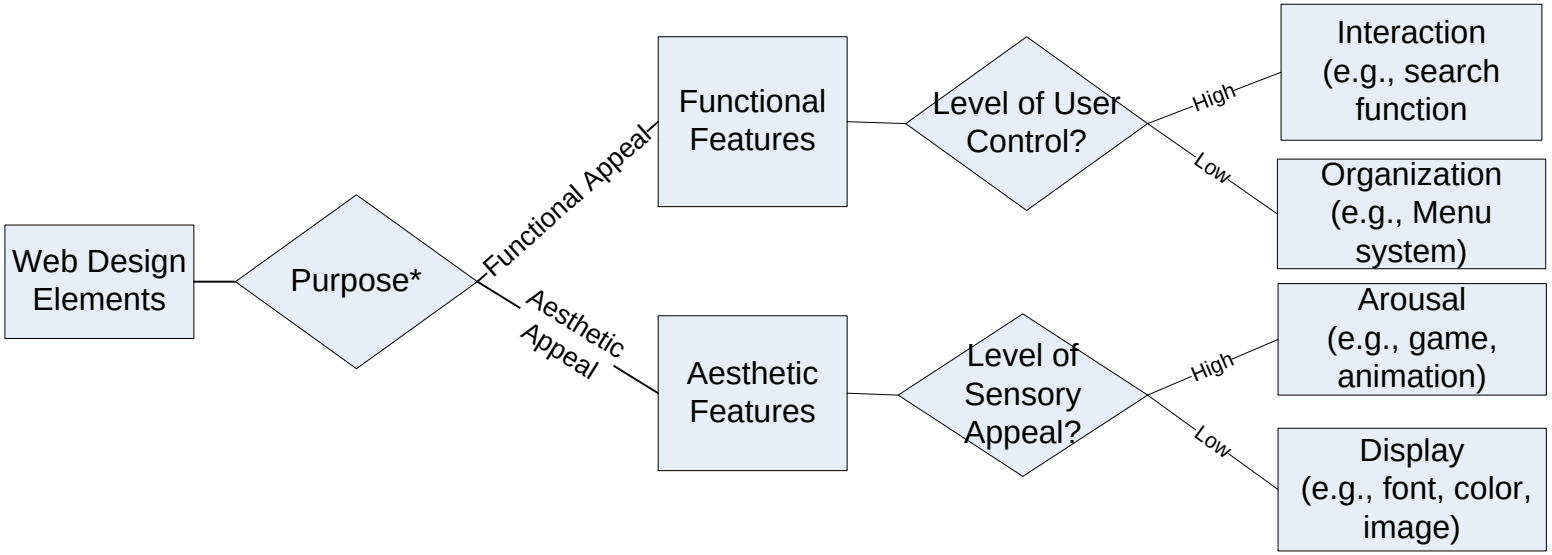

Figure 2-1. Classification Procedure

Organization group: This group includes features that organize and arrange contents into a design that serves site's goals. Cognitive consistency and efficiency principles are associated with this dimension. Once Web contents have been identified, the knowledge must be organized to enable users to understand with minimum efforts. The one key of efficiency principle is that a Web-site structure/organization should helps users to achieve their goals (e.g., information search, transaction). For example, well-organized site structure guides users easy to find information. Organized and clearly described links make users easy to find what they want (McKinney et al. 2002). According to the cognitive consistency principle, site design should provide what users expect. If users get used to a certain structure of a site in one page and the site has different structure in the other page, the site is not efficient and consistent any more. Among 15 key design features identified, three features, namely site structure, menu, and links belong to the "organization" dimension. These features can affect the way users perceive sites and their behaviors such as revisit, purchases, and loyalty.

Interaction Group: This group includes design features that enable users to move from one page to another effectively and to easily communicate with the site. Interactivity principle and efficiency principle (user control) are associated with this dimension. Key elements of interactivity are control, speed, and two-way communication (Liu 2003). For example, users can control the sequences of site content by using searching function or site map. Speed will affect users' perception of efficiency of a site. Links give more control to visitors. They connect the pages and allow visitors to go to new and exciting places on the Web (Nielson 2000). Customized function (e.g., choice option), information collection (e.g., use of cookies) and feedback function (e.g., email), are also

important in interactive design that enables two-way communication (Ha and James 1998; Macias 2003). Therefore, seven features (i.e., links, site map, speed, search function, feedback function, cookie, choice option) emerge in this “interaction” group. In case of e-shopping sites, various fulfillment related features (e.g., shopping cart, transaction process) are also included in this group. These features play major role in affecting users’ behavior or loyalty since they are more perceivable.

Display Group: This group includes features determining how the information should be displayed on the screen. Display consistency, artistic quality, and information presentation principles are related to this dimension. For instance, there are some features (i.e., color, font, and look-and-feel) that increase the artistic quality of a site and, at the same time, are important in maintaining site consistency. For example, as we found in our interviews, the use of color is important in visual appeals. However, if the color scheme and look-and-feel are different in each page of a site, users feel confused and get lost. There are also several features that increase artistic quality of a site. These include use of pictures (Lynch et al. 2001; Yoo and Donthu 2001), images (Huzingh 2000), graph (Lynch et al. 2001) and visual presentation aid such as video and audio (Ranganathan and Ganapathy 2002). Some features help effective information presentation. These include 1) legible text (e.g., writing style, language), 2) information placement (e.g., concise information presentation, logical information presentation, and 3) links. Among 15 design features, seven features (i.e., font, color, look-and-feel, links, text, image/pictures, information placement) belong to this “display” dimension. Users expect a certain level of display design condition to exist and may not

be affected by display design features unless they are absent or exist at an unpleasant level.

Arousal Group: This group includes features that activate higher level of senses (sensory complexity). Games, animation, and multimedia technologies are included in this dimension. Most powerful technology of visual communication is multimedia technology combining text, graphics, sounds, and moving images to supplement the consumers' virtual experience. For example, consumers are able to try clothes and see their appearances from different angles through virtual model. Ha and James (1998) suggest that games and animation contribute to provide a playful environment that allows users communicate with the Web site very well. These arousal features are not found as key features in our interviews. However, for some sites (e.g., entertainment site), these features are important in attracting more users and their attention.

Evaluating Classification Scheme

Here, we seek to evaluate our classification scheme using Hunt's criteria. Hunt (2002, p 230) suggests five criteria for evaluating classification system: 1) Does the scheme adequately specify the phenomenon to be classified? 2) Does the scheme adequately specify the properties or characteristics that will be doing the classifying? 3) Does the scheme have categories that are mutually exclusive? 4) Does the scheme have categories that are collectively exhaustive? and 5) Is the scheme useful?

First criterion inquires whether the classification scheme adequately specifies the phenomenon to be classified. That is, what is being classified? Here, we classify "Web design elements." As we define earlier, Web design encompasses all site features that are used to convey content on the Web. That is, we do not consider content on Web-

sites. For example, the quality of information on Web sites is not the element of Web design. Second criterion asks whether the properties the scheme specifies are the appropriate properties for classificatory purpose. That is, if we choose some characteristics for performing the grouping, we need to stick to them throughout the work. Here, we use the same properties for classifying different design elements in each level. As seen in the tree diagram in Figure 2-1, we divide design elements based on their purpose: 1) are they functional? and 2) are they aesthetic? Two characteristics are used for the second level: 1) the level of users' control and 2) the level of sensory appeals. Third criterion suggests that all the categories at the same level of classification should be mutually exclusive. However, as Hunt pointed out (p. 234), many classifications in marketing do not meet this criterion and the lack of exclusivity is not a mortal blow to useful classificational scheme. For example, if links are used to structure and organize the content of site, links belong to the organization group. At the same time, links can be included in the interactive group since they enable unrestrained navigation. Criterion 4 suggests that scheme should be collectively exhaustive. We seek to provide a classification scheme for Web design elements of general Web site (e.g., corporate Web site). However, our classification scheme may not include all features in case of sites with unique purposes. For example, privacy and security design features are particularly important for financial institution Web sites. The last criterion simply asks, "Is the scheme useful?" This includes questions such as how useful the scheme is for helping marketing managers to solve problems and for developing theories. Hunt said that this criterion is the first among equals. That is, the ultimate criterion is usefulness. He also suggests that classification is regarded as a means for

searching reality for hypotheses or for structuring reality to test hypotheses. First, our scheme can be used to measure Web-site design effectiveness. Marketing managers can use our scheme to evaluate their Web sites. Also, our classification scheme makes many important managerial/research questions more manageable. For example, there are a lot of important questions. Which design components (i.e., organization, interaction, display, arousal) are most relevant to target consumers? How can these components be manipulated? To what extent is the online experience enhanced by the Web design? Our classification scheme offers a good framework for answering many questions. Given that our classification scheme meets Hunt's five criteria (specifically the fifth criteria-usefulness) to some extent, it could be used as a beginning point for investigating Web design and its related phenomena.

Discussion

The major contribution of this study is to provide great understanding of Web design. In particular, we have investigated three questions, 1) what are the Web design principles (e.g., consistency)?, 2) what are the key Web-design features (e.g., menu bar, font)?, and 3) what is a better way to classify different kinds of Web design elements? To address these issues, Depth-interviews are conducted and we identify five design principles (i.e., consistency, efficiency, interactivity, artistic quality, information presentation) and fifteen design features. It is proposed that the concept of Web design can be broken down into four dimensions: 1) organization, 2) interaction, 3) display and 4) arousal.

This study offers several implications for researchers and managers. First, our results provide a useful tool for evaluating and analyzing Web sites. There are various

ways to evaluate Web sites such as site quality and attitude toward sites. However, we do not have a framework or scale to measure effectiveness of design itself. Our five design principles and fifteen key design elements may stimulate managers to evaluate their sites in new ways. Second, our findings will contribute to developing knowledge about the consumers' relationships with site design interface. There are many interesting questions regarding Web design and consumer behavior. For instance, what are the important dimensions (e.g., interactivity, efficiency) that contribute to consumers' overall quality perceptions and patronage behavior on Web sites? Our five principles may be a starting point to investigate this question. What is the best way to enhance the level of consumers' quality perception of sites? It would be interesting to test the relationships between key design features identified in our research and consumers' perception of various dimensions such as interactivity, consistency and efficiency. Third, our classification table provides a useful way to categorize different kinds of Web design elements. Because so many elements make up the Web-site interface, we need to classify these elements. We break down Web design elements into four dimensions. Such a classification would make future study and manipulation of the design interface a more visible and manageable work, and further, contribute to theory development in this new area.

There are some limitations in this chapter. First, this is an exploratory research and conducted depth interviews with seven designers. Further, qualitative insights from this study can serve as a starting point for future model and test. For example, this could be accomplished by building models and generating some quantitative data by survey or experiments. Second, although it is an interesting investigation on Web

design, our result might be limited to general Web sites. For example, our design principles and key design elements might be different to different types of sites (e.g., e-shopping site, entertainment site). It will be interesting to see Web design in different settings.

This study provides some useful tools to study Web design and illustrates need for research on Web design. The study on Web design in marketing is still in beginning stage. Further research need to be done in understanding this new phenomenon.

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CHAPTER 3

CONCEPTUAL MODLE OF WEB-STIE INTERACTIVITY:

A LITERATURE REVIEW

Introduction

Many Web designers and managers often seek to build “interactive Web sites” to attract customers and increase loyalty. To date, there are a variety of definitions and conceptualizations of interactivity in different fields (e.g., sociology, communication, advertising, human-machine interaction literature, marketing). Relatively few studies have attempted to synthesize its scattered meanings and provide a classification scheme. Here, we attempt to create such a synthesis by identifying three ways of defining interactivity: 1) feature (process)-based interactivity, 2) perception-based interactivity, and 3) combination of both. The feature-based approach suggests that interactivity resides in the processes or features of a communication medium (Heeter 1989). We identify two views within the sphere of feature-based interactivity: 1a) communication view and 2b) telepresence view. A second approach is perception-based and focuses primarily on how individuals perceive interactivity (cf. Newhagen et al. 1995; Wu 1999; McMillan and Downes 2000; McMillan 2002a). In our classification scheme, perceived interactivity contains three dimensions: 2a) two-way communication, 2b) control, and 2c) system efficacy.

There is considerable debate about how interactivity is defined or conceptualized (cf. Jensen 1998; Kiousis 2002; Liu and Shrum 2002). To date, little

consensus has been reached, specifically in the case of the Web. Based on reviewing the extant literature and various definitions, we attempt to provide consensual definitions.

What is the best way to increase the level of consumers' interactivity perceptions of a site? What are key site features affecting interactivity perceptions? Very little research has been done to identify site features (e.g., chat room, site map) that contribute interactivity perceptions. Most existing research has identified site features that facilitate structural interactivity or has developed a scale to measure perceived interactivity. By identifying site features affecting interactivity perceptions, we create a conceptual model exploring the relationship among site features, interactivity perceptions, and site effectiveness.

In this chapter, we focus on interactivity on the Web. Thus, the objectives of this paper are three-fold: 1) to sort out inconsistencies in the way that interactivity is conceptualized and to create a classification scheme to illustrate different kinds of interactivity, 2) to make some progress in providing consensual definitions of interactivity, and 3) to identify key Web-site features that contribute to interactivity perceptions and finally to discuss the relationship among Web-site features, interactivity perceptions, and site effectiveness. An overall conceptual model is created to summarize the key relationships.

Table 3-1. Definitions of Interactivity

Author(s)	Definitions	Approach*	C**	T	CO	S
Rafaeli (1988)	Recursive communication exchange, such that later exchanges refer to earlier ones and so on, in which communication roles are interchangeable.	F	√			
Heeter (1989)	Interactivity is multi-dimensional concept (p. 221).	F	√	√		
Blattberg and Deighton (1991)	The facility for individuals and organizations to communicate directly with each other despite time or distance.	F	√			
Steuer (1992)	The extent to which users can participate in modifying the form and content of a mediated environment in real time (p. 84).	F		√		
Newhagen et al. (1995)	The psychological sense message senders have of their own and the receivers' interactivity (p. 165).	P			√	√
Hoffman and Novak (1996)	Interactivity in hypermedia CMEs, like web sites on the Internet, can happen "with the medium (i.e., machine interactivity) in addition to through the medium (i.e., person interactivity)" (p.53).	F	√	√		
Ha and James (1998)	The extent to which communicator and the audience respond to, or are willing to facilitate each other's communication goals (p. 461).	F, P	√	√	√	
Jensen (1998)	A measure of a media's potential ability to let the user exert an influence on the content and/or form of the mediated communication.	F		√		
Cho and Leckenby (1999)	The degree to which a person actively engages in advertising processing by interacting with advertising messages and advertisers (p. 163).	F	√	√		

Wu (1999)	Perceived interactivity can be defined as a two-component construct consisting of navigation and responsiveness (p. 255).	P			√	√
McMillan (2002a)	Identifies four types of interactivity based on intersection of user control and direction of communication: monologue, feedback, responsive dialogue, and mutual discourse.	P	√			√
Kiousis (2002)	The degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many), both synchronously and asynchrounously, and participate in reciprocal message exchanges (third-order dependency). With regard to human users, it additionally refers to their ability to perceive the experience as a simulation of interpersonal communication and increase their awareness of telepresence.	F, P	√	√	√	√
Liu (2003)	The degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized.	P	√		√	√

* Approach: F (Feature-based), P (Perception-based)
** C: communication view, T: telepresence view, CO: control, S: system-efficacy

Defining Interactivity

Table 3-1 shows different definitions of interactivity discussed in past literature. We classify these definitions into three groups: 1) feature-based interactivity, 2) perception-based interactivity, and 3) combination of both. Even though there are many studies discussing interactivity, our classification scheme provides an efficient summary

for the majority of studies, as shown in Table 3-1. We seek to generate consensual definitions of different flavors of interactivity.

Feature/Process-based Interactivity

One approach is based on communication between person and machine (or person and person). In fact, this approach highlights the importance of different media features (e.g., speed, visual images). From this process perspective, exchange is a key concept. For example, Rafaeli (1988, pp. 111), one of early scholars who investigated interactivity in traditional communication media, defines interactivity as “an expression of the extent that in a given series of communication exchanges, any third (or later) transmission (or message) is related to the degree to which previous exchanges referred to even earlier transmissions.” Researchers who focus on features have defined interactivity in terms of specific dimensions/characteristics/features of a particular medium. Steuer (1992) proposes three factors (i.e., speed, range, and mapping) affecting interactivity. There are two dominant views of feature-based interactivity: 1) communication view (human-human interaction) and 2) telepresence view (human-machine or human-message interaction).

The communication view is most often discussed from an interpersonal communication perspective (Rafaeli 1988; Blattberg and Deighton 1991; Ha and James 1998). This point of view frames interactivity in terms of real time, interpersonal exchange between individuals. From sociological perspective, interactivity is defined as the relationship between two or more people who, in a given situation, mutually adapt their behaviors and actions to each other (Jensen 1998, p. 188). In marketing literature, interactivity is considered good conversation in marketplace between two parties. For

example, Deighton (1996) suggests two features of interactivity: 1) the ability to address an individual and 2) the ability to gather and remember the response of that individual. Therefore, in interpersonal view, the more communication in a computer-mediated environment resembles interpersonal communication, the more interactive the communication is (Ha and James 1998). However, there is a criticism examining interactivity in terms of interpersonal communication. First, in computer-mediated environment, individuals may choose time and duration of interaction (Liu and Shrum 2002). Second, interpersonal view ignores the interaction of human beings with computers. For example, in traditional media, users have many choices but no control over the messages (Cho and Leckenby 1999). But with interactive media, users are able to modify the contents of the media. Third, two-way communication is not the only type of experience related to interactivity. Many studies examine one-to-many and many-to-many communications (Hoffman and Novak 1996). Therefore, many scholars seek to consider interactivity a property of a medium (Steuer 1992; Hoffman and Novak 1996; Heeter 1998) that creates mediated environments.

According to Steuer (1992, p. 78), information is not merely transmitted from a sender to a receiver; rather, mediated environment are created and then experienced. In Steuer's model, interactivity is defined the extent to which users can participate in modifying the form and content of a mediated environment in real time (p. 84). His definition is based on a telepresence view of mediated communication, and focuses on properties of the mediated environment and the relationship of individuals to that environment. He suggests three factors that contribute to interactivity: 1) speed (rate at which input can be assimilated into the mediated environment), 2) range (the number of

possibilities for action at any given time), and 3) mapping (the ability of a system to map its controls to changes in the mediated environment). Following Steuer, later studies adopt his telepresence view of interactivity. These studies address two important elements in examining interactivity: 1) control (Cho and Leckenby 1999) and 2) choice (Heeter 1998; Massey and Levy 1999; Coyle and Thorson 2001). For example, users can manipulate and customize the messages by alternating colors, shapes, graphics, sounds, and order of message content (Cho and Leckenby 1999).

Later on, much research has provided a conceptualization of interactivity that combines communication view with telepresence view (Heeter 1989; Hoffman and Novak 1996; Ha and James 1998; Cho and Lekenby 1999; Liu and Shrum 2002; Macias 2003). For instance, Ha and James (1998)'s five dimensions of interactivity include dimensions based on these two views such as choice and reciprocal communication, and Liu and Shrum (2002) specify three dimensions of interactivity including control and two-way communication.

Perceived interactivity

In contrast to researchers who identify "features" or "process" based interactivity, others have suggested that interactivity should be understood through individual perceptions (Newhagen et al. 1995; Wu 1999; McMillan 2002a; Kiousis 2002). Newhagen et al. (1995) is the first one who suggested the concept of perceived interactivity. They adopt interactivity as a psychological variable in a content analysis of NBC news viewers' email messages to evaluate interactivity perceptions. The conceptualization of perceived interactivity in their study is based on "efficacy" that is a two-dimensional construct: 1) viewers' psychological sense of efficacy and 2) their

sense of the media system's interactivity. That is, perceived interactivity is related to senders' sense that NBC News could process their message as useful input and in some way act on it, and it thus corresponds to the idea of system efficacy. These two dimensions have been used to investigate perceived interactivity in later studies. For example, Wu (1999), who applied these two to Web users, renamed these two dimensions internally-based efficacy and externally-based system efficacy (system-efficacy). According to him, internally-based efficacy can be translated into Web user's perceived control over where s/he is and where s/he is going, while externally-based system efficacy can be rendered into his or her sense of how responsive a Web site as a system to his or her actions (Wu 1999, p. 255). Based on these dimensions, he defines perceived interactivity a two-component construct consisting of navigation and responsiveness. Recent research has incorporated one more dimension (i.e., direction of communication) in examining perceived interactivity. These studies apply either traditional organizational communication model (Grunig and Grunig 1989) or interpersonal communication model (Rafaeli 1988). Direction of communication is the extents to which users feel the site facilitate two-way communication. For example, McMillan (2002a) specifies four-part model of Web interactivity based on two perceptions: 1) direction of communication and 2) control. Some researchers develop a scale measuring perceived interactivity (McMillan and Hwang 2002; Liu 2003). They show that perceived interactivity comprises three dimensions: 1) two-way communication, 2) control, and 3) synchronicity (speed, system-efficacy).

Feature- and Perception-based Interactivity

Interactivity levels are fairly stable across time in media technologies, but can vary substantially within individual's perception (Kiousis 2002). Some scholars suggest that both feature-based interactivity and perception-based interactivity need to be considered in defining interactivity in computer-mediated environment (Ha and James 1998; Kiousis 2002). Ha and James (1998) argue that interactivity consists of the following variables: playfulness, choice, connectedness, information collection, and reciprocal communication. In this framework, choice and reciprocal communication could be seen as feature-based dimensions, while connectedness, defined as the feeling of being able to link to the outside world and to broaden one's experience easily, would be more perceived-based dimension. Recent research by Kiousis (2002) suggests that encompassing all aspects of the previously discussed definition of interactivity is more appropriate. His definition of interactivity includes the following major dimensions: 1) the structure of a medium (telepresence view), 2) communication context (communication view), and 3) the perceptions of users (perception-based view).

Consensual Definitions

As discussed in the previous section, no consensual definition of interactivity exists. The second objective of this paper is to make some progress in providing consensual definitions based on previous literature. Past literature shows that interactivity definitions have multiple sources, which has made improvements in development of this concept. Here, we seek to merge various interactivity concepts into hybrid definitions rather than focusing on one aspect of different definitions or altering any definitions made by previous researchers.

As Liu and Shrum (2002) pointed out, it is necessary to distinguish between feature-based and perception-based interactivity. For example, from a feature-based perspective, two-way communication may involve providing chat room and bulletin board in the site. Felt two-way communication, in contrast is how visitors feel the communication is. Consequently, we endeavor to formulate two separate definitions of interactivity: (1) feature-based interactivity and (2) perception-based interactivity.

Two dominant views of feature-based interactivity discussed in previous literature include communication and telepresence view. We incorporate two views in defining feature-based interactivity. Derived from previous definitions by Hoffman and Novak (1996) and Heeter (1989), feature-based interactivity is defined as the degree to which a Web site creates a mediated environment where participants can communicate with each other and modify forms and messages in real time. Perception-based interactivity consists of three dimensions specifically: two-way communication, self-efficacy, and system-efficacy. Based on Newhagen et al. (1996) and McMillan (2002a) works, we define perceived interactivity as the degree to which users perceive that a Web site facilitates interpersonal communication, gives control over online experiences, and responds to human actions quickly. These two are our consensual definitions. One is based on a feature emphasis, and the other is based on a perception emphasis.

Operationalization of Interactivity

To identify key Web-site features affecting interactivity perceptions, we examine how interactivity concepts are operationalized and measured in previous empirical studies. Table 3-2 shows four major approaches of operationalizing interactivity, Table 3-3 presents the interactive features of Web sites (or systems) discussed in previous

empirical studies, and Table 3-4 presents four studies developing measurement scales for perceived interactivity. As shown in Table 3-3, most studies operationalize interactivity as the presence or absence of particular features. Often it is operationalized as the quantity of specific features (e.g., number of links). Thus, if one site has more options (e.g., choice of background colors, searching option) than other site, then the first site has a high degree of interactivity. However, it may be that some features are more important than others. Thus, one user may place more value on searching options, while another user places more value on background color option.

In contrast to the approach shown in Table 3-3, measurement scales for perceived interactivity (see Table 3-4) are often associated with how users feel about the interactivity level of a site. Thus, perceived interactivity measure emphasizes experiential aspects of the Internet.

