

Impact of Web Design Features of Electronic Commerce Web Sites on User Satisfaction and the Likelihood of Consumer Purchase

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Abstract

Electronic commerce website provides the primary channel for consumers who are buying products online to interact with and it will directly affect the way consumers perceive about the products and services provided. This study attempts to study how the different website design features will influence consumers' perception regarding the various e-commerce websites and consequently, the consumers' likelihood of purchase of products from the e-commerce websites. To make it easier for designers to improve certain aspects of the websites separately, Web design features are classified into distinct categories in the new framework for web design features designed, namely, Information, User interface and Network system. With these new classifications, website designers can then make improvements to e-commerce websites according to the amount of influence that each of these classifications have on user satisfaction.

Findings from the data analysis suggest that only the Information and User interface constructs are important in influencing user satisfaction. Thus, it is only when a website has a good user interface that consumers can make better use of the information provided. Besides, results show that user satisfaction is positively associated with consumers' likelihood of purchase. Therefore, since the Information and User interface component of Web design features has a positive relationship with user satisfaction, it can be deduced that these two components of Web design features will positively affect the likelihood of purchase. As a result, website designers can try to add value to the Information and User interface part of Web design features in order to have greater satisfaction among the consumers. In addition, this will lead to a higher likelihood of purchase among consumers. Therefore, by improving the Information and User interface of their websites, e-commerce companies are more likely to earn greater revenue through the increased sales.

Introduction

E-commerce website provides the primary channel for consumers who are buying their products online to interact with. Furthermore, it will directly affect the way consumers perceive about the products and services provided. Thus, it is important that the website is designed in such a way that will make it more pleasant for consumers to purchase their products online. In addition, consumers' perception about the e-commerce websites is important because it will eventually influence consumers' decision as to whether to purchase a product online or not. Studies from various literatures suggest that there are many factors that influence consumer purchase decision on the Internet, such as Product Characteristics (Page & Lepkowska, 2002), Perception of Price (Bednall & Kanuk, 1997) and Perceived Security (Fenech & O'Cass, 2001). Among them, Web Design Features (Schoenbachler & Gordon, 2002) plays an important part in determining the likelihood of consumer purchase from electronic commerce websites. Thus, how consumers feel about an e-commerce website will eventually affect the likelihood of purchase online (Chen, et.al., 2004).

Furthermore, in the electronic commerce world, especially for business-to-consumer (B2C) e-commerce, people who use the websites to search for information and purchase products are considered as customers. So, understanding how the users or potential customers feel about the websites they use is becoming a very serious concern (Cao, et. al., 2005). With a better understanding of users' concern regarding the e-commerce websites, the website designers can then come up with websites that will satisfy consumers. Web designers can also manipulate the Web Design Features during the design stage to achieve a high-quality website which will result in satisfied consumers (Zhang & Dran, 2002). This is important for electronic businesses because consumers who are satisfied with an e-commerce website are expected to have a higher likelihood of purchase (Rodgers, et. al., 2005; Vijayasarathy, 2004).

Therefore, the main objective of this research is to study how the different website design features will influence consumers' perception regarding the various e-commerce websites and consequently, the consumers' likelihood of purchase of products from the e-commerce websites. This research focused on the effect of Web design features instead of the other factors that influence consumer purchase decision because this research aims to help e-commerce website designers in designing websites that will lead to greater user satisfaction and in turn, leading to a higher likelihood of purchase. Since web design features can be easily modified to influence consumers' purchase decision, it is important to measure what users want in a website (Page & Lepkowska, 2002). Furthermore, because the website is a primary user interface for net-enabled business, it makes the study of web design features even more important (Palmer 2002). In addition, consumers can also benefit from the results of this research because designers can then come up with better e-commerce websites which will ensure that consumers have a satisfied online purchasing experience.

In an attempt to find out which components of Web design features have a greater impact on user satisfaction and the likelihood of purchase, the various web design features are identified. However, previous research about Web design features mainly focused on the effect of each individual component of the websites. The effects brought about by a group of Web design features are not studied. This makes it difficult for designers, consumers and researchers to see the relative importance of each group of Web design features. Thus, to make it easier for designers to improve certain aspects of the websites separately, this research attempts to reclassify Web design features according to the definition obtained for the various components

of website design. As a result, a new framework for web design features is designed. This new framework will separate out the different groups of Web design features to assist the study of the impact of these different groups on user satisfaction and likelihood of purchase. To test the hypothesis derived from the framework, a survey is conducted and these will be further elaborated in the subsequent chapters.

Literature Review

Web Design Features

The impact of Web Design Features on consumer decision making is important for both consumers and designers of electronic commerce websites. For consumers, a website with excellent Web design features will make them happier and more satisfied with the e-commerce company. In turn, this will lead to a greater likelihood of purchase from that particular website (Wixom & Todd, 2005) and greater sales and earnings for the e-commerce company. For designers, since the shopping services provided by e-commerce websites are designed for public users with very different cognitive and demographic profiles, the major challenge for the website designers is to come up with a website that have an effective user interface (Chau, et.al., 2000) and offers quality product information for consumers. Thus, it is important for website designers to be able to design websites that can satisfy customers. Furthermore, website success is critical for the survival of business-to-consumer electronic business as the success of an electronic commerce website will affect user satisfaction and consumers' likelihood of purchase (Palmer, 2002). A good website will make potential purchasers more comfortable and happy to browse through the site and make their purchase (Brown & Bastardi, 2000). Since web design features is a direct determinant of website success, it is important for e-commerce websites to have good web design features.

However, there is a need to find out which particular details of the electronic commerce website will have a greater influence on the likelihood of purchase and which group of Web Design Features will have little effect on consumer decision making. Web Design Features is a very general term to refer to the components of an electronic commerce website. Thus, in order to find out the effects that different categories of Web Design Features have on the likelihood of purchase, it is necessary to group the different features of the website into clear-cut categories. There was a list of web interface concept that falls into a few classes, namely content, structure, user and information (Waterworth, et. al., 1993). Zhang & Dran (2002) also came up with a model for Web Design Features with several categories, namely Information content, Visual appearance, Technical support, Navigation and Organization of information content. These website features will affect the way consumers perceive about the e-commerce website and in turn, affect the purchase decision of the consumers (Schoenbachler & Gordon, 2002). In addition, Palmer (2002) also identified metrics for the usability, design and performance construct of consumer-focused websites. These metrics are download delay, navigability, interactivity, responsiveness and the content quality of e-commerce websites. Some of these metrics, including download speeds, search mechanisms, navigation structure and content, are similar to the web design principles that Nielsen (1999) had found to be relatively constant despite the drastic changes in browsers and Internet technology. Therefore, these features of an e-commerce website are more established and found repeatedly in many studies. However, it is not enough just to classify the Web Design Features into different categories. To determine the

effects of these groups of features on website success and eventually, on consumers' likelihood to purchase from that website, it is necessary to design metrics to gauge the successfulness of the website and the likelihood of consumer purchase.

According to the TAM model, consumers' Attitude towards Use will directly affect their behavioral Intention to use (Davis, 1989). Therefore, consumers who are satisfied with the use of the e-commerce websites will have a greater intention to purchase from the websites too. In other words, user satisfaction of e-commerce websites will be directly related to consumers' likelihood of purchase online (Bharati & Chaudhury, 2004).

Research Framework

This research attempts to reorganize the various web design features into three broad categories that will cover all aspects of the website features, namely