Table 3-2. Four Approaches of Operationalizing Interactivity

Authors (year)	Dimensions
Heeter (1989)	1) Complexity of choice available: extent to which users are provided with a choice of availab le information. 2) Effort users must exert: the amount of effort users must exert to access information. 3) Responsiveness to the user: the degree to which a medium can react responsively to a us er. 4) Monitoring information use: the potential to monitor system use. 5) Ease of adding information: the degree to which users can add information to the system t hat a mass, undifferentiated audience can access. 6) Facilitation of interpersonal communication: degree to which a media system facilitates int erpersonal communication between specific users.
Steuer (1992)	1) Speed: the rate at which input can be assimilated into the mediated environment. 2) Range: refers to the number of possibilities for action ant any given time. 3) Mapping: the ability of a system to map its controls to changes in the mediated environme nt in a natural and predictable manner.
Ha an James (1998)	1) Playfulness: presence of curiosity arousal devices and games. 2) Choice: presence of choice of color, speed, language. 3) Connectedness: presence of hyperlinks 4) Information collection: presence of monitoring mechanisms (e.g., registration) 5) Reciprocal communication: presence of response mechanisms (e.g., email address, toll-fr ee number, order mechanisms, surveys, chat rooms)
McMillan (2002)	1) Two-way communication: email, registration, survey, bulletin board, order, chat 1) Control of communication: search, choice, curiosity, game, links, external links

Table 3-3. Interactive Features Discussed in Literature

Dimensions	Approaches	Examples of Site (System) Features	Authors (Year)
Information Collection	Ha and James (1998) McMillan (2002)	Registration, Cookies, Survey	
Feedback (Reciprocal communication)	Heeter (1989) Ha and James (1998) McMillan (2002)	Email links, Chat rooms, Comment form, Toll-free number, Q&A, Bulletin board, Percentage of overall messages based on prior message transmission, Level of transaction facilitation (e.g., online order, order status tracking service).	Ghose and Dou (1998), Messey and Levy (1999), McMillan (2000), Kiousis (2002), Macias (2003)
Choice	Heeter (1989) Steuer (1992) Ha and James (1998)	Number of options (different languages, background color, searching option, news customization, multimedia), Personal-choice helper.	Ghose and Dou (1998), Colye and Thorson (2001), Macias (2003)
Navigation	Steuer (1992) McMillan (2002)	Search function, Site map, Clickable image map, Links	Steuer (1992), Ghose and Dou (1998), Colye and Thorson (2001), Messey and Levy (1999), McMillan (2000), Macias (2003), Tremayne and Dunwoody (2001)
Speed	Steuer (1992)	Speed, Amount of time transmitting and taking messages, Opting out (match to customer's band width).	Kiousis (2002)

Sensory device	Ha and James (1998)	Game, Animation, Sensory complexity (amount of devices employed by the system to activate the five senses).	Kiousis (2002), Macias (2003)

Table 3-4. Four Studies on Perceived Interactivity Scale Development

Authors (year)	Dimensions	Measures	Views
Wu (1999)	Navigation	While I was on the site, I was always aware where I was. While I was on the site, I always knew where I was going. While I was on the site, I was always able to go where I thought I was going. The hyper-linked images and texts tell me exactly what to expect. The visual layout was like a roadmap during my exploration of the site. I felt I did not get much useful information simply because it had too much information (-). I was delighted to be able to choose which link and when to click.	Self Efficacy
	Responsiveness	When I clicked on hyper-linked images or texts, I felt good about the instantaneous display of information. While I was on the site, I could quickly jump from one page to another. I was pleased to express my feelings and opinions on the spot through email or feedback form.	System Efficacy Two-way Communication
McMillan (2002)	Two-way communication	This site facilitates two-way communication.	Two-way Communication
	Control	I feel that I have a great deal of control over my visiting experience at this site.	System efficacy

McMillan and Hwang (2002)	Real-time conversation	Enables two-way communication Enables concurrent communication Primarily one-way communication (-) Is interactive Enables conversation	Two-way Communication
	No Delay	Loads fast Loads slow (-) Operate at high speed	System efficacy
	Engaging	Variety of content Keeps my attention Easy to find my way through the site Unmanageable (-) Doesn't keep my attention (-) Passive (-) Immediate answers to questions Lacks content (-)	Self efficacy System efficacy
Liu (2003)	Active Control	I felt that I had a lot of control over my visiting experiences at this website. While I was on the website, I could choose freely what I wanted to see. While surfing the website, I had absolutely no control over what I can do on the site (-) While surfing the website, my actions decided the kind of experiences I got.	Self efficacy
	Two-way communication	The website is effective in gathering visitors' feedback. This website facilitates two-way communication between the visitors and the site. It is difficult to offer feedback to the website (-) The website makes me feel it wants to listen to its visitors. The website does not at all encourage visitors to talk back (-). The website gives visitors the opportunity to talk back.	Two-way Communication

	Synchronicity	The website processed my input very quickly. Getting information from the website is very fast. I was able to obtain the information I want without any delay. When I clicked on the links, I felt I was getting instantaneous information. The website was very slow in responding to my request (-).	System efficacy

Operationalization of Feature-Based Interactivity

There are four approaches of operationalizing feature-based interactivity construct (i.e., Heeter 1989, Steuer 1992, Ha and James 1998, McMillan and Hwang 2002). Even though there are many studies operationalizing interactivity, the majority of studies follow one of these four approaches, as shown in Table 3-2. For example, following Steuer (1992)'s two dimensions (i.e., range, mapping), Coyle and Thorson (2001) manipulated interactivity level by using two design features: 1) presence of clickable image map (mapping) and 2) the number of clickable areas on the opening page (range). Macias (2003) adopted Steuer (1992)'s range dimension and Ha and James (1998)'s four dimensions of interactivity: 1) choice option (e.g., different language), 2) playfulness (e.g., animation), 3) connectedness (e.g., hypertext links), and 4) reciprocal communication (e.g., email, chat rooms, comment forms). Table 3-3 summarizes interactive design features applied in extant studies. Based on the four approaches, these individual design features can be categorized into six dimensions: 1) information collection, 2) feedback, 3) choice, 4) navigation, 5) speed, and 6) sensory device. Features that facilitate reciprocal communication include information collection options (e.g., registration, cookies, surveys) and feedback functions (e.g., email links, chat room, bulletin board) (Heeter 1989; Ha and James 1998; Messey and Levy 1999; McMillan 2000). Transactions function or order status tracking are also considered features improving reciprocal communication (Ghose and Dou 1998). The more users' options/customization functions are provided in a site, the more interactivity the site is considered (Steuer 1992; Ha and James 1998; Coyle and Thorson 2001; Macias 2003). Control dimension of interactivity is often measured in terms of the navigational features

such as searching function or site map (Heeter 1989; McMillan 2000; Macias 2003). Speed (e.g., loading time) and some sensory devices such as game and animation are also considered as interactive features (Ha and James 1998; Macias 2003).

Measurement Items for Perceived Interactivity

Recently, scholars seek to develop scales to measure perception-based interactivity (see Table 3-4). There are four studies (Wu 1999, McMillan 2002, McMillan and Hwang 2002, and Liu 2003). These studies show that perceived interactivity has three dimensions: 1) two-way communication, 2) self-efficacy and 3) system-efficacy. Perception of two-way communications is measured by items asking “this site facilitate two-way communication,”(McMillan 2002a), “interactive, interpersonal, enable conversation,” (McMillan and Hwang 2002), and “the Web site is effective in gathering visitors’ feedback” (Liu 2003). Perceived self-efficacy is measured by items such as “I feel control over my experience (McMillan 2002a; Liu 2003)”,“easy to find my way (Wu 1999; McMillan and Hwang 2002),” and “I was able to choose which link and when to click (Wu 1999). Items to measure system-efficacy perception are related to synchronicity or responsiveness of a site. For example, it is measured by items such as “the site is fast,” “while I was on the site, I could quickly jump from one page to another,” and “the website processed my input very quickly” (Wu 1999; McMillan and Hwang 2002; Liu 2003).

Web Features, Interactivity Perceptions and Site Effectiveness

The third objective of this paper is to explore key interactive design features that contribute to interactivity perceptions and to examine the relationships among these features, interactivity perceptions and site effectiveness. Stimulus-Organism-Response

framework in store atmosphere literature, social presence theory, social cognitive theory, and TAM (Technology Acceptance Model) are used as theoretical backgrounds in building a model and propositions. After reviewing these conceptual backgrounds, we examine the relationships between certain Web-site features and interactivity perception. Next, we explore the effect of interactivity perception on site effectiveness. Potential moderating variables are explored (e.g., involvement, Internet experience, privacy concerns, desire for control, optimal stimulation level). Our overall conceptual model and hypothesized relationships are shown in Figure 3-1. Table 3-5 present sets of propositions and testing theories.

Research on Store Atmosphere

Studies from environmental psychology suggest that people form inferences about an object based on environmental cues. One frequently used model is Mehrabian-Russell's Stimulus-Organism-Response (S-O-R) framework. Since Donovan and Rossiter (1982) introduced this framework to the study of store atmosphere, a number of studies have applied this model to store environment studies in marketing (e.g., Donovan et al. 1994; Babin and Darden 1995). In a S-O-R context, store environment elements such as temperature, light, and salesperson (stimulus) causes some consumer behavior (response), mediated by consumers' emotional states that have been described by three states, pleasure, arousal, and dominance (Mehrabian and Russell 1974).

Table 3-5. Propositions and Testing Theories

No.	Propositions	Theories*
P1	As the number of information collection features increases, perceived two-way communication increase.	S-O-R, SPT
P2	As the number of feedback functions increases, perceived two-way communication increases.	S-O-R, SPT
P3	As the number of transaction facilitation features increases, perceived two-way communication increases.	S-O-R, SPT
P4	As the number of choice options (e.g., language, background color option) increases, self-efficacy perception increases.	S-O-R, SCT
P5	As the number of navigational features (e.g., navigation structure, links system) increases, self-efficacy perception increases.	S-O-R, SCT
P6	As the number of navigational features (e.g., links, site map) increases, system-efficacy perception increases.	S-O-R, SCT, TAM
P7	As a site loads faster, system-efficacy perception increases.	S-O-R, SCT, TAM
P8	As the number of sensory devices (e.g., games, animation, sound) increases, system-efficacy perception increase.	S-O-R, SCT, TAM
P9	As perceptions of two-way communication increase, Web-site effectiveness increases.	Ad effectiveness, S-O-R
P10	As perceptions of self-efficacy increases, Web-site effectiveness increases.	S-O-R, SCT, TAM
P11	As perceptions of system efficacy increases, Web-site effectiveness increases.	S-O-R, SCT, TAM
P12	The level of involvement will moderate the relationship between design features and interactive perception.	Involvement theory
P13	The internet experience will moderate the relationship between design features and interactive perception.	Social information processing theory
P14	The privacy preference will moderate the relationship between design features and interactive perception.	Privacy preference theory
P15	The desire for control will moderate the relationship between design features and interactive perception.	Desire for control
P16	Web-site effectiveness is higher for Web sites with moderate interactivity than for Web sites with a low- or high-interactivity (inverted-U relationship)	Optimal stimulation level theory
P17	Users' goal will moderate the relationship between design features and interactivity perceptions.	Structuration theory

*S-O-R: Stimulus-Organism-Response Framework, SPT: Social Presence Theory, SCT: Social Cognitive Theory, TAM: Technology Acceptance Model

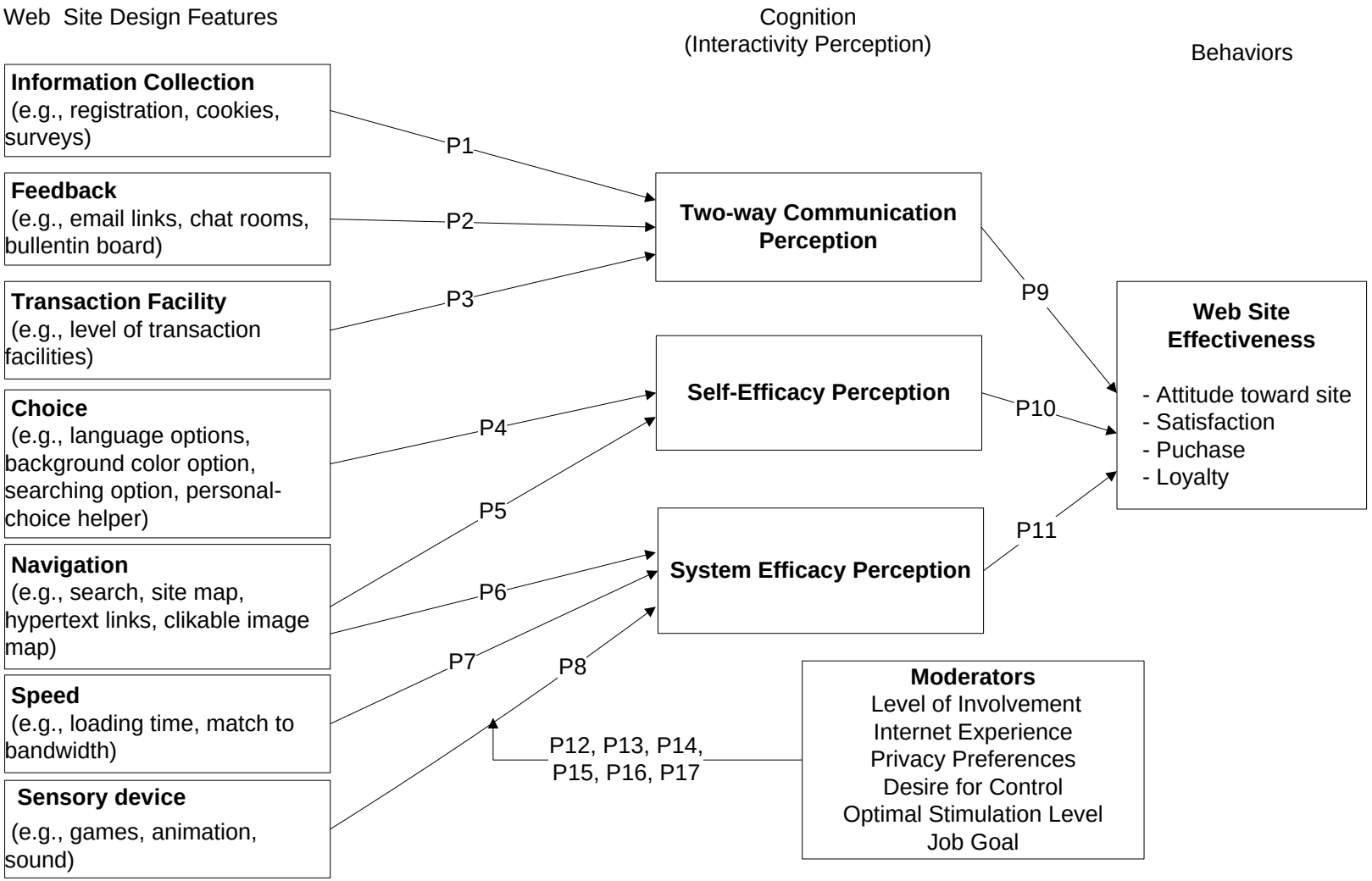

Figure 3-1. Conceptual Model

Early research on store environment has more focused on how environmental cues influence shoppers' emotional state. However, store environment also affects shoppers' cognitions (e.g., perception, information search, belief, categorization). For example, Baker et al. (2002) find that store atmospheric cues influence consumers' assessment of a store on various store choice criteria such as service quality perception and merchandise perception. In service organization, servicescape cues help consumers to distinguish a firm by influencing how it is categorized (Bitner 1992). The impact of various store environmental cues on these cognitive variables would subsequently affect evaluations of store and shopping behaviors.

In e-tailing literature, Eroglu et al.(2001) have applied this S-O-R framework to explain e-store atmospheric cues and shoppers' affective and cognitive reactions. Similarly, we apply this framework to explore how certain design features affect site effectiveness, mediated by interactive perception (cognition).

TAM (Technology Acceptance Model)

One of the most widely applied individual-level technology adoption models in the IS (Information System) literature is Technology Acceptance Model, also known as TAM (Ddavis 1989; Davis, Bagozzi and Warshaw 1989). Its goal is to explain individual usage of computers (technology) based on individual's belief. In particular, TAM posits that two beliefs, perceived usefulness and perceived ease of use, are primary determinants for computer acceptance behavior. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance. That is, people tend to use or not use a system to the extent they believe it will help them perform their job better. However, even if users believe that a

system is useful, at the same time, they may believe that the system is too hard to use. Therefore, system usage is influenced by perceived easy of use, which is defined as the degree to which a person believes that using a particular system would be free of effort. Another construct in TAM is external variables that influence the perception of these two beliefs. Davis et al. (1989) argue that the design characteristics of a system can have an effect on perceived usefulness and ease of use. For example, many system features such as menus, icons, mice, and touch screens are specifically intended to enhance usability. That is, TAM provides a framework explaining how system design interface influences two beliefs (i.e., ease of use, system usefulness), and subsequently affect system usage behavior. We apply the TAM to examine the relationship among Web-design features (system interface), interactivity perception (self-efficacy and system-efficacy perception), and site effectiveness (system usage behavior).

Social Presence Theory

Short et al. (1976) proposed that communication media vary in their degree of *Social Presence*—the degree to which a medium facilitates the interpersonal cues (e.g., gestures, eye contact) that contribute to the sense of each others' presence during the communication process. Thus, the capacity of transmit information about facial expression, direction of looking, posture, dress and non-verbal vocal cues, all contribute to the medium's social presence, which is very important key to understanding two-way communication.

This theoretical perspective on communication might be applied to our model. For example, if a site add more features that enable communicants to sense each others' presence, users perceive that the site facilitate interpersonal communication.

Several studies examine this theory in exploring interactive medium. Yadav and Varadarajan (2005) introduce this perspective in investigating interactivity in the electronic marketplace with respect to the formation and enrichment of interpersonal relationships. One empirical finding from Fortin and Dholakia (2005) is that commercial sites with high interactive features are more likely to create feelings of social presence.

Social Cognitive Theory

Social Cognitive Theory (Bandura 1986) is a model of individual behavior. The core of this theory is triadic reciprocality that results from interplay among personal factors, behavior, and environment. For example, environments' influences such as social pressures or unique situational characteristics, cognitive and other personal factors (e.g., personality, demographic characteristics), and behavior are reciprocally determined. Specifically, he focuses on two cognitive forces guiding behavior: outcome expectations and self-efficacy.

Self-efficacy (Bandura 1986) is defined as people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses. Social cognitive theory and self-efficacy have received considerable attention in studying individual technology adoption behavior in IS research (Compeau and Higgins 1995a, 1995b; Compeau et al. 1999). These studies find a strong relationship between self-efficacy and individual adoption and use of computers. That is, beliefs about one's ability (e.g., self-efficacy) are as important as beliefs about the system and technology. We apply the social cognitive

theory to examine the relationship among Web-design features (environment), self-efficacy perception (belief), and site effectiveness (system usage behavior).

Again, Figure 3-1 presents a model intended to show the relationship among Web-design features, interactivity perceptions, and site effectiveness. Based on the store environment literature, TAM, social presence theory, and social cognitive theory, we propose that certain design elements influence the cognitive state (i.e., interactivity perception), which subsequently affect site effectiveness.

Web Features and Interactivity Perceptions

What are the best methods for enhancing perceived interactivity? One possible approach is to add more interactive features to a Web site. For example, a designer could add two-way communication features such as chat room, email links, and bulletin board to a site (see Tables 3-3). In the same way, a searching function or a site map help users feel more confident that they are in control. Here, we propose that there is a positive relationship between certain Web-site features (i.e., chat room, level of transaction facilitation, number of options, search function, match to band width, speed) and consumers' perceptions of site interactivity (see Figure 3-1).

As discussed earlier, consumers' perceptions of interactivity consists of three dimensions (i.e., two-way communication, control, system-efficacy). First, consumers' perception of two-way communication could be affected by the number of information collection, the number of feedback functions (e.g., email links, chat room), and the number of transaction facilitation features (e.g., order tracking service). Data gathering is becoming more important to companies as they build databases about their customers (Blattberg and Deighton 1991). With more information about audience, an

organization can tailor messages to the interests and prior knowledge levels of the audience (Ha and James 1998). Such information collection can take various forms on the Web such as cookie files, visitor registration and survey. For example, cookie files store the user's information (e.g., ID, IP address) and provide relevant information to the user when the user logs onto the Web server. Therefore, McMillan (2002) suggests that information collection features (e.g., cookie, survey) facilitate two-way communication. Macias (2003) operationalized two-way communication as the number of feedback functions such as email, chat rooms, comment forms. That is, if all of these are present in a site, the site is considered as highly interactive in facilitating two-way communication. The number of transaction facilitation features also affects consumers' perceptions of reciprocal communication. For example, a site is perceived highly interactive if it has more transaction-related features such as transaction function (Liu and Shrum 2002) and order status tracking service (Ghose and Dou 1998). Based on the Social Presence Theory and the S-O-R framework in explaining the relationship between design features and communication perception, we propose that:

P1: As the number of information collection features increases, perceived two-way communication increase.

P2: As the number of feedback functions increases, perceived two-way communication increases.

P3: As the number of transaction facilitation features increases, perceived two-way communication increases.

Second, consumers' perception of control is influenced by number of choice options (e.g., different languages, different font) and navigational features (e.g., search

function, site map). According to Wu (1999), control perception is defined as the extent to which users feel control over where s/he is. The number of possibilities for action at any given time is an important element of interactivity (Steuer 1992). For example, users can customize the message by altering languages and the order of content. Coyle and Thorson (2001) manipulated interactivity by varying the number of clickable links on the first page of a Web site. That is, if a site has more clickable links, users' perceptions of control will increase. Ha and James (1998) argue that as a result of unrestrained navigation (e.g., site map, search function) in the cyberspace, users may feel empowered. Therefore, based on S-O-R framework, TAM, and Social Cognitive Theory, we propose:

P4: As the number of choice options (e.g., language, background color option) increases, control perception increases.

P5: As the number of navigational features (e.g., navigation structure, links system) increases, control perception increases.

Third, system efficacy perception is defined as the extent to which a Web site is responsive as a system to users' actions (Wu 1999, p. 255). Control, speed, and sensory device could be antecedents of the system efficacy perception. Level of control can be computed as the number of actions that the computer system offers to the user. That is, if a site provides more navigational options (e.g., site map, links, search box), users feel that the site/system is responsive to their request. Kiousis (2003) suggests that speed is an important characteristic of an interactive system. He operationalize speed as an average between the amount of time it takes for the software to transmit information and the amount of time responses take to be communicated. For example,

Wu (1999) measures the system efficacy perception as “while I was on the site, I could quickly jump from one page to another”. Some sensory devices (e.g., video, audio, game) are important interactive features of a system. For example, Kiousis (2003) measure interactive system structure as the amount of devices employed by a system to activate the five senses. Ha and James (1998) suggest that Web, as a computer device, can perform many input-output functions (e.g., curiosity arousal devices, games) with the click of the mouse to enhance playfulness and entertainment value, which is one dimension of interactivity. Thus, we propose that:

P6: As the number of navigational features (e.g., links, site map) increases, system-efficacy perception increases.

P7: As a site loads faster, system-efficacy perception increases.

P8: As the number of sensory devices (e.g., games, animation, sound) increases, system-efficacy perception increase.

The Effect of Interactivity

There are many ways to measure Web-site effectiveness. Possibilities include such variables as number of hits, time spent on Web sites, direct sales generated, recall, attitudes, and many more. To date, there are some indications that consumers’ perceptions of interactivity enhance effectiveness. Thus, we show a positive relationship between these variables in Figure 3-1.

Some studies have investigated the potential effect of feature-based interactivity model (Cho and Leckenby 1999; Coyle and Thorson 2001; McMillan 2002a). For example, Cho and Leckenby (1999) found that a higher degree of interactivity leads to enhanced advertising effectiveness (i.e., positive attitude toward a target ad and higher

purchase intentions). However, some studies found conflicting results and report no relationship between feature-based interactivity and attitude or behavioral intentions (Coyle and Thorson 2001; McMillan 2002a).

In contrast, research examining the effect of perceived interactivity on various behavioral measures provides consistent results, showing that there is positive relationship between interactivity perceptions and attitude or behavioral intentions (Wu 1999; McMillan 2000; McMillan 2002a; McMillan and Hwang 2002). In particular, McMillan (2002a) distinguished between perception-based and feature-based model of interactivity when examining its potential effect. By analyzing 108 health-related Web-sites, she argued that perception-based interactivity model is a better predictor of attitude toward sites and behavioral intentions than feature-based interactivity model. Based on above discussion and two theoretical backgrounds, we propose (see Figure 3-1 for a summary of effectiveness indicators):

P9: As perceptions of two-way communication increase, Web-site effectiveness increases.

P10: As perceptions of control increases, Web-site effectiveness increases.

P11: As perceptions of system efficacy increases, Web-site effectiveness increases.

User Characteristics Variables and Its Moderating Role

McMillan (2002a) is the first scholar who examined the relationship between feature-based interactivity and perception-based interactivity. Based on her earlier model of interactivity (feature-based interactivity model, McMillan 2000), she classified 108 health-related Web sites into four groups. At the same time, these Web sites were rated and classified into four groups based on scores of users' two key perceptions (i.e.,

two-way communication and control). Then, feature-based scores and perception-based scores were compared for each site. She found that there is no relationship between perception-based and feature-based model. That is, some sites with more interactive features were perceived as not interactive or vice versa. This is somewhat incompatible with our proposition showing the positive relationship between key site features and interactivity perceptions.

It is important for researchers to understand how individuals perceive actual interactive features and how they experience the environment (Steuer 1992; Liu and Shrum 2002). For example, Liu and Shrum (2002) emphasized that the nature of interactivity (i.e., quality of features) is more important than the level of interactivity (i.e., quantity of features). Many researchers have manipulated the level of interactivity in terms of absence or presence of certain features. However, without valid manipulation checks, it is hard to know whether those features are perceived to be equal in interactivity or be valued more highly than others. Steuer (1992) argued that if interactivity is defined as a variable to enhance users' sense of telepresence, its locus is the perceiver. That is, the characteristics of individuals experiencing the environment are important. Based on these, we propose that the relationship between interactive features and interactivity perceptions is likely to be constrained by individual idiosyncratic characteristics. Individual characteristics include level of involvement, Internet experiences, privacy concerns, desire for control, and optimal stimulation level. In following paragraphs, we discuss each of these factors that influence relationship between Web-site's interactive features and users' interactive perceptions.

Level of Involvement: Level of involvement is an important concept in both traditional media and electronic media. According to the Elaboration Likelihood Model (Petty and Cacioppo 1986), the level of involvement influences the consumer's motivation to process advertising, which affect the processing of advertising messages and attitude change. Applying this theory to Internet environment, people with high involvement with product or subject are more likely to engage in cognitive process by interacting with various stimuli on a Web site (Yoo and Stout 2001). There are several empirical studies supporting this theory. For example, people who are more involved with the subject of a Web site will find the site to be more interactive (Cho and Leckenby 1999; McMillan 2000).

P12-1: The level of involvement will moderate the relationship between design features and interactive perception. That is, as the number of information collection, feedback and transaction functions increase, consumers show higher perception of two-way communication when they are highly involved in the situation/subject than they are less involved.

P12-2: The level of involvement will moderate the relationship between design features and interactive perception. That is, as the number of choice and navigational features increase, consumers show higher perception of control when they are highly involved in the situation/subject than they are less involved.

P12-3: The level of involvement will moderate the relationship between design features and interactive perception. That is, as the number of sensory device, the number of navigational features, and speed increase, consumers show higher perception of

system-efficacy when they are highly involved in the situation/subject than they are less involved.

Internet Experiences: Yoo and Stout (2001) argue that there would be some difference in processing information or advertising messages between users with less Internet experience and Web-savvy users. Computer-mediated communication anxiety is also another factor affecting the relationship between interactivity features and interactivity perceptions. For example, Liu and Shrum (2002) propose that people with high level of computer-mediated communication anxiety tend to avoid interaction in computer-mediated environment and less likely to enjoy two-way communication features (e.g., chat room, bulletin board) on the Internet.

P13-1: The Internet experience is positively related to two-way communication perception. That is, experienced Internet users are more likely to show higher perception of two-way communication on the site.

P13-2: The Internet experience is positively related to control perception. That is, experienced Internet users are more likely to show higher perception of control on the site.

P13-3: The Internet experience is positively related to system-efficacy perception. That is, experienced Internet users are more likely to show higher perception of system-efficacy on the site.

Privacy Preferences: Privacy is an Internet users' key concern. For example, interactivity often takes the form of marketers collecting, compiling, and using information about consumers. And this may result in potential loss of privacy (Stewart 2004). Not all customers will take advantage of online feedback mechanisms made

available to them (Liu and Shrum 2002). Some of them feel these mechanisms are against their privacy. Therefore, users' level of privacy concerns might be important consideration in adding interactive features to a Web site.

P14: The privacy preference is negatively related to two-way communication perception. That is, consumers with high privacy preference are more likely to show lower perception of two-way communication on the site.

Desire for Control: Users' desire for control might be a moderator between interactive features and perceptions. Desire for control is defined the extent to which people generally are motivated to see themselves in control of the events in their lives (Burger 1992). According to this theory, people with high desire for control tend to seek more control in interacting with media, whereas people with low desire for control do not tend to process control relevant features/information, and thus, control features are not likely to make any difference for them. Therefore, higher control features (e.g., more options) could lead higher interactivity perceptions for people with high desire for control than for people with low desire for control.

P15-1: Desire for control is positively related to control perception. That is, people with high desire for control are more likely to show higher perception of control on the site.

P15-2: Desire for control is positively related to system-efficacy perception. That is, people with high desire for control are more likely to show higher perception of system-efficacy on the site.

Optimal Stimulation Level: According to optimal stimulation level theory (Berlyne 1960; Raju 1980), every organism prefers a certain level of stimulation, which may be termed "optimum stimulation." Therefore, when environmental stimulation (e.g.,

interactivity) is below optimum, then Web users will attempt to increase stimulation; when it is above optimum, s/he will strive to reduce it. Applying this theory, we propose that Web pages of moderate interactivity are more effective than Web pages that are either high or low in this dimension. Therefore, we propose:

P16: Web-site effectiveness is higher for Web sites with moderate interactivity than for Web sites with a low- or high-interactivity (inverted-U relationship).

Situational Factor (User's Tasks)

Second factor influencing the relationship between interactivity features and perception is situational variable. For example, consumers whose primary purpose is information search about a product would favorable interpret an interactive structure that allows them to find a lot of information very easily. In contrast, if consumers' goal is make a quick transaction, they will be annoyed by too much information. The role of situational factor in interactive media is well explained by Structuration Theory (Giddens 1984; Stewart and Pavlou 2002). Key elements of this theory are interaction, structure, and interpretation. Interaction is embedded in a structural context (e.g., interactive features of Web site). Interpretation mediates the relationship between structure and interaction, and this interpretation is mediated by the actors' goals. Therefore, when interactive design features of Web site support users' tasks of use the site, users show higher perception of interactivity. This situational factor is also considered in Cho and Leckenby (1999) research. Employing Expectancy-Value theory by Fishbien (1967) to Web advertising, they found that whether the target ad (i.e., later message after clicking a banner ad) satisfies what people expected from the banner ad may be an important factor influencing interactivity. That is, consumers evaluate advertising message's

interactivity based on the degree to which it is effective in achieving their goals and values. Therefore, we propose:

P17: Users' tasks will moderate the relationship between design features and interactivity perceptions. That is, as the number of transaction facility and feedback features increase, consumers show higher perception of two-way communication when a user's tasks is making a quick transaction. Also, as the number of choice and navigation features increase, consumers show higher perception of self-efficacy when a user's task is prolonged information search.

Discussion

In this paper, we discuss interactivity and provide answers to three questions: 1) what are some efficient ways for classifying different kinds of interactivity? 2) what are the best consensual definitions of interactivity?, and 3) what are the key Web site features that contribute to interactivity perceptions? In addition, we discuss the relationships among site features, interactivity perceptions, and site effectiveness (see figure 1). We propose that there are three different approaches (i.e., feature-based, perception-based, and combination of both) in defining interactivity. Key dimensions of feature-based interactivity include reciprocal communication and telepresence dimensions. Perception-based interactivity consists of three dimensions including two-way communication, control, and system-efficacy. A classification table is created to illustrate and summarize different kinds of interactivity (see Table 3-1). We provide two hybrid definitions of interactivity: 1) feature-based and 2) perception-based. We propose that certain site features (e.g., level of transaction facilitation, number of options) affect interactivity perceptions and subsequently influence Web-site effectiveness (e.g.,

purchases, loyalty). The moderating effects of individual characteristic variables (e.g., involvement, desire for control) are also considered.

Many companies invest their resources to build interactive Web sites to accomplish their e-objectives (e.g., satisfaction, loyalty, future intention). However, interactivity resides in the eyes of users, not in system itself. Our model identifies key Web-design features that increase interactivity perceptions. We also suggest that Web designers and practitioners should consider the role of individual characteristics in the formation of interactivity perceptions. Our model suggests several avenues for researchers. Given that the current definitions of interactivity are inconsistent, our classification scheme and hybrid definitions might be useful in guiding future research on interactivity. Many empirical studies have measured interactivity in terms of levels (e.g., presence vs. absence, number of features) of interactivity features. However, without valid manipulation check and considering individual characteristics, it is impossible to understand whether consumers perceive certain features interactive or not. Our proposed model suggests a variety of measures for site effectiveness (e.g., purchases, loyalty, word-of-mouth, satisfaction). For instance, a consumer's experience with a site can result in subsequent, wide-spread word-of-mouth (WOM) communications via chat rooms and spoof sites. To date, most studies have focused on traditional measures of effectiveness (e.g., attitude, purchase intentions). More research should be done to understand the relationship between interactivity and unique aspects of the Web (e.g., hits, time spent on site, click-stream data).

There are several limitations associated with this paper. First, no empirical tests are conducted. Second, we only consider interactivity on the Web. Different definitions

and conceptualization may be required to examine interactivity in other context (e.g., PDA, digital cable). Third, existing interactivity definitions do not adequately consider the control issue. For instance, given the present state of technology, users may experience more control when reading a newspaper (e.g., in terms of their ability to skip around easily within the medium) than they do when interacting online.

Our knowledge about interactivity and related phenomena are still in the development stage. This paper may serve as a starting point to stimulate future research about interactivity and its implications for marketing practice.

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CHAPTER 4

A LAB EXPERIMENT ON WEB FEATURES, INTERACTIVITY PERCEPTION, AND SITE EFFECTIVENESS

Introduction

In this chapter, we conduct an experiment to examine what kinds of Web-site features affect consumers' perceptions of Web-site interactivity. Other key dependent variables are measures of Web-site effectiveness (e.g., satisfaction, loyalty, word of mouth [WOM]). Although there are many different kinds of interactive media (e.g., TiVo, cable television, telephone, video game), we focus on Web-site interactivity.

The objectives of this chapter are threefold. The first is to test the relationship between design features and interactivity perceptions. Site-design features are the elements firms use to facilitate delivery of content on the Web. Because it is not realistic to test all possible features in one empirical setting, we test three key features (i.e., number of clicks, response time, and message type). In particular, we are interested in applying four theories: 1) telepresence theory (Steuer 1992), 2) service-waits literature (Taylor 1994), 3) interactivity theory (Rafaeli 1988), and 4) social presence theory (Short, Williams, and Christie 1976). Telepresence theory predicts a negative relationship between the number of clicks and interactivity perception and site effectiveness. Service-waits literature suggests that response time is negatively related to interactivity perception and site effectiveness. Two theories, interactivity theory and social presence

theory, predict how different message types affect interactivity perception and site effectiveness.

The second objective is to examine the relationship between perceived interactivity and site effectiveness. Thus, we test contrasting hypotheses that we derive from competing theories, namely, stimulus-organism-response (S-O-R) theory and optimal-stimulation-level theory (OSL). For example, S-O-R posits that an increase in cognition (e.g., interactivity perception) positively affects evaluation (i.e., site effectiveness). In contrast, OSL theory suggests that there is a certain level of interactivity in which site effectiveness is maximized. Therefore, we investigate the nature of the relationship (e.g., linear, curvilinear) between interactivity perception and site effectiveness.

Third, we apply cognitive control theory (Averill 1973) to understand the relationship between message type (i.e., personalized message and standardized message) and site effectiveness. That is, are the message-type effects the same under users' different tasks? According to cognitive control theory, in stressful situations, people feel more in control when they are given more information. For example, people who send messages to a store about product delivery problems (i.e., a complaining situation) show greater satisfaction and repurchase behavior when they receive personalized message than do people who send product-inquiry messages. To test the theory, we create two shopping (or user) situations: 1) price inquiry (prepurchase) and 2) faulty-service inquiry (postpurchase).

Conceptual Background

Interactivity

There is considerable debate in the literature about how to define interactivity (see McMillan 2002; Steuer 1992; Yadav and Varadarajan 2005). Table 4-1 summarizes the different definitions of interactivity (for a more detailed explanation of interactivity, see Chapter 3). Essentially, there are two ways to define interactivity: 1) feature-based interactivity and 2) perception-based interactivity. The feature-based approach suggests that interactivity resides in the capability or features of a communication medium. We identify two views within the sphere of feature-based interactivity: communication and technology. In contrast, the perception-based approach focuses primarily on how individuals perceive interactivity. As Table 4-1 shows, perceived interactivity contains three dimensions: communication, control, and synchronicity (responsiveness). Table 4-1 classifies different kinds of interactivity on the basis of two views (i.e., feature-based and perception-based) and four dimensions (i.e., communication, technology, control, and synchronicity). In this study, we focus on perceived interactivity. On the basis of the three dimensions of perceived interactivity, we define “perceived interactivity” as the degree to which users believe that a Web site facilitates interpersonal communication, gives control over online experiences, and responds to human actions quickly. The features adopted for our definition are indicated in Table 4-1 (in bold). In the following section, we provide an overview of Table 4-1 and its two categories.

Table 4-1: Definitions of Interactivity

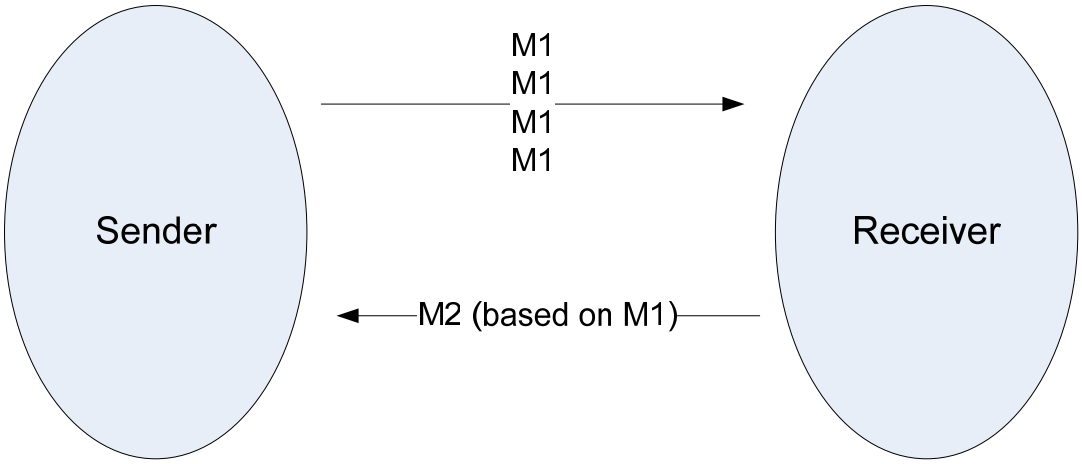
Authors	Definitions	Approach	C	T	CO	S
Rafaeli (1988)	Recursive communication exchange (later exchanges refer to earlier ones and so on), in which communication roles are interchangeable.	F	√			
Heeter (1989)	Interactivity is a six-dimensional concept (p. 221): 1) choice available, 2) amount of effort required to access information, 3) responsiveness, 4) potential to monitor information use, 5) ease of adding information to system, and 6) potential to facilitate interpersonal communication.	F	√	√		
Blattberg and Deighton (1991)	The facility for individuals and organizations to communicate directly with each other despite time or distance.	F	√			
Steuer (1992)	The extent to which users can participate in modifying the form and content of a mediated environment in real time (p. 84). Interactivity has three dimensions: 1) speed, 2) range (number of possible actions at any given time), and 3) mapping (similarity between human actions and those in the mediated environment).	F		√		
Newhagen, Corders, and Levy (1995)	Message senders' psychological sense of **their own (control) and the receivers' interactivity (system efficacy)** (p. 165).	P			√	√
Hoffman and Novak (1996)	Interactivity in hypermedia CMEs, such as Web sites on the Internet, can happen "with the medium (i.e., machine interactivity) in addition to through the medium (i.e., person interactivity)" (p.53).	F	√	√		
Ha and James (1998)	The extent to which the communicator and the audience respond to or are willing to facilitate each other's communication goals (p. 461).	F, P	√	√	√	

Jensen (1998)	A measure of a media's ability to let the user exert an influence on the content and/or form of the mediated communication.	F		√		
Cho and Leckenby (1999)	The degree to which a person actively engages in advertising processing by interacting with advertising messages and advertisers (p. 163).	F	√	√		
Wu (1999)	Perceived interactivity can be defined as a two-component construct consisting of navigation and responsiveness (p. 255).	P			√	√
McMillan (2002)	Identifies four types of interactivity based on the intersection of **user control and direction of communication:** monologue, feedback, responsive dialogue, and mutual discourse.	P	√			√
Kiousis (2002)	The degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many), both synchronously and asynchronously, and participate in reciprocal message exchanges (third-order dependency). With regard to human users, it also refers to their ability to perceive the experience as a simulation of **interpersonal communication** and to increase their awareness of telepresence.	F, P	√	√	√	√
Liu (2003)	The degree to which two or more communication parties can act on each other, on the communication medium, and on the messages, and the degree to which such **influences are synchronized**.	P	√		√	√
Yadav and Varadaraj an (2005)	Interactivity in the electronic marketplace is the degree to which computer-mediated communication is perceived by each of the communicating entities as a) **bidirectional,** b) timely, **c) mutually controllable, and d) responsive.**	P	√		√	√

Note. Approach: F (feature-based), P (perception-based). C = communication view, T = technology view, CO = control, and S = synchronicity. We adopt the phrases in bold in our definition.

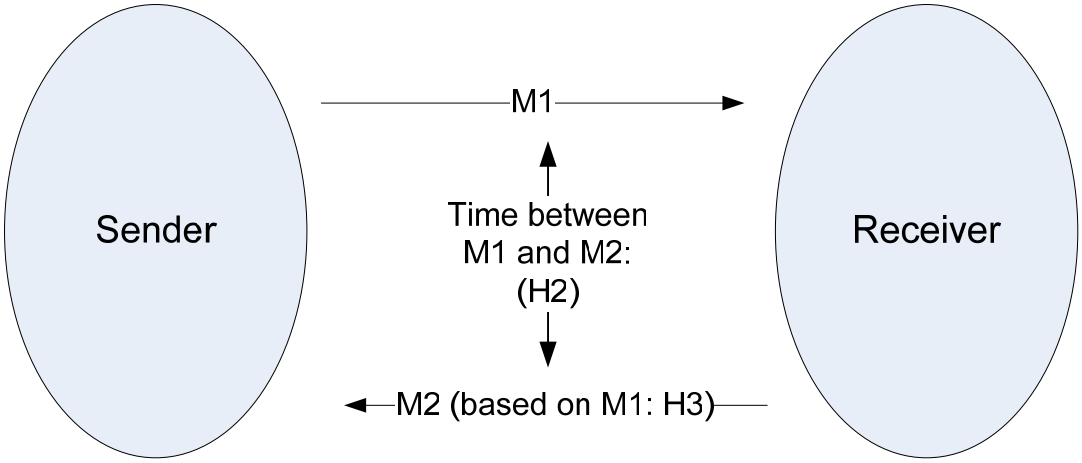
Feature-based approach: The feature-based approach highlights the importance of having different media features (e.g., speed, message type) on a medium. There are two dominant views of feature-based interactivity: 1) communication and 2) technology. The communication view is often discussed from an interpersonal communication perspective. For example, Rafaeli (1988, p. 111) defines interactivity as "an expression of the extent that in a given series of communication exchanges, any later message is related to the degree to which previous exchanges referred to even earlier transmission" (see Table 4-1). Figures 4-1 and 4-2 illustrate this relationship. First, a person sends a message (M1) to an object. Second, an object receives the message (M1) and sends a return message (M2 based on M1). The person receives the return message associated with the first message (M1). A device (or medium) can be perceived as interactive if this cycle can be easily repeated over time.

Some definitions highlight the role of media technology in this message exchange. For example, interactivity is considered a property of a medium (Heeter 1998; Steuer 1992) that creates mediated environments. That is, information is not merely transmitted from a sender to a receiver; rather, mediated environments are created and experienced. Therefore, Steuer (1992) defines interactivity as the extent to which users can participate in modifying the form and content of a mediated environment in real time (see Table 4-1).



Note. M1 denotes number of clicks, and M2 denotes responding messages.

Figure 4-1: Interactivity: Hypothesis 1



Note. M1 denotes message, and M2 denotes responding message.

Figure 4-2: Interactivity: Hypotheses 2 and 3

Under a feature-based approach, most studies operationalize interactivity as the presence or absence of particular features. Often, interactivity is operationalized as the quantity of specific features. Table 4-2 provides a list of extant studies that have applied key interactive design features in an empirical setting. For example, Coyle and Thorson (2001) manipulate interactivity on the basis of Steuer (1992)'s definition: 1) presence of a clickable image map and 2) the number of clickable areas. The interactive design features in Table 4-2 are grouped into three categories: communication, choice, and speed (see Table 4-3). Most prior empirical research examines *feedback mechanisms* in a communication dimension (e.g., e-mail links, chat rooms) and *choice dimensions* (e.g., number of options, navigational tools). However, there are indications that these features may not be appropriate in the study of interactivity. First, prior research suggests that a site is considered interactive when it has more of these features. However, it is questionable whether the addition of more of these features results in higher levels of interactivity. Without valid manipulation checks, it is not possible to know which features are perceived as interactive (Liu and Shrum 2002). Second, McMillan (2002) finds that these feedback mechanisms and choice features are not related to interactivity perception. That is, increasing the number or presence of these features does not necessarily stimulate an increase of interactivity.

In contrast, relatively little attention has been paid to other features in the communication dimension (e.g., message relatedness, social presence) and speed dimension. In addition, these features are predicted by key theories (i.e., interactivity theory, social presence theory, telepresence theory, and service-waits literature).

Therefore, in this study, we focus on features such as message relatedness, social presence, and speed (e.g., response time).

Perception-based approach: Some scholars attempt to understand interactivity through individual perceptions (Liu 2003; McMillan 2002; Newhagen et al. 1995; Wu 1999). Under this approach, perceived interactivity includes three dimensions: communication, control, and synchronicity. Table 4-1 classifies perceived interactivity in terms of these three dimensions. The definition we use herein includes these three concepts. A two-way communication is the extent to which users believe that a Web site facilitates two-way communication. Control is defined as Web users' perceived control over where they are and where they are going. Synchronicity is defined as a Web site's responsiveness to users' actions. Perceived interactivity, which is a dependent variable in our study, is measured in terms of these three dimensions.

Table 4-2: Key Interactivity Features Used in Prior Studies

Author	Method	Theories	Key Site/Medium's Design Features of Interactivity
Ha and James (1998)	Content analysis	NC	1) Curiosity arousal devices and games. 2) Choice of color, speed, language. 3) Hyperlinks. 4) Monitoring mechanisms (e.g., registration). 5) Response mechanisms (e.g., e-mail address, toll-free telephone number, order mechanisms, surveys, chat rooms).
Ghose and Dou (1998)	Content analysis and Logit model	NC	1) Customer support: software downloading, online problem diagnostics, electronic-form inquiry, order status tracking, comment, feedback. 2) Marketing research: site survey, product survey, new product proposal. 3) Personal-choice helper: keyword search, personal-choice helper, virtual reality display, dealer locator. 4) Ad/promotion: electronic coupon, user groups, online order, sweepstakes/prize, multimedia shows, push media, interactive job placement. 5) Entertainment: electronic postcard, surfer postings, games.
Massey and Levy (1999)	Content analysis	Heeter's (1989) interactivity definitions	1) Choice available: news, entertainment, multimedia, commercial, and news customization. **2) Responsiveness to users: e-mail links to journalists, actual response rate to e-mail messages.**

			3) Ease of adding information: online letters to the editor, bulletin boards, reader polls on news topics of the day. 4) Interpersonal interaction: chat rooms. 5) Immediacy of Information: presence of a publication date or an update ticker.
Coyle and Thorson (2001)	Experiment	Steuer's (1992) interactivity definition	1) Presence of a clickable image map. 2) The number of clickable areas on the opening page.
Tremayne and Dunwoody (2001)	Think-aloud protocol analysis	Steuer's (1992) interactivity definition	1) Web-site structure: degree of choices that allow users to alter the content they consume (e.g., hypertext links, search engines, and rollover graphics). 2) Web experience.
McMillan (2002)	Content analysis	NC	2) Two-way communication: e-mail, registration, survey, bulletin board, order, chat. 3) Control of communication: search, choice, curiosity, game, links, external links.
Kiousis (2002)	Conceptual	NC	**1) Speed: amount of time transmitting and taking messages.** 2) Timing flexibility: allowing participants to communicate in real time or in a delayed manner. 3) Range: the number of actions that the system offers to the user. 4) Sensory complexity: amount of devices employed to activate the five senses.

			5) Third-order dependency: percentage of overall messages that refer to prior message transmissions. **6) Social presence: percentage of messages when participants explicitly refer to themselves (e.g., I, me, my).**
Macias (2003)	Experiments	Steuer's (1992), Ha and James's (1998), and Hoffman and Novak's (1996) interactivity definitions	1) Range: choice options (e.g., different language), search, and site map. 2) Animation. 3) Hypertext links. 4) E-mail, chat rooms, comment forms.

Note. NC = not clear. We empirically study the features in bold in this dissertation.

Table 4-3: Summary of Key Interactive Features

Dimensions	Examples of Site (System) Features	Empirical Test (of Consequences)
Communication	1) Feedback mechanisms: e-mail links, chat rooms, comment form, toll-free telephone number, Q&A, bulletin board, FAQ 2) **Message relatedness**: Percentage of overall messages based on prior message transmission 3) **Social presence** 4) Level of transaction facilitation: online order, order status tracking service	Ghose and Dou (1998), Massey and Levy (1999), McMillan (2002), Kiousis (2002), Macias (2003)
Choice	1) Number of options: different languages, background color, searching option, news customization, multimedia 2) Personal-choice helper 3) Navigational choices: Search function, site map, clickable image map, and links	Ghose and Dou (1998), Colye and Thorson (2001), Massey and Levy (1999), McMillan (2000), Macias (2003), Tremayne and Dunwoody (2001), and Macias (2003)
Speed	**1) Speed:** amount of time transmitting and taking messages (e.g., **response time, the number of clicks required to reach certain information**).	Kiousis (2002)

Note. We empirically study the features in bold in this dissertation.

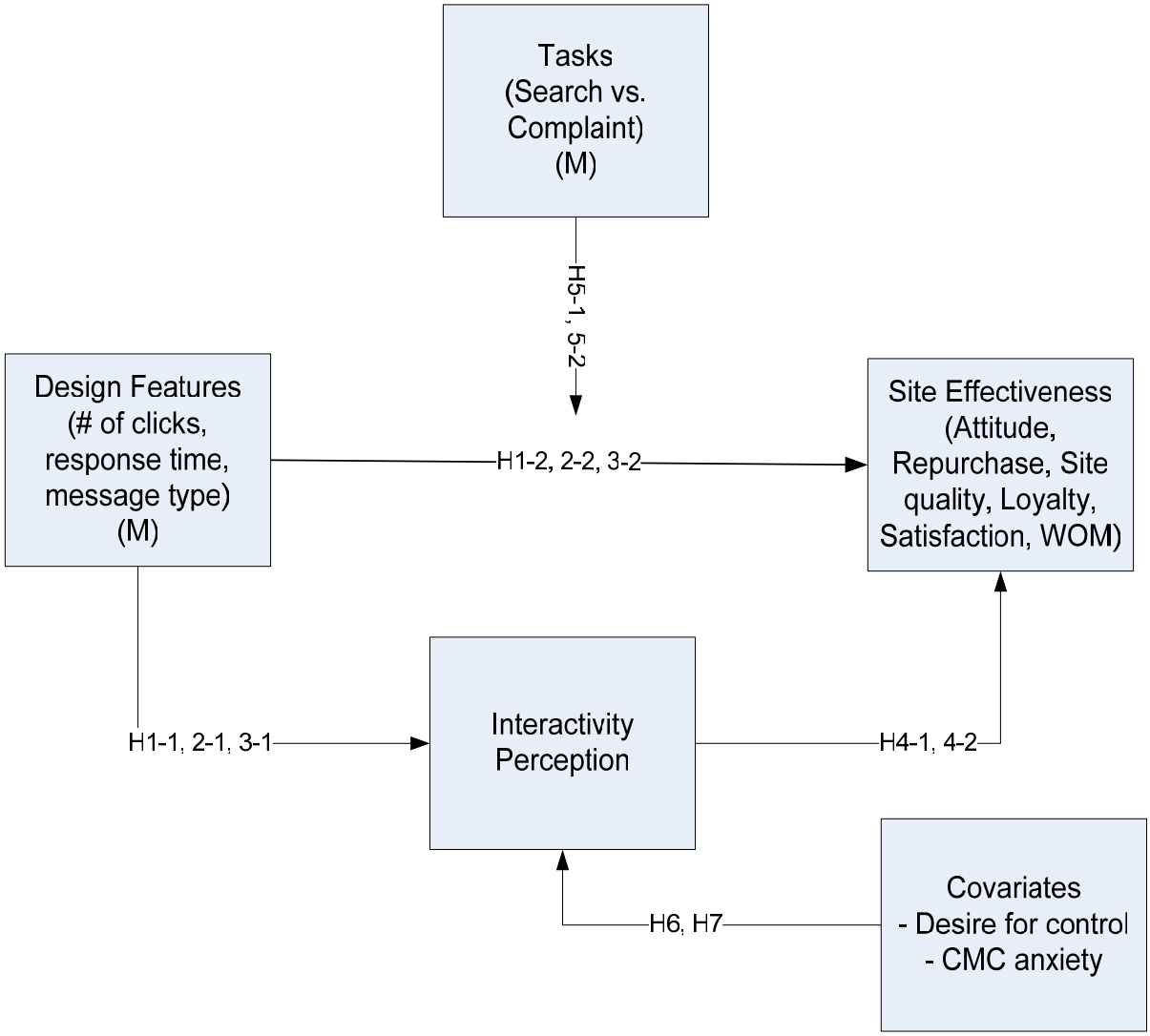
Web Features, Interactivity Perceptions, and Site Effectiveness

From a marketing perspective, what are the best ways to enhance perceived interactivity? As implied in the first objective of this chapter, one possible approach is to add more interactive features to a Web site. However, few studies examine this relationship (cf. McMillan 2002), and thus we are uncertain about the relationship between media features and interactivity perceptions. As Table 4-3 shows, there are at least 20 features that might influence interactivity perception. We acknowledge that it is not possible to test all variables in one empirical setting. Thus, we select the three features that the key theories support: 1) number of clicks, 2) response time, and 3) message type.

In the design of an *effective* Web site, it is important to create an attractive presence that meets the various e-objectives of the firm (Udo and Marquis 2001). Therefore, site effectiveness is measured by how well the Web site achieves such e-objectives. We investigate six measures of site effectiveness here: attitude, repurchase, satisfaction, site quality, loyalty, and WOM. Given the nature of prior studies (i.e., all perceptual data), we do not know whether the relationship between features and effectiveness is linear or curvilinear. Therefore, we examine the relationship between interactivity perception and site effectiveness on the basis of two competing theories: 1) S-O-R framework and 2) OSL theory.

In our empirical setting, participants send instant messages to an e-store. Firms/organizations create their Web sites to accomplish various objectives (e.g., generating transaction, attracting visitors). An important e-objective is managing customer relationships (e.g., integrated marketing, communications with customers,

customer support services) (Pan and Lee 2003). In particular, the Internet environment provides immediate communication with consumers through e-mail or chat. For example, many companies provide live chat functions through instant messaging on their Web sites to facilitate interactions between online consumers and customer service representatives. Prior research suggests that a consumer's computer-mediated communication (CMC) experience with a firm is an antecedent of various site effectiveness measures, such as intentions, satisfaction, loyalty, and WOM behavior (Moore and Moore 2004; Strauss and Hill 2001). Gartner predicts that instant messaging will become the preferred communication method, exceeding e-mail traffic by 2006 (Grey 2003). Given the time limits of experiments in a lab setting, it is appropriate to use a communication scenario (i.e., sending instant messages to a store) in our experimental setting to examine the relationships among site features, interactivity, and site effectiveness. Figure 4-3 shows an integrative model of site features, interactivity perception, and site effectiveness. We develop the hypotheses in the following section.



Note. M = manipulated variables.

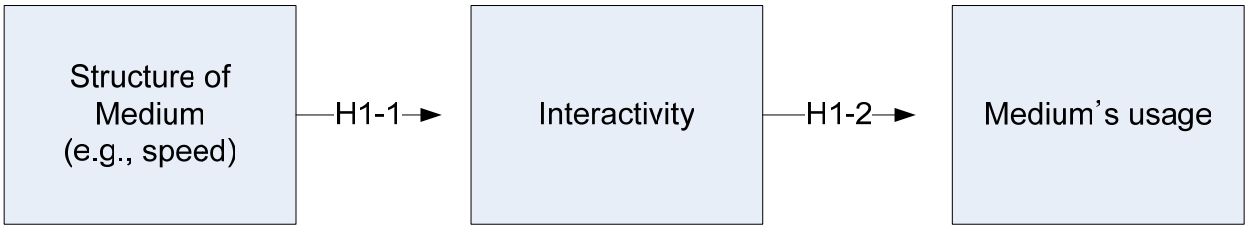
Figure 4-3: Integrated Model of Web Features, Interactivity Perception, and Site Effectiveness

Hypotheses

Speed: Number of Clicks and Response Time

Here, we are interested in examining how the speed of a Web site affects interactivity perceptions. Speed has been considered an important element of interactivity (see Table 4-1 and Table 4-2), and it is defined as the amount of time to transmit and take messages (Kiousis 2002). In our empirical setting, participants are asked to send instant messages to a store. Therefore, we define speed in terms of how quickly consumers can send instant messages and how quickly they receive a response. On the basis of this definition, we operationalize speed in terms of two features: 1) the number of clicks required to reach the store's "live chat" button (how easily consumers find the button) and 2) response time (how quickly consumers receive a reply).

We hypothesize that the number of clicks it takes to receive a response is negatively related to interactivity perception and site effectiveness. Telepresence theory (Steuer 1992) suggests that the structure of a medium influences users' sense of telepresence and medium usage. Telepresence is defined as the experience of presence in an environment by means of a communication medium (Steuer 1992, p. 76). For example, if a person is watching the news on television, he or she is experiencing the distant "real" world through a television monitor. Yet he or she may have the illusion of being there (sense of telepresence).



Note. Speed is the rate at which input can be assimilated into the mediated environment.

Figure 4-4: Telepresence Theory

In particular, Steuer (1992) theorizes that interactivity is a key construct of telepresence, and he identifies important medium structures (capabilities) that contribute to interactivity and telepresence. One important medium structure that Steuer suggests is speed, which refers to the rate at which input can be assimilated into the mediated environment. Therefore, telepresence theory predicts that users perceive more interactivity in a medium (i.e., site) when that medium manages users' requests/inputs quickly (see Figure 4-4). In our setting, participants send inputs (clicks) to locate a store's "live chat" button. Therefore, they perceive more interactivity when they click fewer tiers to connect to information because a fewer number of clicks is associated with how quickly their inputs can be assimilated into the medium (i.e., Web site). This relationship also appears in Figure 4-1. Clicking is a kind of message (M1: looking for a store's chat button) that people send to an object (site). If a person needs to click four times to locate certain information, this means that he or she sends the same message (M1: looking for chat button) four times and then receives one return message (M2: finding a "live chat" button) from a site. A medium is perceived as

interactive if the number of messages (number of M1s) required to stimulate a return message (M2) is relatively small.

In the interviews (Chapter 2), Web designers indicated that the number of clicks is an important feature. For example, there is a maximum number of clicks or seconds that users are willing to spend trying to reach certain information. Designers use a rule of thumb to minimize user clicks so that users will not be overtaxed.

> On e-commerce sites, if I have to click five times to get to a page I'm looking for, I'm probably going to leave. I don't have that much patience. So it better be easy to get to the information I am looking for. (Participant #6)

> People have three seconds to get the information, or you have three seconds to have somebody to log onto your Web page and to this is what I want, and to click on a link and go somewhere else. If they can't find it quickly, they will go away usually, unless it's a very particular thing they are looking for. (Participant #2)

On the basis of our participants' comments, we expect the following:

Hypotheses 1-1: As the number of clicks required to reach a "live chat" button decreases, interactivity perceptions increase.

Hypotheses 1-2: As the number of clicks required to reach a "live chat" button decreases, Web site effectiveness increases.

Again, we measure site effectiveness with six variables: attitude, repurchase, site quality, loyalty, satisfaction, and WOM.

We next discuss how response time (e.g., instant messages) affects interactivity and site effectiveness. In our setting, participants are waiting for an e-store's response to their instant messages. Figure 4-2 shows the time difference between the point when a person sends a message (M1) and the point when a response communication is received (M2). A medium is perceived as more interactive if the time lag between M1 and M2 decreases.

The effect of time lag on interactivity perception and communication effectiveness is predicted in the services literature on waiting time. Duration of waiting time in services is an important factor that affects 1) consumers' affective and cognitive reactions (Hui and Tse 1996; Katz, Larson, and Larson 1991) and 2) their service evaluations and behaviors (Davis and Vollmann 1990; Hui and Tse 1996; Taylor 1994). Empirical evidence shows that waiting time has a negative effect on affective/cognitive reaction and overall service evaluation/behaviors. For example, Hui and Tse (1996) find that duration of waiting time is an important predictor of perceived duration of time and acceptability of service. Therefore, the services literature predicts that waiting time negatively affects interactivity perception (cognitive reaction) and site effectiveness (service evaluation and behavior). In our setting, participants send instant messages to an e-store and wait for the store's response. Thus, consumers' interactivity perceptions and site effectiveness are enhanced as a store's response time to their instant messages decreases.

Hypotheses 2-1: As a store's response time to consumers' messages decreases, interactivity perceptions increase.

Hypotheses 2-2: As a store's response time to consumers' messages decreases, Web-site effectiveness increases.

Message Type

We hypothesize that the type of message is related to consumers' interactivity perceptions and site effectiveness. In our empirical setting, participants receive response message from an e-tail store. We apply two theories—namely, interactive theory and social presence theory—to predict the relationship.

Rafaeli (1988) distinguishes among three communication processes: 1) two-way communication, 2) reaction, and 3) interaction. A two-way communication is established as soon as a message flows bilaterally (i.e., the presence of contact information, such as toll-free telephone numbers and e-mail addresses). For example, as Figure 4-2 shows, as long as a person is able to send a message (M2) to an object (site), a two-way communication is facilitated. Reactive communication requires that later messages refer to earlier ones (e.g., a response to someone's e-mail message). For example, a person sends a message (M1) to an object (site) and receives a response (M2) from the site. Interaction differs from reaction through the incorporation of earlier references to the content, nature, or form (e.g., the content of a replying e-mail is related to the previous messages). Consequently, when a site sends a message that is related to a consumer's prior message, interactivity perceptions and site effectiveness are enhanced. Figure 4-2 illustrates this relationship. Here, an Interactive message is based on the way later messages (M2) relate to previous messages (M1).

In addition, social presence theory (Short et al. 1976) predicts the effect of message types on interactivity perception and site effectiveness. According to this theory, a sense of each party's presence is important in interpersonal interaction. For example, in a classroom, a teacher knows that he or she is interacting with students when they send social presence cues, such as eye contact or facial expression. Similarly, when a person communicates with a medium (e.g., a Web site), and the medium facilitates social presence cues that create a sense that the person is communicating with a "real" person, he or she will consider the medium more interactive. Therefore, social presence theory posits that consumers perceive a Web site as more

interactive and effective when the site has social presence cues than when the site has no social presence cue. In our empirical setting, if a reply is from a physical person (the name of the person is known) rather than from an anonymous customer representative, consumers' interactivity perceptions and site effectiveness are enhanced. On the basis of these two theories, we expect the following:

Hypotheses 3-1: When Web sites send messages that are related to former messages and include a social presence cue, consumers' interactivity perceptions are enhanced.

Hypotheses 3-2: When Web sites send messages that are related to former messages and include a social presence cue, site effectiveness is enhanced.

Site Effectiveness

We are interested in the relationship between interactivity perception and site effectiveness. That is, when interactivity perception is enhanced, is site effectiveness also enhanced? Two theories predict different relationships. First, the S-O-R framework predicts a positive, linear relationship between interactivity perception and site effectiveness. The S-O-R framework has been widely used in the store environment literature in which environmental elements (e.g., temperature, light, salesperson) are featured as stimuli and affect consumers' cognitive states (e.g., interactivity perception) and behaviors (responses) (Mehrabian and Russell 1974). Empirical research shows that there is a positive relationship between interactivity perceptions and attitude or behavioral intentions (McMillan 2002; McMillan and Hwang 2002; Wu 1999).

In contrast, according to OSL theory (Berlyne 1960; Raju 1980), every organism prefers a certain level of stimulation, which is termed "optimum stimulation." Consequently, when interactivity perception is below optimum, Web users will attempt

to increase stimulation; when it is above optimum, they will strive to reduce it. The OSL theory has been supported in many empirical studies (e.g., Geissler, Zinkhan, and Watson 2001; Nadkarni and Gupta 2004; Stevenson, Bruner, and Kumar 2000; Sundar, Brown, and Kalyanaraman 1999). Sundar et al.'s (1999) findings show that people in a moderate-interactivity condition judge political candidates to be more qualified than people in a high- or low-interactivity condition. Some scholars (Geissler et al. 2001; Stevenson et al. 2000) apply Berlyne's (1960) framework to an Internet setting. For example, Geissler et al. (2001) find that attention levels are higher for home pages that are perceived as moderately complex than for home pages that are either less complex or more complex. Therefore, the S-O-R framework and OSL theory predict competing hypotheses:

Hypotheses 4-1: As interactivity perceptions increase, Web-site effectiveness increases (a linear relationship based on S-O-R theory).

Hypotheses 4-2: Web-site effectiveness is greater for Web sites with moderate interactivity than for Web sites with low or high interactivity (inverted U-shaped relationship based on OSL theory).

Tasks

Are message effects (i.e., personalized message and standardized message) similar when consumers have different tasks? In our experimental setting, we consider two tasks: 1) search (prepurchase) and 2) complaining (postpurchase). Under the prepurchase condition, participants send instant messages and request information about sales tax charges on an e-store product (i.e., a T-shirt bearing a university logo). Under the postpurchase condition, participants submit a complaint about problems

related to product delivery. In this case, we develop our hypotheses on the basis of cognitive control theory (Averill 1973). Cognitive control has two mechanisms: information gain and reappraisal of a stressful situation. Both mechanisms are cognitive efforts that a person can use to cope with a stressful situation. In the case of information gain, a person perceives the situation as more predictable; in the case of a reappraisal, the event is considered through a cognitive reinterpretation “to conform to the needs and desires of the individual” (Averill 1973, p. 293); that is, an individual imposes the meaning to the event. For example, under a stressful situation, consumers perceive the situation as more acceptable and controllable (reinterpretation) if they are given more information (information gain). Therefore, participants who complain about receiving the wrong product will perceive the site as more effective (reinterpretation) if they receive personalized messages (i.e., information gain; messages based on previous message and with contact person’s name) rather than standardized messages. On the basis of this logic, we hypothesize the following:

Hypotheses 5-1: When messages are personalized (i.e., the message contains a social cue and is related to former messages), site effectiveness is greater for the complaining task (most stressful situation) than for the search task (least stressful situation).

Hypotheses 5-2: When messages are standardized (i.e., message contains no social cue and is not related to former messages), site effectiveness is lower for the complaining task (most stressful situation) than for the search task (least stressful situation).

Covariates

Interactivity perceptions are likely to be constrained by individual idiosyncratic characteristics (Liu and Shrum 2002; Steuer 1992). Of the various individual characteristics, we are interested in two variables in particular that might serve as covariates: 1) desire for control and 2) CMC anxiety. In our setting, participants send instant messages (i.e., CMCs) to solve their problems (i.e., control of a situation). Therefore, we predict that these two personal characteristics are associated with interactivity perception. We develop these relationships and the hypotheses in the following section.

Desire for control: Desire for control is defined as the extent to which people are generally motivated to believe that they are in control of events in their lives (Burger 1992). According to this theory, people with a high desire for control seek more control in their daily lives. They tend to pay more attention to control-relevant information in situations. In contrast, people with a low desire for control do not necessarily process control-relevant information or features. As a result, in an interactive medium (e.g., a Web site), control-relevant design features (e.g., speed) are likely to influence users with a high desire for control. In contrast, control features are not likely to make any difference for people with a low desire for control. Thus:

Hypotheses 6: Desire for control is positively related to interactivity perception. That is, people with a high desire for control are more likely to experience greater perceptions of control interactivity on a Web site.

CMC anxiety: Computer-mediated communication anxiety is another factor that affects the relationship between interactivity features and interactivity perceptions. Brown,

Fuller, and Vician (2004) define CMC anxiety as an individual's level of fear or apprehension associated with actual or anticipated use of information technology to communicate with others. Liu and Shrum (2002) propose that people with a high level of CMC anxiety are less likely to enjoy two-way communication features (e.g., chat room, bulletin board) and are more likely to show lower perceptions in interactivity on the Internet. Thus:

Hypotheses 7: CMC anxiety is negatively related to interactivity perception. That is, people with a high level of CMC anxiety are likely to show lower perceptions of interactivity on a Web site.

Experiment

Stimulus and Subject

We test the aforementioned hypotheses in an experiment. The experiment is a 2 (number of clicks) x 2 (response time) x 2 (message type) x 2 (tasks) between-subjects factorial design. Therefore, there are 16 versions of a Web site. The stimulus is a fictitious, Web-based store (TotallyDawgs) that sells University of Georgia (UGA) souvenirs and paraphernalia (e.g., T-shirts, mugs). We conduct the experiment in a computer lab. Participants were recruited from undergraduate business classes and were scheduled to participate in a 30-minute laboratory session. Participants were given class credit as a motivation or incentive for their participation. Furthermore, all the students were entered into five raffle drawings of $30 each. A total of 341 participants took part in the experiment, and we randomly assigned them to the 16 treatment levels. All participants were required to have at least some online experience. However, online shopping experience was not a requirement for participation. We eliminated 5

participants for failure to demonstrate serious responses. Of the remaining 336 participants, 46.4% were female, 83.6% were white, 29.9% had a household income of $80,000 or lower, and their mean age was 20.6 years (range of 18–32 years).

Procedure

Participants were introduced to the purpose of the study, as follows: "TotallyDawgs.com is a start-up, Web-based retailer that sells UGA souvenirs. The company's target market is young people, especially college students like yourself. TotallyDawgs.com plans to launch its first Web site in the fall of 2006. Prior to launch, the company wants to test its Web site with potential customers."

Participants first answered some questions on covariate measures (i.e., desire for control and CMC anxiety). Then, they were given one of the following scenarios:

Search scenario (prepurchase)*: Your mother's birthday is coming soon, and you'd like to buy her something. You've decided to buy a T-shirts (with a UGA logo, shown below) in TotallyDawgs.com. Before you make a purchase decision, you want to know whether the store charges any tax on your order. So, you would like to contact the store and ask this. To obtain a quick response, you want to engage in live chatting with a store representative.*

Complaining scenario (postpurchase)*: About one week ago, you purchased a birthday gift for your mother. Specifically, you purchased a T-shirt bearing a UGA logo. Yesterday, you received the item and discovered that the store sent the wrong T-shirt. Now, you want to know how to receive the right item as soon as possible and how to return the wrong item. So, you would like to contact the store. To obtain a quick response, you want to engage in live chatting with a store representative.*

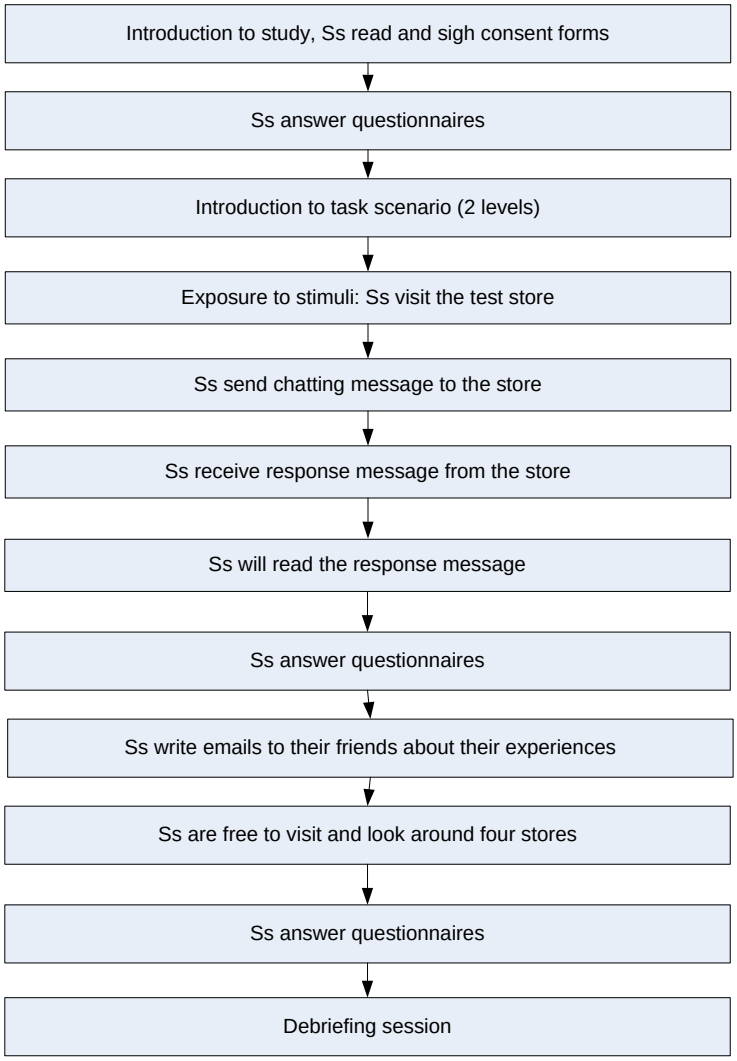


Figure 4-5: Procedure of Experiment

After reading one of these scenarios, participants were asked both to visit the TotallyDawgs store and to initiate a live chat with the e-store (i.e., sending questions through instant messenger). Participants were asked to wait to visit the store until they received a response. We then collected perceptual dependent measures, such as interactivity perception and site effectiveness (i.e., satisfaction, loyalty, attitude, and site

quality). To obtain behavioral site effectiveness measures (e.g., WOM behavior, repurchase behavior), we asked participants to send e-mail messages to their best friends about their shopping experiences and to shop around on four similar online stores (including TotallyDawgs.com) for their self-gifts. Last, participants answered some demographic questions. The detailed procedure appears in Figure 4-5.

Independent Variables Manipulation

Number of clicks: We manipulate the number of clicks in terms of how many clicks are required to locate the "live chat" button of the target store. Under the condition of fewest clicks, participants need to click one time to locate the button. Under the condition of many clicks, participants need to click at least six times to locate the button.

We conducted a manipulation check before the final experiment. Participants answered manipulation check questions for perceived ease of use (Davis, Bagozzi, and Warshaw 1989). We use 7-point Likert scales to indicate agreement or disagreement with the following questions.

1) Finding the "live chat" button is easy.
2) Navigating the site is easy for me.

Response time: We manipulate response time in terms of how quickly participants receive a reply from the store about their inquiries or complaints. Under the slow condition, participants receive a reply after 90 seconds. Under the fast condition, participants receive a reply after 15 seconds.

To validate the stimulate level of response time, we measured perceived quickness (Gorn et al. 2004). We use 7-point Likert scales to indicate agreement or disagreement with the following questions.

1) Slow ---------- Fast
2) Not speedy ---------- Speedy
3) Not quick ---------- Quick

Message type: Message type is the extent to which the reply is based on prior messages and whether the replying message includes a social cue (i.e., contact person's name). Under the baseline condition, participants receive a standardized message. For the highly personalized message, a person (including his or her name) responds to a participant's request appropriately. For example, in the case of a complaining situation (e.g., wrong product delivery), participants receive a message that specifically addresses their requests. Therefore, we manipulate message type as follows: 1) participants receive a standardized message, and 2) participants receive a personalized message with the contact person's name.

Standardized message (under all scenarios):

Thanks for contacting us. Support is currently unavailable. Please provide your name and e-mail address, and we will get back to you shortly.

Personalized message (under scenario 1):

We are required by law to charge sales or use tax in any state in which it has a physical presence. (We currently operate retail stores only in Georgia.) The actual tax rate applied to your purchase is based on the destination of the order.

Personalized message (under scenario 2):

First, we apologize for the inconvenience. You will get the right item no later than tomorrow evening. For your convenience, we have provided a

preaddressed UPS return label. Please drop off the return item at the UPS store nearest you. Of course, you do not need to pay anything. Do you have any more questions?

Participants answered the manipulation-check questions for perceived personalization (Wolfinbarger and Gilly 2003). We used a 7-point Likert scale to indicate agreement or disagreement with the following questions:

1) The message gives me personal attention.
2) The message understands my specific needs.

Dependent Variables and Covariates

We used existing perceived interactivity measures (Liu 2003; McMillan and Hwang 2002; Wu 1999). Specifically, we measured perceived interactivity on the basis of three dimensions: 1) two-way communication (six items), 2) control (nine items), and 3) responsiveness (six items) (see Table 4-4). The coefficient alphas computed for three dimensions (α = 0.934, 0.901, and 0.922, respectively) indicate high internal consistency. We also measured site effectiveness with four perceptual measures (i.e., satisfaction, loyalty, attitude toward the Web site, and site quality) and two behavioral measures (repurchase [measure of repurchase behavior], in which participants were given several alternative stores including TotallyDawgs and were asked which store they would visit in the future, and WOM communications, in which participants were asked to send e-mail messages to their friends about overall shopping experiences at TotallyDawgs.com). The coefficient alphas computed for the four perceptual measures indicate strong internal consistency: 1) satisfaction (three items; α = 0.928), 2) loyalty

(five items; α = 0.956), 3) attitude (three items; α = 0.950), and 4) quality (two items; α = 0.942).

We use the established scales to measure the two covariates desire for control and CMC anxiety. Table 4-4 provides a more complete description of the measurement approaches.

Pretest

We pretested the experimental design in a four-stage study. Each stage is discussed in the following section.

Manipulation checks: We conducted the first pretest to check the manipulations of four variables: 1) situation (normal vs. stressful), 2) number of clicks (one vs. six), 3) response time (15 seconds vs. 60 seconds) and 4) message type (standardized vs. personalized).

Sixteen students participated in the pretest. The results show that there are significant differences between 1) a normal situation and a stressful situation, 2) one click and six clicks, and 3) a standardized message and a personalized message. However, there is no significant difference between 15 seconds and 60 seconds. On the basis of this result, we manipulated the response time as 15 seconds versus 90 seconds (this manipulation was checked in the pilot study; see the stage-four study).

Four of the eight students who were assigned to the six-clicks condition could not find the "live chat" button without assistance. Therefore, to clarify the task, the following sentences were included in the questionnaire: “You should find the button in the site. If you have any difficulty in finding the button, please imagine you are in a situation that you need help/assistance from the store.”

Overall site-quality checks (TotallyDawgs.com): We conducted the second pretest to check the overall quality of the stimulus (site: TotallDawgs.com). Five doctoral students were invited to view the site and evaluate the overall quality of the site. On the basis of their comments, the following changes were made:

1) We deleted the shopping cart, which is not used for our experiment.
2) We corrected some typographical errors, such as “gift” (→ “gifts”) and “hats” (→ “caps and hats”).
3) We changed the welcoming message on the front page to make the site more realistic.

Questionnaire checks: We conducted the third pretest to evaluate the questionnaire. The questionnaire was evaluated by four graduate students. On the basis of their comments, we reworded some questions for better clarification. In addition, to avoid confusion, we highlighted negative words such as "not" and "no" in the questions.

Table 4-4: Measures of Dependent Variables

Variables (Scale)		Measures	Author
Interactivity Perception	Two-way communication	1) This Web site facilitates two-way communication. 2) The Web site gives me the opportunity to talk back. 3) The Web site facilitates concurrent communication. 4) The Web site enables conversation. 5) The Web site does not encourage visitors to talk back. (R) 6) The site is effective in gathering visitors' feedback.	Wu (1999), McMillan and Hwang (2002), Liu (2003)
	Control	1) While I was on the site, I was always aware where I was. 2) While I was on the site, I always knew where I was going. 3) While I was on the site, I was always able to go where I though I was going. 4) I was delighted to be able to choose which link and when to click. 5) I feel that I have a great deal of control over my visiting experience at this site. 6) The Web site is not manageable. (R) 7) While I was on the site, I could choose freely what I wanted to see. 8) While surfing the site, I had absolutely no control over what I can do on the site. (R) 9) While surfing the site, my actions decided the kind of experiences I got.	

	Responsiveness	1) The web site processed my input very quickly. 2) Getting information from the website is very fast. 3) I was able to obtain the information I want without any delay. 4) When I clicked on the links, I felt I was getting instantaneous information. 5) The web site was very slow in responding to my request. (R) 6) The web site answers my question immediately.	
Attitude Toward the Site (7–point scale)		1) Good – bad 2) Favorable – unfavorable 3) Like – dislike	Coyle and Thorson (2001)
Repurchase		Participants choose one Web-based store out of four possible stores.	Pan (2003)
Satisfaction (7–point scale)		1) I am satisfied with the experience. 2) This online shopping experience is exactly what I needed. 3) This online experience hasn't worked out as well as I thought I would. (R)	Fornell et al. (1996)
WOM		Participants write e-mail messages about shopping experiences to their best friends.	Song, Zinkhan, and Pan (2005)
Overall Site Quality (7-point scale)		1) The overall quality of my purchase experience with this web site is (1 = *very poor*, 7 = *excellent*). 2) My overall feelings toward this website are … (1 = *very dissatisfied*, 7 = *very satisfied*).	Wolfinbarger and Gilly (2003)

Loyalty Intentions (7-point scale)	1) I encourage friends and relatives to do business with the web site. 2) I say positive things about the web site to other people. 3) I will do more business with the web site in the next few years. 4) I would recommend the web site to someone who seeks my advice. 5) I consider this web site to be my first choice to buy the kind of product I most recently purchased online.	Zeithaml, Berry, and Parasuraman (1996)
Desire for Control (7-point scale)	1) I prefer a job where I have a lot of control over what I do and when I do it. 2) I enjoy political participation because I want to have as much of a say in running government as possible. 3) I try to avoid situations where someone else tells me what to do. 4) I would prefer to be a leader rather than a follower. 5) I enjoy being able to influence the actions of others. 6) I am careful to check everything on an automobile before I leave for a long trip. 7) Others usually know what is best for me. 8) I enjoy making my own decisions. 9) I enjoy having control over my own destiny. 10) I would rather someone else took over the leadership role when I am involved in a group project. 11) I consider myself to be generally more capable of handling situations than others are.	Burger and Cooper (1979)

	12) I'd rather run my own business and make my own mistakes than listen to someone else's order. 13) I like to get a good idea of what a job is all about before I begin. 14) When I see a problem I prefer to do something about it rather than sit by and let it continue. 15) When it comes to orders, I would rather give them than receive them. 16) I wish I could push many of life's daily decisions off on someone else. 17) When driving, I try to avoid putting myself in a situation where I could be hurt by someone else's mistake. 18) I prefer to avoid situations where someone else has to tell me what it is I should be doing. 19) There are many situations in which I would prefer only one choice rather than having to make a decision. 20) I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered by it.	
CMC Anxiety (7-point scale)	1) Chatting communication makes me uneasy. 2) Chatting communication makes me nervous. 3) While composing a chatting message to someone I don't know, I feel tense. 4) I would be fearful of sending chatting message to someone I don't know.	Brown et al. (2004)

(R) = reverse scored.

Table 4-5: Manipulation Checks

Variable 1: Situation			
Item (7-point scale)	**Situation 1 (asking about sales tax charge on the order) (N[a])**	**Situation 2 (Complaining about wrong delivery) (N)**	**t-value (df)**
This situation makes me feel upset.	1.95 (20)	4.2 (20)	-4.899 * (38)
Variable 2: Number of Clicks			
Items (7-point scale)	**One click (N)**	**Six clicks (N)**	**t-value (df)**
Finding the "live chat" button is easy.	5.5 (20)	2.0 (20)	7.102 * (38)
Navigating the site is easy for me.	5.95 (20)	3.75 (20)	4.897 * (38)
Variable 3: Response time			
Items (7-point scale)	**15 seconds (N)**	**90 seconds (N)**	**t-value (df)**
Slow ------- Fast	4.65 (20)	2.45 (20)	4.872 * (38)
Not speedy ------ Speedy	4.35 (20)	2.50 (20)	3.899 * (38)
Not quick ------- Quick	4.40 (20)	2.45 (20)	4.154 * (38)
Variable 4: Type of Message			
Items (7-point scale)	**Standardized message (N)**	**Personalized message (N)**	**t-value (df)**
The message gives me personal attention.	2.15 (20)	5.15 (20)	-5.816 * (38)
The message reflects my specific needs.	1.90 (20)	5.65 (20)	-7.777 * (38)

[a]N denotes the number of participants; * $p < .05$.

Pilot study (manipulation checks and experiment validation): The pilot study helped validate the treatment levels and overall process of the experiment. We exposed 40 students (who were randomly assigned to eight cells) to the total experimental experience under conditions such as those of the main experiment. The results from the pilot study provide strong support for the internal validity of the experiment. As Table 4-5 shows, participants showed significant differences in their perceptions of situation ($t = -4.899$, $df = 38$, $p < 0.05$, clicks ($t = 7.102, 4.897$; $df = 38$, $p < 0.05$), response time ($t = 4.872, 3.899, 4.154$; $df = 38$, $p < 0.05$), and message types ($t = -5.816, -7.777$; $df = 38$, $p < 0.05$).

Regarding the response time manipulation, we found that there is a significant difference in the perception of speed between 15 seconds and 90 seconds. No participants in the six-clicks condition had problems finding the "live chat" button after we added a new paragraph to the questionnaire. The pilot study result indicates that no other changes were needed for the main experiment.

Findings

We used multivariate analysis of covariance (MANCOVA) to examine the effects of three features (i.e., clicks, response time, and message type) on perceived interactivity and site effectiveness. There are several reasons to use MANCOVA rather than analysis of covariance. For example, MANCOVA is particularly powerful in the presence of multicollinearity among the dependent variables. Moreover, the use of separate univariate analyses of variance can seriously inflate Type I errors (Hair et al. 1998). We include desire for control and CMC anxiety as covariates to investigate their possible influences on differences in responses.

Number of clicks: Before examining the effect of the number of clicks on the individual dependent measures, we conducted a multivariate test to assess the effects collectively. Table 4-6 provides summary outputs from the MANCOVA. All four multivariate differences measures (i.e., Pillai's trace, Hotelling's trace, Wilks' lambda, and Roy's largest root) are significant at the 5% level, resulting in the same conclusion; that is, all the dependent variables (interactivity perception, satisfaction, loyalty, attitude, and quality) vary across different number of clicks. Given the significance of the multivariate test, we examine the result of a univariate test (within MANCOVA) to determine whether all dependent variables are significantly different or whether the results are derived from differences of only several dependent variables. The main effects of the number of clicks on two dimensions of perceived interactivity (i.e., control and responsiveness) were significant (see Table 4-6). Participants in the one-click condition perceive the site as more controllable (mean = 5.513) than do participants in the six-click condition (mean = 4.414) (for the means, see Figure 4-6). Responsiveness has the same pattern. However, the number of clicks is not an antecedent of communication perception. Thus, H1-1 is partially supported.

There were significant effects of the number of clicks on satisfaction ($F(1, 314) = 21.783$, $p < 0.05$; mean square [MS] = 38.075), loyalty ($F(1, 314) = 33.623$, $p < 0.05$; MS = 58.676), attitude ($F(1, 314) = 31.836$, $p < 0.05$; MS = 49.690), and quality ($F(1, 314) = 33.619$, $p < 0.05$; MS = 49.485). Therefore, H1-2 is supported.

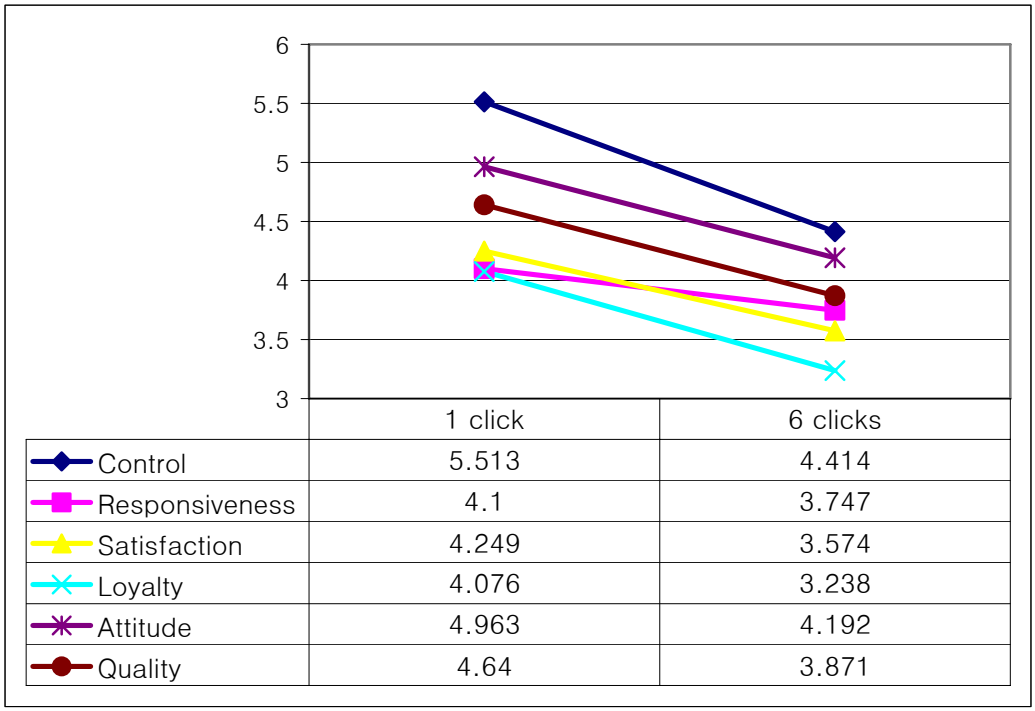
Table 4-6: MANCOVA Result: Main Effect of Number of Clicks

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.283	17.331*	0.283
Wilks' Lambda	0.717	17.331*	0.283
Hotelling's Trace	0.394	17.331*	0.283
Roy's Largest Root	0.3984	17.331*	0.283
Univariate F tests			
Variable	Df	F Value	Effect Size (eta^2)
Interactivity 1 (Communication)	1	2.430	0.008
Interactivity 2 (Control)	**1**	**100.446***	**0.242**
Interactivity 3 (Responsiveness)	**1**	**5.552***	**0.017**
Satisfaction	**1**	**21.783***	**0.065**
Loyalty	**1**	**33.623***	**0.097**
Attitude	**1**	**32.836***	**0.092**
Quality	**1**	**33.619***	**0.097**

* $p < 0.05$.

To investigate the possible mediating effect of interactivity perception on site effectiveness, we then conducted MANCOVA with the number of clicks as an independent factor, site effectiveness measures (satisfaction, loyalty, attitude, and quality) as dependent variables, and three interactivity perceptions as covariates (Table 4-7). The results indicate that all interactivity perceptions (covariates) were statistically significant ($p < 0.05$). However, the previously significant effect of the number of clicks on satisfaction disappeared when the three interactivity perceptions were covariates ($F(1, 317) = 2.752$, $p > 0.05$; $MS = 2.010$). Moreover, all effect sizes of site effectiveness

measures decrease when interactivity perceptions were the covariates (see Tables 4-6 and 4-7). The findings provide evidence for the mediating role of interactivity perception. The magnitude of the mediation is computed as the percentage of reduction in the MS of the effect produced by the interactivity perception (covariate) (Gorn et al. 2004). Interactivity perception mediated 84.2%–94.7% of the MS effect for the number of clicks on site effectiveness measures: satisfaction (94.7%), loyalty (87.7%), attitude (89.3%), and quality (84.2%). That is, the number of clicks negatively affects site effectiveness, and this effect is mediated by the greater interactivity perception that a small number of clicks induces than a large number of clicks induces.



	1 click	6 clicks
Control	5.513	4.414
Responsiveness	4.1	3.747
Satisfaction	4.249	3.574
Loyalty	4.076	3.238
Attitude	4.963	4.192
Quality	4.64	3.871

Figure 4-6: Interactivity and Site Effectiveness Are Greater for the One-Click Condition

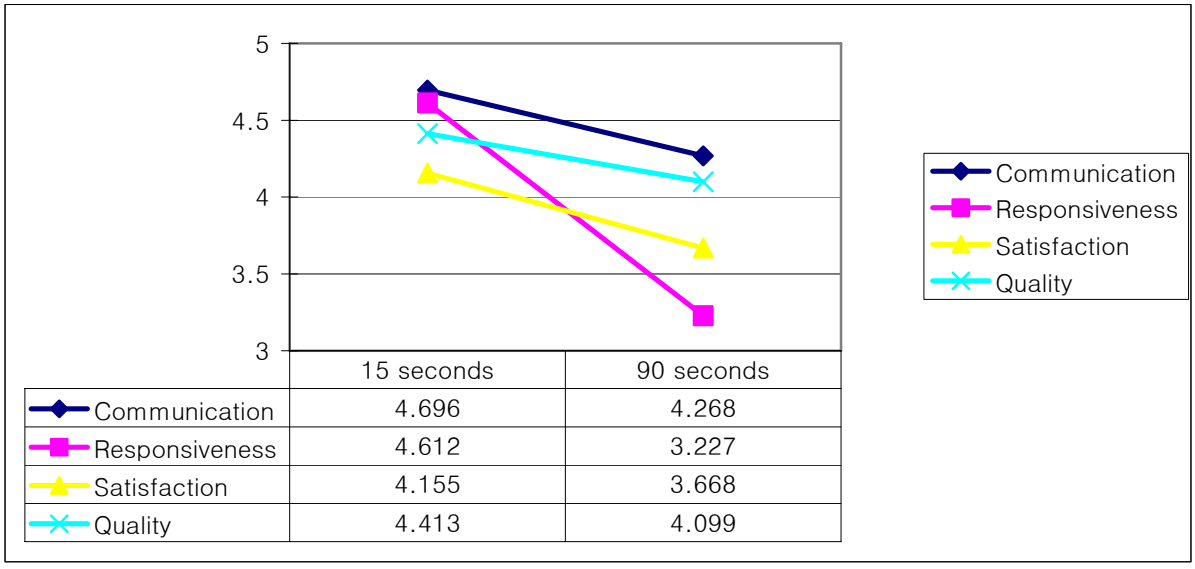
Table 4-7: MANCOVA Result: Main Effect of Number of Clicks with Interactivity Perceptions as Covariates

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.033	2.703*	0.033
Wilks' Lambda	0.967	2.703*	0.033
Hotelling's Trace	0.034	2.703*	0.033
Roy's Largest Root	0.034	2.703*	0.033
Univariate F tests			
Variable	df	F Value	Effect Size (eta^2)
Satisfaction	1	2.752	0.009
Loyalty	**1**	**7.600***	**0.023**
Attitude	**1**	**5.828***	**0.018**
Quality	**1**	**9.545***	**0.029**

* $p < 0.05$.

Message response time: Table 4-8 provides the result of a main effect of response time. The multivariate test reveals that all dependent variables are significantly different across response time. The main effects of response time on two dimensions of perceived interactivity (i.e., two-way communication and responsiveness) were significant (see Table 4-8). Participants in the fast-response condition perceive the site as more communicative (mean = 4.696) than do participants in the slow-response condition (mean = 4.268) (for the means, see Figure 4-7). The responsiveness measure has the same pattern. In contrast, the effect of response time on the control dimension is not significant ($F(1, 314) = 0.127$, $p > 0.05$). Therefore, H2-1 is partially supported.

There are significant effects of message response time on satisfaction ($F(1, 314) = 11.192$, $p < 0.05$; $MS = 19.563$) and quality ($F(1, 314) = 5.547$, $p < 0.05$; $MS = 8.165$). However, the message response time is not a significant antecedent of loyalty and attitude. A possible reason for this could be the presence of the live chat function on the site. As the illustrative examples of participants' e-mail messages show (see Table 5-2 in Chapter 5), participants were impressed that the site provided a real-time chatting function. In other words, the presence of a chatting function provided a positive image of this particular Web site, even though the store sent a slow reply (90 seconds). Therefore, the store's slow response had a negative effect on participants' specific experience with the store (i.e., satisfaction and quality measures of their specific experience with the site). In contrast, slow response did not affect participants' overall feelings about (attitude) and commitment to the site (loyalty). Thus, our findings partially support H2-2.



	15 seconds	90 seconds
Communication	4.696	4.268
Responsiveness	4.612	3.227
Satisfaction	4.155	3.668
Quality	4.413	4.099

Figure 4-7: Interactivity and Site Effectiveness Are Greater for the 15-Seconds Condition

Table 4-8: MANCOVA Result: Main Effect of Response Time

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.290	17.979*	0.290
Wilks' Lambda	0.710	17.979*	0.290
Hotelling's Trace	0.409	17.979*	0.290
Roy's Largest Root	0.409	17.979*	0.290
Univariate F tests			
Variable	df	F Value	Effect Size (eta^2)
Interactivity 1 (Communication)	**1**	**8.517***	**0.026**
Interactivity 2 (Control)	1	0.127	0.000
Interactivity 3(Responsiveness)	**1**	**88.407***	**0.220**
Satisfaction	**1**	**11.192***	**0.034**
Loyalty	1	2.234	0.007
Attitude	1	2.420	0.008
Quality	**1**	**5.547***	**0.017**

* $p < 0.05$.

Message type: Table 4-9 provides the results of the main effect of message type. The multivariate test reveals that all dependent variables are significantly different across message type. The main effects of message type on three dimensions of perceived interactivity (i.e., communication, control, and responsiveness) were significant. Participants who receive a personalized message perceive the site as more communicative, controllable, and responsive (mean = 5.417, 5.278, 4.558, respectively) than do participants who receive standardized message (mean = 3.547, 4.649, 3.281, respectivley) (for the means, see Figure 4-8). There were significant effects of message

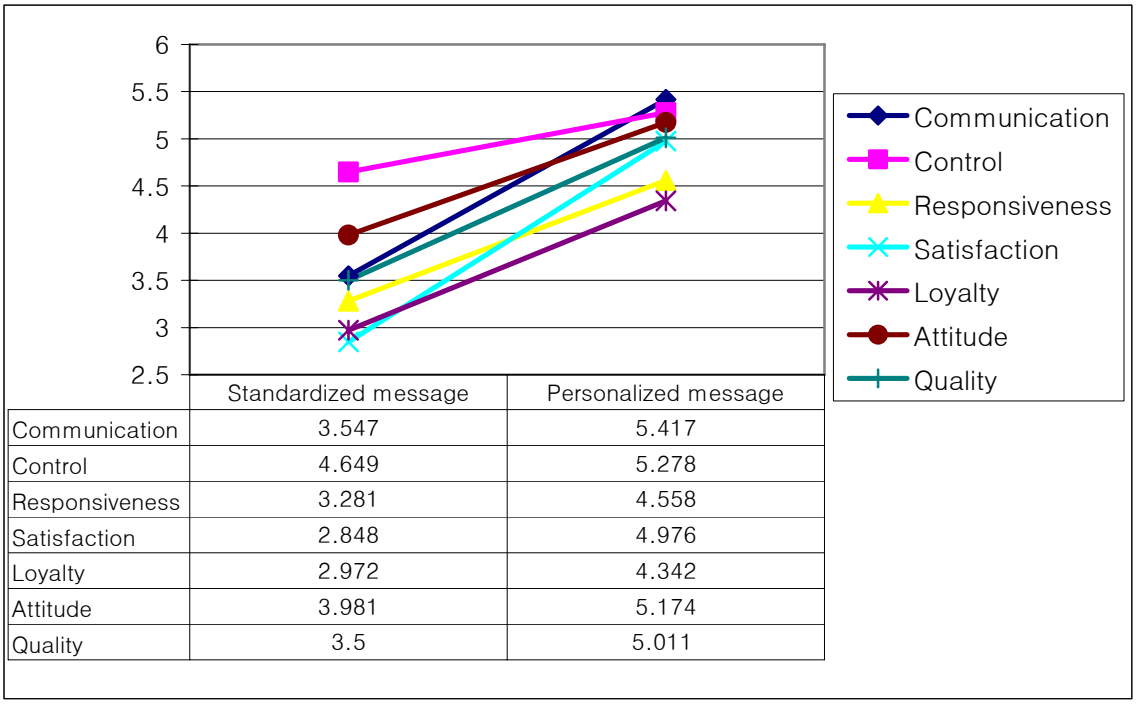
type on satisfaction ($F(1, 314) = 214.900$, $p < 0.05$; MS = 375.636), loyalty ($F(1, 314) = 89.182$, $p < 0.05$; MS = 155.632), attitude ($F(1, 314) = 78.576$, $p < 0.05$; MS = 117.960), and quality ($F(1, 314) = 128.713$, $p < 0.05$; MS=189.457). Therefore, H3-1 and H3-2 are supported.

We then conducted MANCOVA with message type as an independent factor, site effectiveness measures (satisfaction, loyalty, attitude, and quality) as dependent variables, and three interactivity perceptions as covariates. The results indicate that all interactivity perceptions (covariates) were statistically significant ($p < 0.05$). In addition, the previously significant effect of message type on loyalty ($F(1, 317) = 2.548$, $p > 0.05$; MS= 2.415) and attitude ($F(1, 317) = 1.221$, $p > 0.05$; MS=1.109) disappeared when the interactivity perceptions were covariates. Moreover, all effect sizes of the site effectiveness measure decreased when the interactivity perceptions were covariates (see Tables 4-9 and 4-10). The findings provide evidence for the mediating role of interactivity perception. The magnitude of the mediation is computed as the percentage of reduction in the MS of the effect produced by the interactivity perception (covariate). Interactivity perception mediated 89.7%–99.1% of the MS effect for message type on site effectiveness measures: satisfaction (89.7%), loyalty (98.4%), attitude (99.1%), and quality (94.7%). Again, this suggests that interactivity perception serves as a mediator between message type and site effectiveness.

Table 4-9: MANCOVA Result: Main Effect of Message Type

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.473	39.532*	0.473
Wilks' Lambda	0.527	39.532*	0.473
Hotelling's Trace	0.898	39.532*	0.473
Roy's Largest Root	0.898	39.532*	0.473
Univariate F tests			
Variable	df	F Value	Effect Size (eta^2)
Interactivity 1 (Communication)	**1**	**162.883***	**0.342**
Interactivity 2 (Control)	**1**	**32.738***	**0.094**
Interactivity 3(Responsiveness)	**1**	**75.438***	**0.194**
Satisfaction	**1**	**214.900***	**0.406**
Loyalty	**1**	**89.182***	**0.221**
Attitude	**1**	**75.576***	**0.194**
Quality	**1**	**128.713***	**0.291**

* $p < 0.05$.



	Standardized message	Personalized message
Communication	3.547	5.417
Control	4.649	5.278
Responsiveness	3.281	4.558
Satisfaction	2.848	4.976
Loyalty	2.972	4.342
Attitude	3.981	5.174
Quality	3.5	5.011

Figure 4-8: Interactivity and Site Effectiveness Are Greater for the Personalized-Message Condition

Table 4-10: MANCOVA Result: Main Effect of Message Type (Interactivity Perceptions as Covariates)

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.172	16.307*	0.172
Wilks' Lambda	0.828	16.307*	0.172
Hotelling's Trace	0.208	16.307*	0.172
Roy's Largest Root	0.208	16.307*	0.172
Univariate F tests			
Variable	df	F Value	Effect Size (eta^2)
Satisfaction	**1**	**53.091***	**0.143**
Loyalty	1	2.548	0.008
Attitude	1	1.221	0.004
Quality	**1**	**12.180***	**0.047**

* $p < 0.05$.

Interaction effect*:* Table 4-11 provides the results of the interaction effect. The multivariate test reveals that all dependent variables are significantly different across the message types by situations. The interaction effect of message type and situation on the communication dimension is significant (see Table 4-11). Participants who received a personalized message perceive the site as more communicative when they are under a stressful situation (i.e., wrong product delivery) (mean = 5.543) than when they are under a less-stressful situation (i.e., price inquiry) (mean = 5.291). Similarly, participants who received a standardized message perceive the site as less communicative when they are under a stressful situation (i.e., wrong product delivery) (mean = 3.293) than when they are under a less-stressful situation (i.e., price inquiry) (mean = 3.800). (for the means, see Figure 4-9, 10, 11, 12 and 13). There are also significant interaction effects on satisfaction ($F(1, 314) = 10.620$, $p < 0.05$; MS = 18.563), loyalty ($F(1, 314) = 8.809$, $p < 0.05$; MS = 15.372), attitude ($F(1, 314) = 5.916$, $p < 0.05$; MS = 9.234), and quality ($F(1, 314) = 8.992$, $p < 0.05$; MS = 13.236). Therefore, H5-1 and H5-2 are supported.

We then conducted MANCOVA with message type and situation as independent factors, site effectiveness measures (satisfaction, loyalty, attitude, and quality) as dependent variables, and three interactivity perceptions as covariates. The results indicate that all interactivity perceptions (covariates) are statistically significant ($p < 0.05$). However, the previously significant result of the multivariate test is no longer significant. All four multivariate differences measures are not significant at the 5% level ($F(1, 253) = 1.662$, $p > 0.05$), indicating that interactivity perception mediates the interaction effect of message type and situation on site effectiveness.

Table 4-11: MANCOVA Result: Interaction Effect of Message Type by Situation

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.045	2.094*	0.045
Wilks' Lambda	0.955	2.094*	0.045
Hotelling's Trace	0.048	2.094*	0.045
Roy's Largest Root	0.048	2.094*	0.045
Univariate F tests			
Variable	df	F Value	Effect Size (eta^2)
Interactivity 1 (Communication)	**1**	**6.592***	**0.021**
Interactivity 2 (Control)	1	3.489	0.011
Interactivity 3(Responsiveness)	1	1.790	0.006
Satisfaction	**1**	**10.620***	**0.033**
Loyalty	**1**	**8.809***	**0.027**
Attitude	**1**	**5.916***	**0.018**
Quality	**1**	**8.992***	**0.028**

* $p < 0.05$.

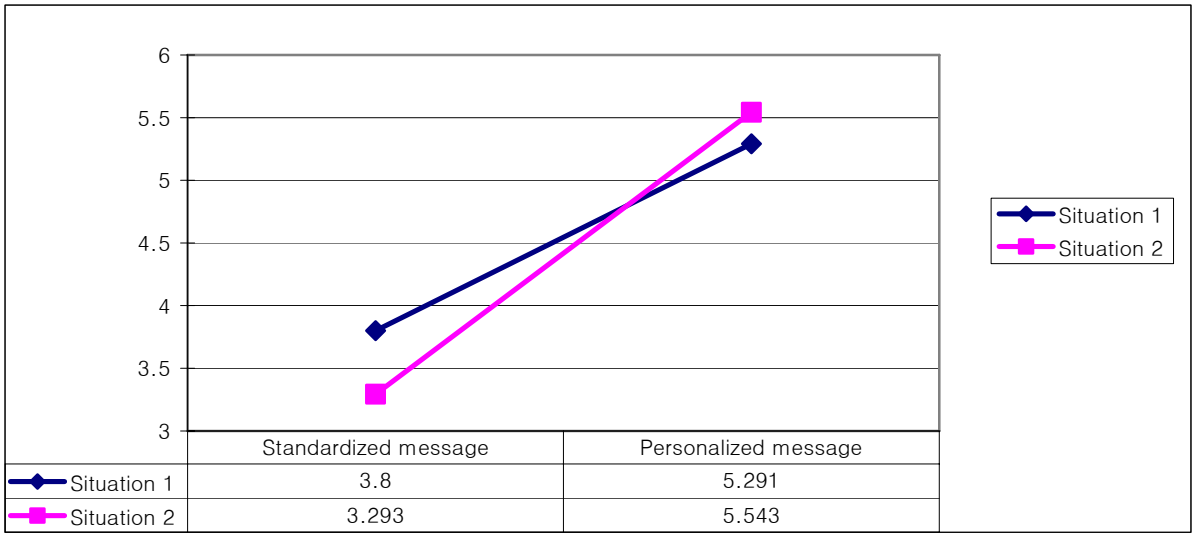
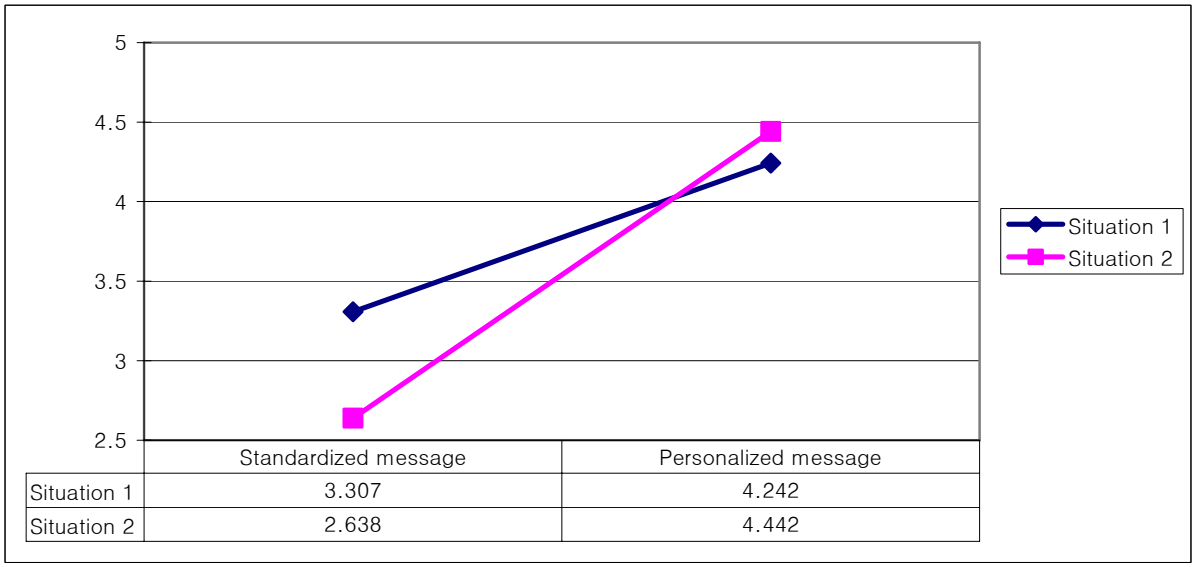


Figure 4-9: Interaction Effect of Message Type by Situation on Interactivity Perception

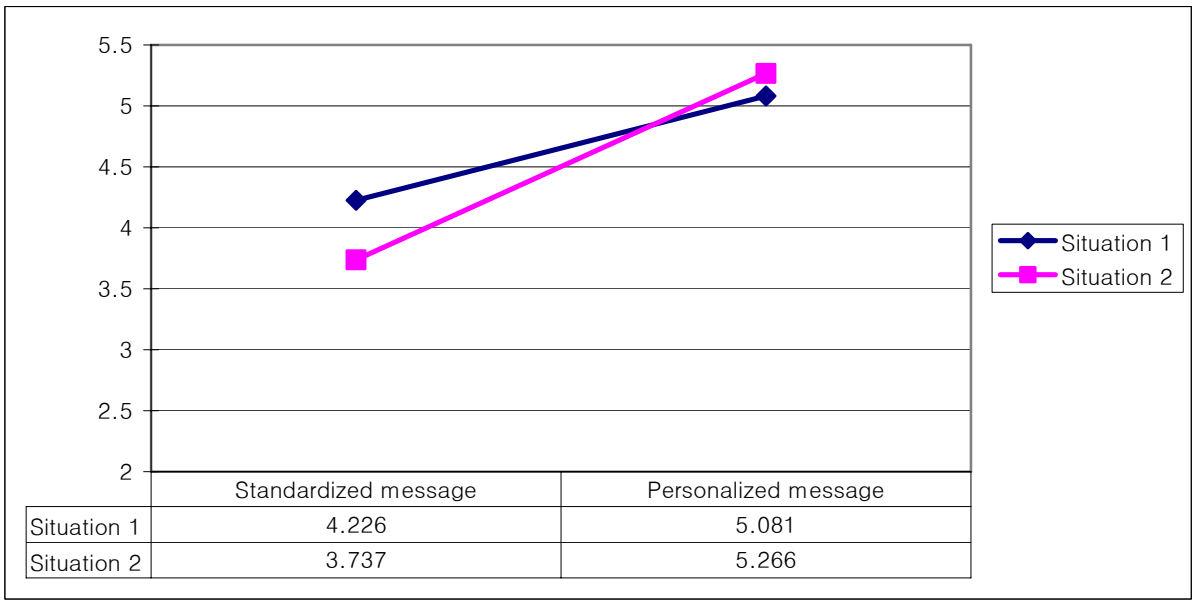
	Standardized message	Personalized message
Situation 1	3.051	4.701
Situation 2	2.645	5.25

Figure 4-10: Interaction Effect of Message Type by Situation on Satisfaction



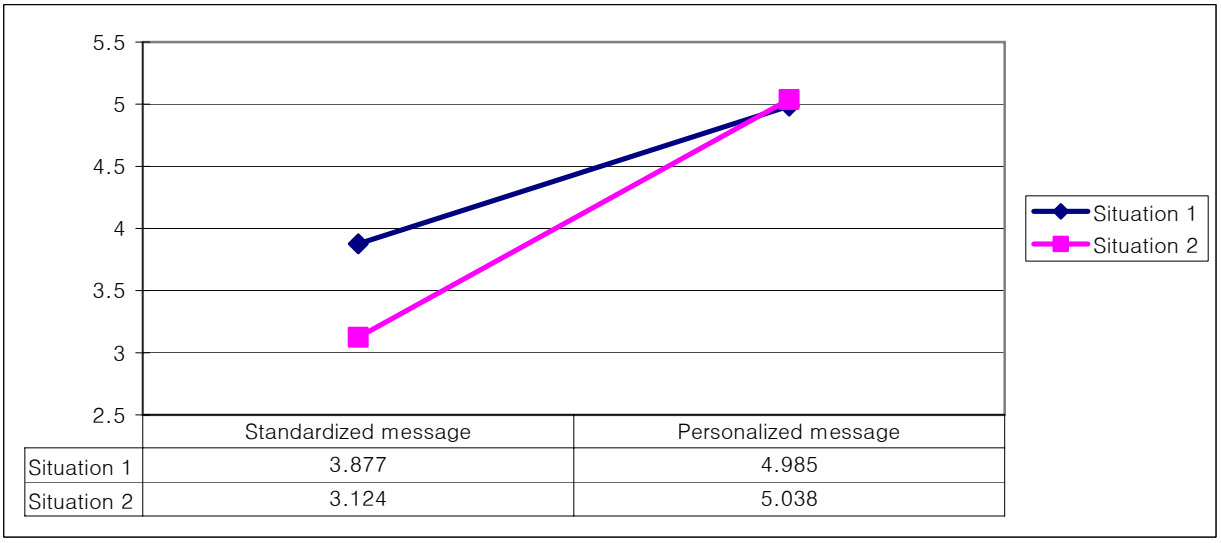
	Standardized message	Personalized message
Situation 1	3.307	4.242
Situation 2	2.638	4.442

Figure 4-11: Interaction Effect of Message Type by Situation on Loyalty



	Standardized message	Personalized message
Situation 1	4.226	5.081
Situation 2	3.737	5.266

Figure 4-12: Interaction Effect of Message Type by Situation on Attitude



	Standardized message	Personalized message
Situation 1	3.877	4.985
Situation 2	3.124	5.038

Figure 4-13: Interaction Effect of Message Type by Situation on Quality

Interactivity Perceptions and Site Effectiveness

We use regression analysis to evaluate the relationship between perceived interactivity and site effectiveness. Two competing theories suggest different relationships (i.e., linear [H 4-1] vs. curvilinear [H 4-2]). We used the following quadratic regression model to test the competing hypotheses:

$$Y= a+ bX + CX^2,$$

where Y = site effectiveness score and X = perceived interactivity score.

A quadratic regression indicated that the coefficient of the quadratic terms was not significant for all the perceptual site effectiveness measures (i.e., satisfaction, loyalty, attitude, and quality). In contrast, linear regression indicated that the average interactivity scores account for 30%–40% of the variance in the site effectiveness scores. The positive coefficients ($p < 0.05$) of the linear terms reveal that there are linear relationships between interactivity perceptions and site effectiveness. Therefore, the regression analysis supports H4-1 but rejects H4-2. That is, as interactivity perceptions increase, Web-site effectiveness increases as well.

To validate the positive relationship between interactivity perceptions and site effectiveness, we calculated Pearson correlation coefficients. Tables 4-12, 4-13, 4-14, and 4-15 contain correlations between the three interactivity scales (X1–X3) and the site effectiveness measures (Y; satisfaction, loyalty, attitude, and quality). As Table 4-12 shows, Person correlation coefficients between satisfaction and all three interactivity measures are significant (coefficients are between 0.573 and 0.742) at the 1.7% level[1].

[1]The alpha level is adjusted to correct for multiple comparison following Bonferroni correction procedure.

Loyalty, attitude, and site quality have similar relationships to interactivity perceptions (positive coefficient; $p < 0.017$).

We evaluated the effect of common method variance on the results. According to Podsakoff et al. (2003), the source of the common method bias cannot be identified in situations in which the predictor and criterion variables are not measured in different contexts. Such was the case with our data collection. Therefore, following Lindell and Whitney (2001), we calculated the relative impacts of the common method variance. The last row in Tables 4-12, 4-13, 4-14, and 4-15 indicates the coefficients after we controlled for common method variance. All correlations remain significant at the 1.7% level, even after common method variance was controlled. Therefore, we conclude that there is a positive relationship between interactivity perception and site effectiveness.

Table 4-12: Correlations Among Communication (X1), Control (X2), Responsiveness (X3), and Satisfaction (Y)

Scale	X1	X2	X3	Y
Communication (X1)	0.934			
Control (X2)	0.480	0.901		
Responsiveness (X3)	0.559	0.437	0.922	
Satisfaction (Y)	0.715*	0.573*	0.742*	1.00
Correlation (After Common Method Variance Is Controlled)	0.559*	0.293*	0.629*	

Note: N = 336. Values on the diagonal are estimates of scale reliability.
* $p < 0.017$.

Table 4-13: Correlations Among Communication (X1), Control (X2), Responsiveness (X3), and Loyalty (Y)

Scale	X1	X2	X3	Y
Communication (X1)	0.934			
Control (X2)	0.480	0.901		
Responsiveness (X3)	0.559	0.437	0.922	
Loyalty (Y)	0.641*	0.600*	0.625*	
Correlation (After Common Method Variance Is Controlled)	0.410*	0.351*	0.388*	

Note: n=336. Values on the diagonal are estimates of scale reliability.
* $p < 0.017$.

Table 4-14: Correlations Among Communication (X1), Control (X2), Responsiveness (X3), and Attitude (Y)

Scale	X1	X2	X3	Y
Communication (X1)	0.934			
Control (X2)	0.480	0.901		
Responsiveness (X3)	0.559	0.437	0.922	
Attitude (Y)	0.634*	0.598*	0.589*	
Correlation (After Common Method Variance Is Controlled)	0.396*	0.347*	0.313*	

Note: n=336. Values on the diagonal are estimates of scale reliability.
* $p < 0.017$.

Table 4-15: Correlations Among Communication (X1), Control (X2), Responsiveness (X3), and Site Quality (Y)

Scale	X1	X2	X3	Y
Communication (X1)	0.934			
Control (X2)	0.480	0.901		
Responsiveness (X3)	0.559	0.437	0.922	
Site Quality (Y)	0.668*	0.581*	0.652*	
Correlation (After Common Method Variance Is Controlled)	0.465*	0.310*	0.443*	

Note: n=336. Values on the diagonal are estimates of scale reliability.
* $p < 0.017$.

Alternative Estimation Procedure: Structural Equations Model

To examine the relationship between interactivity perception and site effectiveness (H4-1), we tested the structural equation model shown in Figure 4-14. The structural equation approach has several advantages over MANOVA or MANCOVA (Bagozzi and Yi 1989). First, when basic measurements tend to be unreliable individually, the structural equation method may be useful. Second, when sample sizes are unequal across groups (violating the homogeneity assumption), structural equation will provide more powerful tests. Third, if one knows *a priori* theoretical relations among the dependent variables, we can incorporate these relations into analysis. The third is the case in our study.

The experimental manipulations were represented by four dummy variables that were expressed as exogenous latent variables. The two treatments of each dummy

variable were coded 0 (situation 1, 1 click, 15 seconds, standardized message) or 1 (situation 2, 6 clicks, 90 seconds, personalized message) following Bagozzi and Yi (1989). Product terms of the four dummy variables for the interaction effects (two-way, three-way, and four-way) were created and included in the model.

Model fit indexes are reported in the Table 4-16. The rationale of including these particular indexes is primarily the recommendations by Hoyle and Panter (1995). Chi-square, GFI and RMSEA suggest a poor model fit, whereas NFI, NNFI and CFI indicate a good model fit. We investigate the CFA (Confirmatory Factor Analysis) model by removing all structural paths from the full model. The CFA model generates a chi-square of 2931.98 (509), which is also significant at 1% level, indicating a poor fit in the measurement model. Given the main objective of this research is to test the relationship between interactivity perception and site effectiveness, as opposed to developing measurement scales for ‘interactivity’ and ‘site effectiveness’, we consider the proposed model acceptable and focus on significant path values to interpret our findings.

The parameter estimates are as shown in Figure 4-14, Table 4-17, and Table 4-18. Specifically, all path values from interactivity perception to site effectiveness measures are statistically significant at 5% level (see Figure 4-14), supporting the positive relationships between interactivity perception and site effectiveness (H4-1). For example, path value from interactivity 2 (control) to loyalty (0.81) suggests that consumers’ control perception over the site has positive influence on attitude toward the site.

Table 4-16: Model Fit Indexes

Model Fit Indexes	Chi-square	Satorra-Bentler Chi-square	GFI	NFI	NNFI	CFI	RMSR	RMSEA
Index Values	3485.25 (920)	3607.43 (920)	0.67	0.95	0.95	0.96	0.28	0.093
Cutting Values/ P-Value	P<0.01	P<0.01	0.9	0.9	0.9	0.9	N.A.	0*
Acceptance of the index	No	No	No	Yes	Yes	Yes	N.A.	No

* p-Value for test of close fit (RMSEA) = 0

Table 4-17: Path Values from Exogenous Variables to Interactivity

Paths	Estimates (gamma)	Paths	Estimates (gamma)
A → Interactivity 1	-0.14	BD → Interactivity 2	-0.15
B → Interactivity 1	0.040	**CD → Interactivity 2**	**0.34***
C → Interactivity 1	-0.11	ABC → Interactivity 2	0.24
D → Interactivity 1	**0.74***	**ABD → Interactivity 2**	**0.43***
AB → Interactivity 1	**0.12***	ACD → Interactivity 2	0.082
AC → Interactivity 1	0.017	BCD → Interactivity 2	-0.13
AD → Interactivity 1	**0.20***	ABCD → Interactivity 2	-0.47
BC → Interactivity 1	-0.19	A → Interactivity 3	-0.022
BD → Interactivity 1	0.053	B → Interactivity 3	-0.063
CD → Interactivity 1	0.26	**C → Interactivity 3**	**-0.35***
ABC → Interactivity 1	0.16	**D → Interactivity 3**	**0.27***
ABD → Interactivity 1	0.19	**AB → Interactivity 3**	**0.069***
ACD → Interactivity 1	0.060	**AC → Interactivity 3**	**0.20***
BCD → Interactivity 1	**0.61***	**AD → Interactivity 3**	**0.17***
ABCD → Interactivity 1	-0.055	BC → Interactivity 3	-0.021
A → Interactivity 2	-0.12	BD → Interactivity 3	0.16
B → Interactivity 2	**-0.70***	CD → Interactivity 3	0.063
C → Interactivity 2	**0.21***	ABC → Interactivity 3	-0.071
D → Interactivity 2	**0.19***	ABD → Interactivity 3	-0.10
AB → Interactivity 2	**0.25***	ACD → Interactivity 3	-0.22
AC → Interactivity 2	0.029	BCD → Interactivity 3	0.33
AD → Interactivity 2	**0.22***	ABCD → Interactivity 3	-0.31
BC → Interactivity 2	0.086		

* p< 0.05

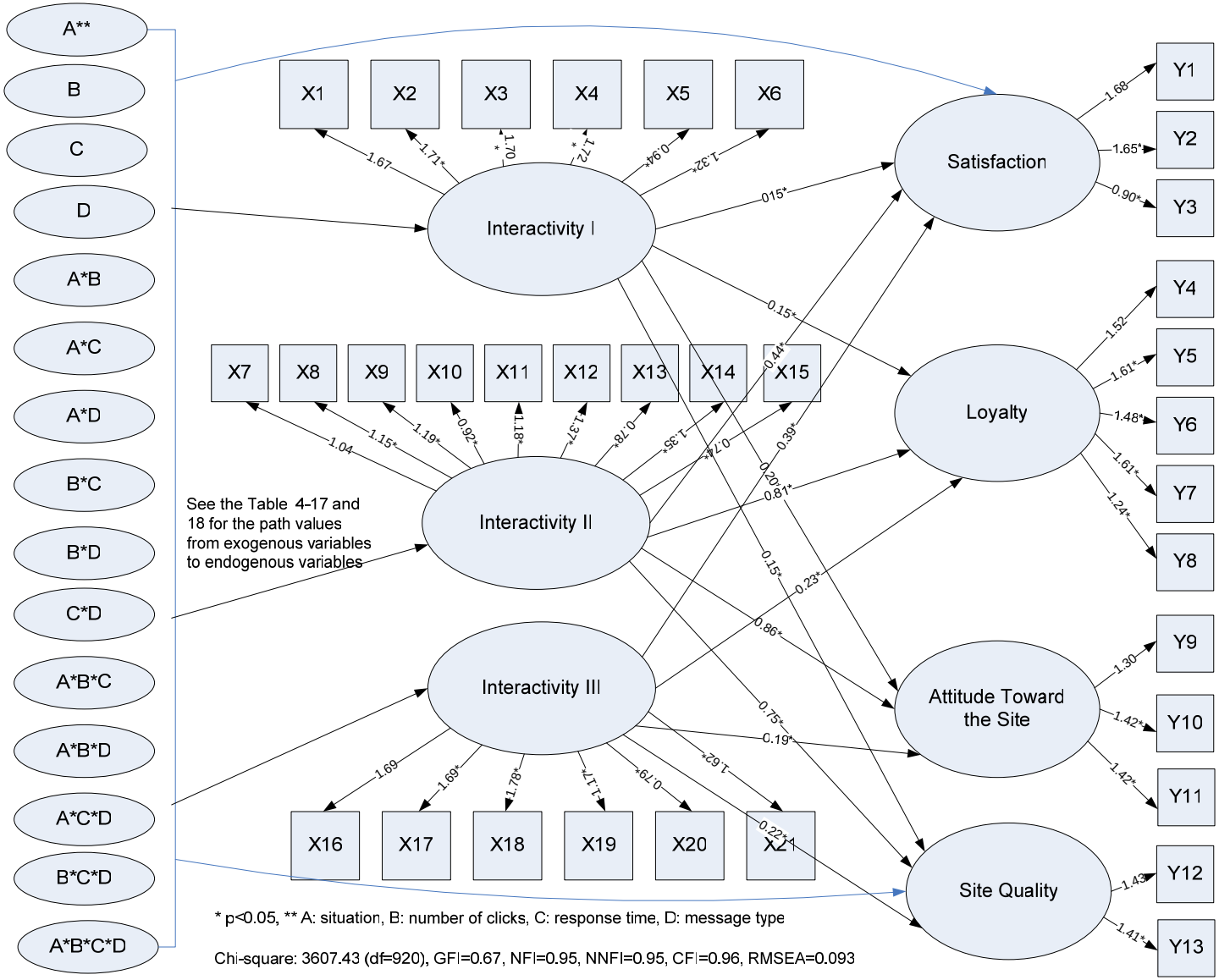


Figure 4-14: LISREL Results of Model

Table 4-18: Path Values from Exogenous Variables to Site Effectiveness Measures

Paths	Estimates (gamma)	Paths	Estimates (gamma)
A → Satisfaction	0.0021	A → Attitude	-0.031
B → Satisfaction	**0.15***	**B → Attitude**	**0.29***
C → Satisfaction	0.080	C → Attitude	-0.04
D → Satisfaction	**0.22***	D → Attitude	-0.16
AB → Satisfaction	**-0.099***	**AB → Attitude**	**-0.12***
AC → Satisfaction	-0.028	AC → Attitude	-0.037
AD → Satisfaction	**0.11***	AD → Attitude	0.018
BC → Satisfaction	-0.023	BC → Attitude	-0.11
BD → Satisfaction	0.11	BD → Attitude	0.13
CD → Satisfaction	0.13	CD → Attitude	-0.14
ABC → Satisfaction	-0.057	ABC → Attitude	-0.15
ABD → Satisfaction	-0.14	ABD → Attitude	-0.039
ACD → Satisfaction	-0.19	ACD → Attitude	-0.051
BCD → Satisfaction	-0.042	BCD → Attitude	-0.036
ABCD → Satisfaction	0.098	ABCD → Attitude	0.17
A → Loyalty	-0.11	**A → Quality**	**-0.19***
B → Loyalty	**0.24***	**B → Quality**	**0.21***
C → Loyalty	0.044	C → Quality	-0.0098
D → Loyalty	-0.051	D → Quality	0.077
AB → Loyalty	**-0.096***	**AB → Quality**	**-0.11***
AC → Loyalty	-0.0062	AC → Quality	-0.00045
AD → Loyalty	0.0074	AD → Quality	0.026
BC → Loyalty	-0.027	BC → Quality	-0.087
BD → Loyalty	0.10	BD → Quality	0.055
CD → Loyalty	0.031	CD → Quality	0.029
ABC → Loyalty	-0.41*	ABC → Quality	-0.11
ABD → Loyalty	0.073	ABD → Quality	0.072
ACD → Loyalty	0.0037	ACD → Quality	0.014
BCD → Loyalty	-0.11	BCD → Quality	0.097
ABCD → Loyalty	0.47	ABCD → Quality	0.27

* $p < 0.05$

WOM Communication

We conducted content analysis for the 325 e-mail messages that participants sent to the site. The categories used to code the e-mails appear in Table 4-19. Two coders (one is the author and one is a graduate marketing student at a southeastern state university) were involved in the coding process. First, coder A developed a coding sheet that was used to train coder B on how to code the e-mail messages and on the definitions for each variable on the sheet. Second, each coder independently classified each of the e-mail messages onto the coding sheets. Interjudge reliability was calculated on the basis of PRAM (Program for Reliability Assessment with Multiple Coders). For the 18 items coded, intercoder reliability (raw percent agreement) was 94.04%, with individual reliabilities ranging from 80.4% to 99.4%, which indicate excellent agreement (Neuendorf 2002). The two coders resolved all disagreements; thus 100% agreement was achieved.

We conducted cross-tabulation analysis to estimate the effect of site features on WOM behaviors. Participants in the one-click condition are more likely to show positive WOM behavior than those in the six-click condition ($\chi^2 = 18.728$, d.f. = 2, $p < 0.05$; see Table 4-20). In addition, participants who received personalized message are more likely to have a positive evaluation of the store than those who received standardized messages ($\chi^2 = 55.650$, d.f. = 2, $p < 0.05$; see Table 4-22). However, response time does not affect participants' overall evaluations of the store (see Table 4-21). This suggests that the number of clicks and the types of messages received from the store are major concerns among e-shoppers. However, response time is not a strong predictor of overall evaluations of the store. This is similar to the prior result; that is,

there is an insignificant effect of response time on loyalty and attitude measures (e.g., overall feelings, commitment to the site).

Table 4-19: Intercoder Reliability

	Items	Percent Agreement
Positive Comments	Easy to find chat function	80.4
	Message speed	92.5
	Message content	93.5
	Navigation	94.1
	Price	98.1
	Selection	89.8
	Overall feeling	97.5
	Design	95.7
	Recommend	**87.6**
Negative Comments	Easy to find chat function	98.4
	Message speed	93.8
	Message content	93.8
	Navigation	97.5
	Price	99.4
	Selection	98.8
	Overall feeling	95.3
	Design	94.4
	NOT Recommend	**92.2**
Overall		**94.04**

Table 4-20: Cross-Tab Analysis: Click Versus Recommendation

	Recommend	Not Recommend	Did Not Mention	Total
One click	88	26	50	164
Six clicks	49	53	59	161
Total	137	79	109	325

$\chi^2 = 18.728$; $p < 0.05$.

Table 4-21: Cross-Tab Analysis: Speed Versus Recommendation

	Recommend	Not Recommend	Did Not Mention	Total
Fast	77	35	55	165
Slow	60	44	56	160
Total	137	79	109	325

$\chi^2 = 3.288$; $p > 0.05$.

Table 4-22 Cross-Tab Analysis: Message Type Versus Recommendation

	Recommend	Not Recommend	Did Not Mention	Total
Standardized	39	65	57	161
Personalized	98	14	52	164
Total	137	79	109	325

$\chi^2 = 55.650$; $p < 0.05$.

Table 4-23 MANOVA Result: Main Effect of WOM Behavior on Interactivity Perception

Multivariate Tests of Significance			
Test Name	Value	F-Value	Effect Size (eta^2)
Pillai's Trace	0.447	30.790*	0.223
Wiks' Lambda	0.567	34.997*	0.274
Hotelling's Trace	0.739	39.312*	0.270
Roy's Largest Root	0.705	75.405*	0.413
Univariate F tests			
Variable	DF	F-Value	Effect Size (eta^2)
Interactivity 1 (Communication)	**1**	**80.871***	**0.334**
Interactivity 2 (Control)	**1**	**39.391***	**0.197**
Interactivity 3(Responsiveness)	**1**	**68.599***	**0.299**

* $p<0.05$

Then, to examine the effect of interactivity perception on WOM behavior, a multivariate analysis of variance (MANOVA; Table 4-23) was conducted. In addition, to analyze pairwise differences between groups of sites, a post-hoc Scheffé test (Table 4-24) was conducted. The subjects who recommended TotallyDawgs to their friends have significantly higher communication perception ($F (1, 322) = 80.871$, $p<0.05$), control perception ($F (1, 322) = 39.391$, $p<0.05$), and responsiveness perception ($F (1, 322) = 68.599$, $p<0.05$) than other shoppers. These results provide convergent evidence for the positive relationship between interactivity perception and site effectiveness (i.e., WOM behavior).

Table 4-24 Multiple Comparisons (WOM Behavior)

Dependent Variable: Interactivity Perception
Scheffé Test

Evaluation			Mean Difference (I-J)	Std. Error
Interactivity 1	Recommend	Not recommend	2.4381*	0.19181
		Didn't' mention	0.9580*	0.17427
Interactivity 2	Recommend	Not recommend	1.2980*	0.15150
		Didn't' mention	0.7670*	0.13764
Interactivity 3	Recommend	Not recommend	2.1882*	0.19710
		Didn't' mention	1.4125*	0.17907

* p<0.05.

Repeat Purchase Behavior

In the final task, participants were asked to choose one site among four similar Web stores (including TotallyDAwgs.com) to purchase self-gifts. Of the 336 participants, 39 (11.6%) chose TotallyDawgs over other stores, whereas 58 (17.3%) chose ugaredzon.com, 129 (38.4%) chose e-bulldog.com, and 110 (32.7%) chose bulldogstore.com. First, we conducted cross-tabulation to test the effect of site features (i.e., number of clicks, response time, and message type) on repeat purchase behavior.

Table 4-25: Cross-Tab Analysis: Message Type Versus Repeat Purchase

	Where would you buy?		Total
	TotallyDawgs	Other Sites	
Standardized message	13	155	168
Personalized message	26	142	168
	39	297	336

$\chi^2 = 4.902$; $p < 0.05$.

The message type strongly affects participants' repurchase behavior (χ^2 = 4.902, d.f. = 2, $p < 0.05$, see table 4-25). However, the number of clicks and response time do not influence repeat purchase behavior. These findings suggest that message relatedness (i.e., how much a message from the shop reflects participants' concerns) is an important feature affecting patronage behavior.

Second, to examine the effect of interactivity perception on repurchase behavior, we conducted a MANOVA (Table 4-26). In addition, to analyze pairwise differences between the groups, we conducted a post-hoc Scheffé test (Table 4-27). The participants who chose TotallyDawgs over the other three stores have significantly greater communication perceptions ($F(1, 334) = 13.641$, $p < 0.05$), control perceptions ($F(1, 334) = 8.506$, $p < 0.05$), and responsiveness perceptions ($F(1, 334) = 23.072$, $p < 0.05$) than do the other participants. These results provide convergent evidence for the positive relationship between interactivity perception and site effectiveness (i.e., repurchase behavior).

Table 4-26: MANOVA Results: The Main Effect of Store on Interactivity Perception

Multivariate Tests of Significance			
Test Name	Value	F Value	Effect Size (eta^2)
Pillai's Trace	0.070	8.355*	0.070
Wilks' Lambda	0.930	8.355*	0.070
Hotelling's Trace	0.075	8.355*	0.070
Roy's Largest Root	0.075	8.355*	0.070
Univariate F Tests			
Variable	df	F Value	Effect Size (eta^2)
Interactivity 1 (Communication)	**1**	**13.641***	**0.039**
Interactivity 2 (Control)	**1**	**8.506***	**0.025**
Interactivity 3(Responsiveness)	**1**	**23.072***	**0.065**

* $p < 0.05$.

Table 4-27 Multiple Comparisons (Repurchase)

Dependent Variable: Interactivity Perception
Scheffé Test

	Vendors		**Mean Difference (I-J)**	**SE**
Interactivity 1	TotallyDawgs	E-bulldog	0.8381*	0.29295
		UGAredzone	0.6921	0.33198
		Bulldogstore	1.4098*	0.29877
Interactivity 2	TotallyDawgs	E-bulldog	0.5791	0.21652
		UGAredzone	0.3943	0.24536
		Bulldogstore	0.7035*	0.22082
Interactivity 3	TotallyDawgs	E-bulldog	1.2975*	0.28978
		UGAredzone	0.9089	0.32838
		Bulldogstore	1.5211*	0.29553

* $p < 0.05$.

Covariates

The MANCOVA shows that Internet CMC anxiety is significant for interactivity perception (control) ($F(1, 314) = 8.119$, $p < 0.05$). That is, participants who have high CMC anxiety perceive the site as less controllable than participants who have low CMC anxiety. This provides support for H7. However, we found that desire for control was not significant. Thus, no support was found for H6. This insignificant result may come from the different concepts of "control" used in the literature. In the communication literature, control (specifically over the Internet) is associated with the customization of the message that users receive according to their communication goals (Liu 2003). However, desire for control (which we measured as a covariate) is related to a person's control over life events (e.g., making decisions, being a leader, being an influencer).

Discussion

Findings

In this chapter, we investigate the effect of three e-shopping features (i.e., number of clicks, response time, and message type) on interactivity perception and site effectiveness. Specifically, we tested this relationship under a situation in which participants were involved in CMC (i.e., chatting) with an e-shopping site. According to social presence theory, service-waits literature, interactivity theory, and social presence theory, we hypothesized that these three site features are important antecedents that affect interactivity perception and site effectiveness. In addition, in applying cognitive control theory, we expected these relationships to be moderated by different tasks (i.e., search, complaint). We also tested competing theories that examine the relationship between interactivity perception and site effectiveness. We summarize the overall

results of the hypothesis testing in Tables 4-28, 4-29, 4-30, 4-31, and 4-32. Clicks, response time, and message type are important antecedents of interactivity perception and site effectiveness. We also found that there is positive relationship between interactivity perception and site effectiveness. Our findings support the interaction hypothesis; that is, message-type effects vary under users' different tasks.

Theoretical Implications

The findings have implications for interactivity theory development. Prior literature has focused both on how interactivity should be defined (McMillan 2005) and on the consequences of interactivity (Macias 2003; Sicilia, Ruiz, and Munuera 2005) in the context of CMC. However, to the best of our knowledge, no research has empirically tested the question, How can the level of interactivity be increased? That is, what are the antecedents of interactivity? By presenting and testing four theories, this study seeks to answer that question. The results from the experiment suggest that the four theories—telepresence theory, service-waits literature, interactivity theory, and social presence theory—explain the effect of three site features—number of clicks, response time, message type—on interactivity perception very well.

We measure interactivity perception with three dimensions that McMillan and Hwang (2002) and Liu (2003) suggest: 1) communication, 2) control, and 3) responsiveness. Of the three site features, message type is the strongest predictor of all three interactivity dimensions. However, the number of clicks and response time partially contribute to interactivity perception (H1-1 and H2-2 are partially supported; see Tables 4-28 and 4-29). For example, the number of clicks contributes to two dimensions of interactivity: control and responsiveness. These results provide important implications

for interactivity conceptualization. Two views define interactivity: 1) Rafaeli's (1998) communication view and 2) Steuer's (1992) telepresence view. The communication view predicts the effect of message type (the strongest antecedent) on interactivity perception (see H3-1). Therefore, our results support the communication view of interactivity.

In addition, our results provide evidence that there is a positive relationship between interactivity perception and site effectiveness. These findings suggest that of the two competing theories (S-O-R theory and OSL theory), S-O-R theory explains the interactivity perception–site effectiveness relationship. That is, consumers visiting a Web site with high interactivity are likely to show positive patronage behaviors (e.g., satisfaction, attitude, WOM behavior, repurchase).

A significant interaction effect in the experiment supports cognitive control theory (Averill 1973). According to this theory, under complex conditions, personalized messages (i.e., more information) strengthen cognitive reappraisal effects (i.e., consumers reinterpret the situation) and thus increase the positive evaluation of a site. That is, when consumers receive personalized messages, they show greater satisfaction, loyalty, and attitudes under a complaining task (wrong product delivery) than under a search task (asking product price).

We found significant effects of response time on satisfaction and quality perceptions but not on loyalty, attitude, WOM behavior, and repurchase. A possible reason for this is that satisfaction and quality are experience-specific measures (i.e., measures about specific Web-site experiences). Conversely, loyalty, attitude, WOM behavior, and repurchase are overall measures (i.e., measures about overall feelings

about and commitments to a site). Because consumers value the presence of a chatting function, they show positive attitudes toward a site, regardless of the speed of the response. Thus, additional research that examines the effect of time on interactivity perception in different communication media (e.g., e-mail, telephone) is needed.

We attempted to measure site effectiveness in a natural setting (i.e., sending e-mails to friends, choosing similar Web sites for the experiment). These methods are both cost-effective and objective with regard to understanding consumer behavior from an electronic marketplace perspective.

Managerial Implications

Our results suggest some ways that firms can increase interactivity perception on their Web sites. Most existing studies have suggested that the presence of certain design features enhances interactivity perception. For example, Ha and James (1998) and McMillan (2002) argue that the presence of a communication channel (e.g., e-mail address, chatting, bulletin board) increases interactivity perception. Our results suggest that the quality of the exchange messages (i.e., message type) is more important than just the presence of communication channels. Thus, e-stores should be careful when adding interactive features to their Web sites because having certain features alone does not ensure greater interactivity perception.

Of the three features studied in this chapter, message type has the greatest effect on site effectiveness (compare the effect sizes of the four site effectiveness measures in Tables 4-6, 4-8, and 4-9). That is, how much a consumer associates the response message with his or her inquiry is a more important feature of site effectiveness than either the number of clicks or response time. The results indicate

both the practical importance of the study and the management of communication messages. Thus, e-stores should carefully plan and monitor any communication with consumers. For example, social presence cues (e.g., the customer representative's name) is one strategy that firms can use to increase the level of message relatedness.

The positive relationship between interactivity and site effectiveness also indicates the importance of managing interactivity perception. That is, because interactivity influences the effectiveness of a site, in turn the transactions conducted on a site will also be affected. Moreover, interactivity perception mediated more than 80% of the MS effect for design features on site effectiveness. This supports our argument that creating and managing interactivity in CMC (e.g., Web site) is crucial for marketers.

Our findings suggest that consumers' tasks and/or situations affect the relationship between message type and interactivity perception. For example, consider that consumers navigate an e-shopping site to find answers to such problems as a wrong delivery or a return/exchange. The e-store should deal with these consumers with special care, using hot line (i.e., a direct number without waiting) and fast real-time chatting services. Consumers with general inquiries about products/services can be treated in cost-effective ways, such as through e-mail communication, Automated Response Systems, frequently asked questions, and a customer service page.

Limitations and Future Research

There are many site-design features that may affect interactivity perception (see Table 4-3). However, we tested only three features in this chapter. It would be interesting to test other features such as personalized function, navigational choices, and transaction facilitation functions. Here, we consider a service situation in which

consumers interact with a store by sending e-messages. More studies should be conducted in a transaction setting, such as the search or purchase of products. For example, how is interactivity perceived in a situation in which consumers make a transaction?

We found that social presences cues (e.g., name, use of “I” instead of “we”) stimulate interactivity perception. Further research might explore the effect of various cues (e.g., accent, use of familiar name) on interactivity perception and satisfaction in e-service encounters. For example, Indian call center operators are trained to disguise their pronounced Indian accents and replace them with American, Canadian, or British one-depending on which part of the world they will be speaking with (p 26, Friedman 2005).

Most of the studies on service waits have been conducted in traditional service contexts (e.g., face-to-face). Therefore, the waits are in minutes or hours rather than seconds. Perhaps a 90-second wait for a service on the Internet is equivalent to a 30-minute wait in traditional settings. Therefore, it would be interesting to examine the relationship between site features and interactivity perception under different communication channels, including face-to-face, chatting, e-mail, telephone, and Web pages. In addition, consumers’ tolerance to wait might be another important factor affecting interactivity perceptions. For example, consumers who are willing to wait for 2 minutes during a chat communication may show different interactivity perceptions from consumers who are willing to wait for only 20 seconds. It is also interesting to examine consumers’ perceived waiting duration. For example, consider a situation when a consumer is waiting for a service on the Internet (e.g., sending an instant message). A

consumer who is involved in other activities (e.g., surfing the Internet, checking email messages) during waiting time period perceives a shorter waiting duration than a consumer who is solely waiting for the service without engaging any other activities.

As discussed in chapter 3, interactivity perception is influenced by consumers' experience with shopping sites. It might be different in interacting on the Internet between consumers with less Internet experience and Internet-savvy users. Future research should capture consumers' different expectations and experiences over shopping sites. Longitudinal studies might be valuable in examining the patterns of interactivity perceptions on shopping sites over time. For example, it would be interesting to know how consumers' interactivity perceptions evolve as they accumulate more experiences with a particular site.

We attempted to use objective measures of site effectiveness (e.g., sending e-mails to friends). There are many site effectiveness measures such as number of hits and time spent on the site. Future research should examine the effect of site design features on various site effectiveness measures.

From organizational standpoint, it is important to consider both benefits and cost of modifying design features of sites. For instance, adding a chatting function on a site is beneficial to consumers. However, there might be some cost (e.g., generating prompt responses) related to maintain this function. Further research should more directly study the effect of design features on firm's performance (e.g., return on investment).

In summary, on the basis of key theories, we identify important features affecting interactivity perception. Our findings provide evidence that executional factors, such as

the number of clicks and message type, affect perceived interactivity, which in turn is an important predictor of site effectiveness.

Table 4-28: Results for Hypotheses for Number of Clicks

Number	Hypotheses	Theory	Findings
H1-1	As the number of clicks required to reach a “live chat” button decreases, interactivity perception (communication) increases.	Telepresence Theory	Not supported
	As the number of clicks required to reach a “live chat” button decreases, interactivity perception (control) increases.		**Supported**
	As the number of clicks required to reach a “live chat” button decreases, interactivity perception (responsiveness) increases.		**Supported**
H1-2	As the number of clicks required to reach a “live chat” button decreases, satisfaction increases.	Telepresence Theory	**Supported**
	As the number of clicks required to reach a “live chat” button decreases, loyalty increases.		**Supported**
	As the number of clicks required to reach a “live chat” button decreases, attitude toward the site increases.		**Supported**
	As the number of clicks required to reach a “live chat” button decreases, site-quality perception increases.		**Supported**
	As the number of clicks required to reach a “live chat” button decreases, consumers show positive WOM behavior.		**Supported**
	As the number of clicks required to reach a “live chat” button decreases, repurchase increases.		Not supported

Table 4-29: Results for Hypotheses for Response Time

Number	Hypotheses	Theory	Findings
H2-1	As a store's response time to consumers' messages decreases, interactivity perceptions (communication) increase.	Service Waiting Literature	**Supported**
	As a store's response time to consumers' messages decreases, interactivity perceptions (control) increase.		Not supported
	As a store's response time to consumers' messages decreases, interactivity perceptions (responsiveness) increase.		**Supported**
H2-2	As a store's response time to consumers' messages decreases, satisfaction increases.	Service Waiting Literature	**Supported**
	As a store's response time to consumers' messages decreases, loyalty increases.		Not supported
	As a store's response time to consumers' messages decreases, attitude toward the site increases.		Not supported
	As a store's response time to consumers' messages decreases, site-quality perception increases.		**Supported**
	As a store's response time to consumers' messages decreases, consumers show positive WOM behavior.		Not supported
	As a store's response time to consumers' messages decreases, repurchase increases.		Not supported

Table 4-30: Results for Hypotheses for Message Type

Number	Hypotheses	Theory	Findings
H3-1	When sites send messages that are related to former messages and include a social presence cue, consumers' interactivity perceptions (communication) are enhanced.	Interactivity Literature Social Presence Theory	**Supported**
	When sites send messages that are related to former messages and include a social presence cue, consumers' interactivity perceptions (control) are enhanced.		**Supported**
	When sites send messages that are related to former messages and include a social presence cue, consumers' interactivity perceptions (responsiveness) are enhanced.		**Supported**
H3-2	When sites send messages that are related to former messages and include a social presence cue, site satisfaction is enhanced.	Interactivity Literature Social Presence Theory	**Supported**
	When sites send messages that are related to former messages and include a social presence cue, site loyalty is enhanced.		**Supported**
	When sites send messages that are related to former messages and include a social presence cue, attitude toward the site is enhanced.		**Supported**
	When sites send messages that are related to former messages and include a social presence cue, site-quality perception is enhanced.		**Supported**
	When sites send messages that are related to former messages and include a social presence cue, positive WOM behavior is enhanced.		**Supported**
	When sites send messages that are related to former messages and include a social presence cue, repurchase is enhanced.		**Supported**

Table 4-31: Results for Hypotheses for the Relationship Between Interactivity Perception and Site Effectiveness (competing hypotheses)

Number	Competing Hypotheses	Theory	Findings
H4-1	As interactivity perceptions increase, Web-site effectiveness increases (a linear relationship).	S-O-R theory	**Supported**
H4-2	Web-site effectiveness is greater for Web sites with moderate interactivity than for Web sites with a low or high interactivity (inverted U-shaped relationship).	OSL Theory	Not supported

Table 4-32: Results for Hypotheses for the Interaction Effects (Situation by Message Type)

Number	Competing Hypotheses	Theory	Findings
H5-1	When messages are personalized, satisfaction is greater for the complaining task (most stressful situation) than for the search task (least stressful situation).	Cognitive Control Theory	**Supported**
	When messages are personalized, loyalty is greater for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**
	When messages are personalized, attitude is greater for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**
	When messages are personalized, site-quality perception is greater for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**
H5-2	When messages are standardized, satisfaction is lower for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**
	When messages are standardized, loyalty is lower for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**
	When messages are standardized, attitude is lower for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**
	When messages are standardized, quality is lower for the complaining task (most stressful situation) than for the search task (least stressful situation).		**Supported**

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CHAPTER 5

CONCLUSION

Introduction

This dissertation focuses on the relationships among Web design, interactivity perception, and site effectiveness. We employed multiple, complementary methods to address the objectives. The findings have implications for theory, managers, and consumers. Thus, Chapter 5 provides a synthesis of the study as a whole and proposes frameworks for future research. Specifically, this chapter includes the following:

1) Key findings, which are related to the original objectives described in Chapter 1;
2) New insights into e-scapes, e-encounters, and interactivity;
3) Implications for academics and managers (e.g., related to e-encounters); and
4) Limitations and directions for future research

Key Findings

As Table 5-1 shows, Web design and interactivity are the main focus here. The design of a Web site creates the physical environment. Consumers often form judgments on the basis of site interface cues, such as color, overall look, and navigational structure. In this sense, a Web design creates an “e-scape,” which is the atmospheric setting of a virtual store. In the service literature, Bitner (1992) classifies servicescapes into three dimensions: 1) ambient condition (e.g., temperature, air quality, music), 2) space/functional (e.g., layout, furnishings), and 3) signs and symbols (e.g.,

signage, style of decor). In this study, we specify four dimensions: 1) organization (e.g., site map, menu), 2) interaction (e.g., feedback function, cookie), 3) display (e.g., color, look-and-feel), and 4) arousal (e.g., game, multimedia).

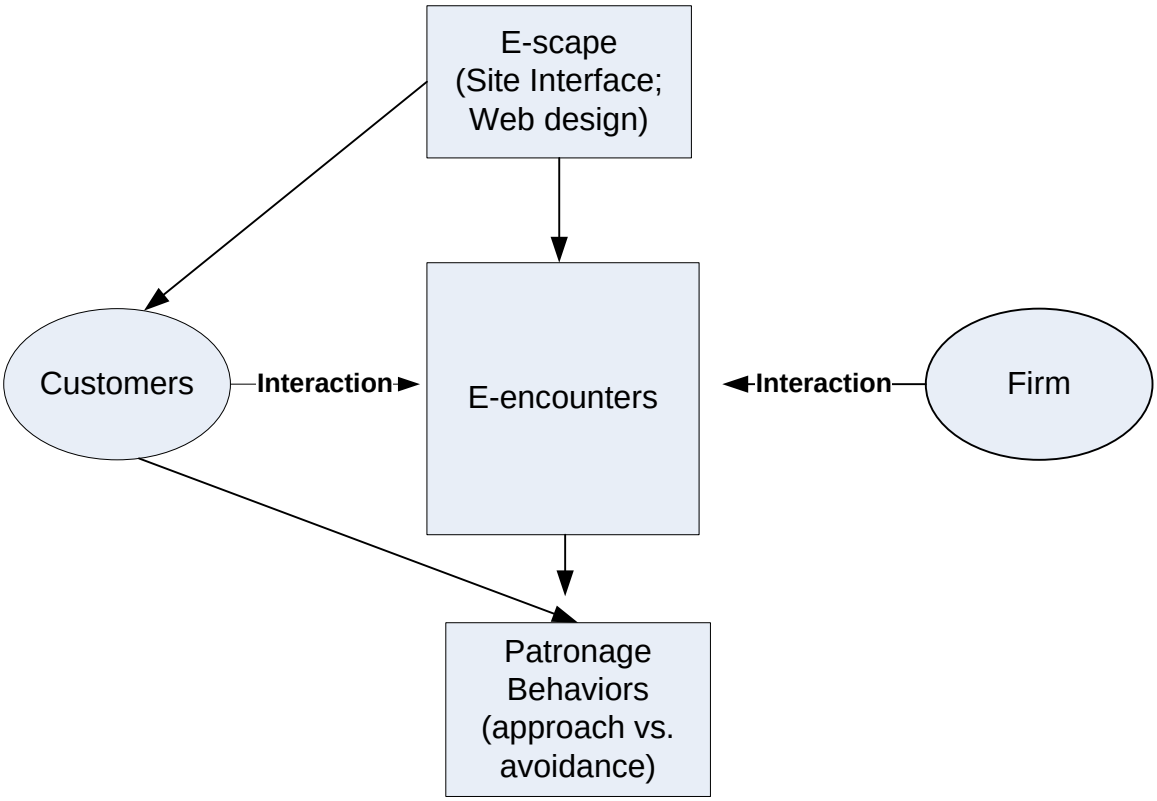

Figure 5-1 E-encounters

Service encounters are conceptualized as the interaction between a customer and a firm (Bitner et al. 2000). Service encounters can take place face-to-face, over the telephone, through the mail, or over the Internet. Our study focuses on Internet

encounters, or e-encounters (see Figure 5-1). As Chapter 4 illustrates, a consumer browses an e-shopping site (e-scape), finds live chat functions (e-scape), sends an instant message to inquire about product price, and receives an immediate answer from the store. From the consumer's point of view, an e-encounter with the site provides all the experiences (e.g., sending a message, receiving a message). In turn, these positive experiences affect the consumer's patronage behavior (approach vs. avoidance).

Another key theme of Web-site effectiveness is interactivity (see Figure 5-1). In accordance with the marketing, communication, and IS literature streams, we define "interactivity perception" as the degree to which consumers believe that an e-encounter 1) facilitates interpersonal communication, 2) allows control over the e-encounter experience, and 3) responds to consumers' actions quickly (see Chapter 3). In this study, we show that interactivity perceptions influence patronage behaviors. These interactivity perceptions are largely influenced by e-scape features, such as presence of a chat button, message content, and speed of message (see Chapter 4).

Table 5-1 Dissertation Objectives and Key Findings

#	Objectives	Key Findings
1	To advance the understanding of Web-design features.	1) Five design principles (i.e., consistency, efficiency, interactivity, artistic quality, and information presentation) are identified. 2) Fifteen key design features include font, color, look-and-feel, image/pictures, site structure, menu, links, site map, speed, search function, legible text, information placement, feedback function, cookie, and choices.
2	To enhance the understanding of perceived Web-site interactivity.	We define interactivity in two ways: 1) feature-based interactivity and 2) perception-based interactivity: 1) Feature-based interactivity is the degree to which a Web site creates a mediated environment in which participants can communicate with one another and modify forms and messages in real time. 2) Perception-based interactivity is the degree to which users perceive that a Web site facilitates interpersonal communication, allows control over online experiences, and responds to human actions quickly.
3	To provide classification schemes that illustrate two emerging concepts: (1) Web design and (2) interactivity.	1) Web design can be broken down into four dimensions: a) organization, b) interaction, c) display, and d) arousal. 2) Different types of interactivity are categorized on the basis of four dimensions: a) communication, b) technology, c) control, and d) synchronicity.
4	To understand the relationships among Web-site features, interactivity perceptions, and site effectiveness.	A conceptual model with 17 propositions is suggested: 1) Key site features (e.g., navigational structure, feedback functions) contribute to interactivity perceptions. 2) Competing hypotheses propose different relationships (i.e., linear vs. curvilinear) between interactivity perception and site effectiveness. 3) Individual characteristics and situational variables (e.g., involvement, desire for control, Internet experience, tasks) play important roles in the relationship between site features and interactivity perceptions.

5	To test the relationships identified under objective 4.	A 2 x 2 x 2 x 2 full factorial experiment is conducted in a service setting (i.e., participants send instant messages to an e-store). 1) Three key features (i.e., number of clicks, response time, response message type) are important antecedents of interactivity perception and site effectiveness. 2) Response message type is the most important feature. 3) There is a positive relationship between interactivity perception and site effectiveness (i.e., satisfaction, loyalty, attitude, site quality). 4) Interactivity perception mediates more than 80% of the MS effect for site features on site effectiveness. 5) Message type effects on site effectiveness are different under users' different tasks.

New Insights into E-encounter Interactions

There is a trend for organizations to replace physical services with digital-based services (e.g., online banking, online customer service, airline companies' e-checking systems). The e-encounter interaction matrix (Table 5-2) serves as a framework to illustrate how the quality of consumer e-encounters can be enhanced. In the first column, there are three drivers of service-encounter satisfaction: 1) customization and flexibility, 2) effective service recovery, and 3) spontaneous delight (Bitner et al. 2000). Next, we discuss each of these three drivers, the key e-scape dimensions in each driver of satisfaction, and illustrative examples from our study.

Customization and Flexibility: Customers appreciate e-customization. As Table 5-2, Column 5, shows, a customer was pleased to find what he wanted in a few clicks rather than exploring 100 different pages. In this sense, both control over the shopping experience and customization enhance satisfaction. The interaction and organization

dimensions play important roles in perceived customization. The interaction dimension includes site features such as the searching function and the site map. For example, users can control the sequence of site contents by using the site map. The organization dimension helps customers complete tasks with minimal effort. Key organization features include site structure, menu system, and link structure.

Effective Service Recovery: Service recovery is the actions of a service provider in response to a service failure. When failures occur, customers demand and expect effective service recovery (Bitner et al. 2000). In Chapter 4, participants encountered a situation in which the wrong product is delivered. As Table 5-2, Column 5, shows, a customer was satisfied by the organization's recovery ("I was mad at first, but a customer service person helped me right away on their website"). Interactivity is important in service recovery. Key interactivity features include speed of recovery and feedback functions.

Spontaneous Delight: Another way that firms can achieve effective e-encounters is to provide customers with unexpected, pleasing experiences. According to Bitner et al. (2000), these pleasant surprises can result in "spontaneous delight." For example, in our experiment, participants were impressed when they found a "live chat" button, which they did not expect. Their delights resulted in positive patronage behaviors. Arousal and interaction dimensions are important for unexpected (pleasing) experience. Animation and multimedia technologies also can stimulate spontaneous delight. For example, some online clothing stores (e.g., Rapido, Land's End) provide "virtual models," which pleasantly surprise customers. Amazon.com collects click-stream data about its

customers, which enables Amazon to create personalized home pages that reflect the preferences of an individual customer.

Implications for Theory

A contribution of this dissertation is its systematic exploration of Web-site interfaces (Web design, e-scapes), as examined in Chapter 2. The advent of the Internet has redefined the physical environment and has created the e-scape. In the service literature, key in-store variables, such as lighting, music, color, smell, employee service, and store layout, are identified. Moreover, these key variables are classified into several groups (Baker 1986; Bitner 1992). Similarly, we identified 15 key features of e-scapes and categorized them into four dimensions (see Chapter 2). The results are theoretically fruitful and suggest various ways that the effect of e-scape on customers' perceptions and site effectiveness can be examined and tested.

We develop a conceptual model that investigates the relationship among e-scape features, interactivity perceptions, and site effectiveness. On the basis of various theories (e.g., TAM, social cognition theory, social presence theory, S-O-R theory), this model suggests 17 propositions that can be tested in future research. Our knowledge of e-scapes and Web-site interactivity is still in the developmental stage. Thus, the theories and frameworks used to build the conceptual model contribute to theory development in these two relatively emerging areas.

To our knowledge, this study is the first to test empirically the effect of e-scape features on interactivity perceptions. Specifically, in accordance with four theories (i.e., telepresence theory, service-waits literature, interactivity theory, and social presence theory), we found that the number of clicks, response time, and message type were

important predictors of interactivity perceptions and site effectiveness. This result gives some implications for the way interactivity could be manipulated in future research. For example, interactivity has been manipulated as the presence or absence of certain e-scape features (e.g., presence of chatting function, presence of site map). However, our findings suggest that managing the number of clicks and response message is more appropriate in manipulating interactivity than simply adding features, such as site maps and chatting functions.

Cognitive control theory (Averill 1973) represents another perspective that can guide research that focuses on interactivity perception in computer-mediated communication environments. Cognitive control has two mechanisms: information gain and reappraisal of a stressful situation. These two mechanisms are cognitive efforts that a person can use to cope with a given situation. We apply this theory to study how consumers process information about their situation (information gain), how such information influences their interactivity perceptions (information reappraisal), and, as a result, whether they exhibit positive responses to the site.

Implications for Managers

This dissertation examines how Web design affects consumers' interactivity perceptions and site effectiveness. In addition, this study broadens the knowledge about e-service encounters.

Web sites serve as important marketing tools (e.g., to facilitate transactions, to provide customer service). We provide the concept of "interactivity" as a way to enhance site effectiveness. As Chapter 4 shows, interactivity perceptions enhance satisfaction, loyalty, attitude toward sites, site-quality perception, WOM behavior, and

repurchase behavior. As a result, organizations may have an interest in managing different kinds of site interactivity (e.g., control, responsiveness). For example, when users search for specific information (e.g., stockholders seeking performance statistics), the “control” dimension of interactivity might be the most important.

The findings highlight the importance of e-servicescapes (e.g., the physical surroundings of a Web site, the Web design). Site-design features provide cues that enable customers to judge the effectiveness of the site itself and the organization’s overall quality and service. Thus, we find that some key site-design features (i.e., number of clicks, response time, and message type) are antecedents of consumers’ interactivity perceptions. For example, to enhance interactivity perceptions, an e-tailer can add an instant chatting function in a customer service section and respond to customers’ messages immediately (e.g., lively chat with customer representatives). Such a fast response enables real-time two-way communication between customers and the e-tailer.

Another key implication for managers to consider is the effect of consumers’ different tasks on interactivity perceptions. When e-stores design and manage e-scapes, they should consider consumers’ specific situations before purchase, during purchase, and after purchase. Same e-scape features have different effects on consumers’ interactivity perceptions, depending on consumers’ situations at the time of purchase. For example, when an e-store improves a site’s navigational structure (i.e., decreases the number of clicks to locate specific information), consumers who are involved in prolonged search behavior will have higher interactivity perceptions than consumers who show exploratory search behavior (i.e., hedonic browsing).

Limitations and Future Research

We studied customers over a relatively limited period and setting (i.e., e-shopping, service recovery). A direction for future research is to examine different kinds of sites (e.g., financial services, travel, software). Different site features may be more or less effective in different industries. The transaction stage (search vs. purchase vs. complaint vs. disposal) may also drive the key relationships studied herein.

We categorize Web design elements into four dimensions: organization, interaction, display, and arousal (see Chapter 2). Although we evaluated this classification scheme on the basis of Hunt's (2002) criteria, various validating procedures (e.g., interviews with different groups of Web users, Delphi method) need to be conducted to make such a scheme generalizable.

In Chapter 3, we identified a complex model with a relatively large number of predictors. It is difficult to test the full model (e.g., Figure 3-1, Table 3-3) with one empirical study. For example, there are at least 20 potential site features that are proposed to influence interactivity perceptions and site effectiveness. We tested only 3 features in this study. Future researchers should test other segments of this model.

In this study, we focused on consumers' interactivity perceptions of Web sites. However, there are many other key dimensions of Web sites (e.g., trust, usability). For example, to develop strong relationships with customers, organizations also must create an atmosphere of trust and security. What are the key site features that contribute to customers' trust on a Web site?

Other limitations include the use of relatively small sample sizes (Chapter 2) and of student participants (Chapter 4). Although students are savvy in using the Internet, other segments of the population may have different experiences.

The emergence of the Internet has generated many new business opportunities. Managing effective e-encounters is a crucial task for firms that want to attract loyal customers and sustain competitive advantage. In e-encounters, interface design (e-scape) is one such success factor. This study offers a potential understanding of how customers interact with e-scape and how firms can design e-scapes to establish, maintain, and enhance customer relationships. This study also shows managers how to use e-encounters to accomplish their strategic goals.

Table 5-2. E-encounter Interactions: A Framework

Drivers of Service-Encounter Satisfaction (Bitner et al. 2000)	Definitions	E-scape Dimensions (Chapter 2)	Key elements of E-scapes (Chapter 2)	Some Examples from Consumers' E-mail Messages (Chapter 4)
Customization/ Flexibility	Customers expect and demand flexibility and customization in service encounters.	Organization interaction	Site structure Menu system Links structure Search function Cookie Choice option	"I just visited this new web site that sells uga merchandise. It is way easier than searching around 100 different sites; it has everything you need on just a couple of links. I will be doing all my buying here and hope that you will do yours here too."
Effective Service Recovery	Customers demand and expect effective service recovery when failures occur.	Interaction	Speed Search function Feedback function Cookie	"I bought a shirt for my mom off this website TotallyDawgs.com, and they sent the wrong one. I was mad at first, but a customer service person helped me right away on their website." "Even though it wasn't a great experience with the wrong item, they were nice and helped me fix the problem. I think that this website wouldn't be a bad place to shop if you needed UGA stuff."

Spontaneous Delight	Customers are impressed when unexpected, pleasant things occur during an encounter.	Interaction arousal	Cookie Choice option Animation Games Virtual model Multimedia Technologies	“There's this special link called 'Live Chat' where you can actually chat with one of the store's representatives and ask them anything you want about their product. You don't see this kind of stuff very often now do ya?” “I think that the chat feature is good. I always like to see web sites that have chat for their customer service. It is much more personal than e-mail.”

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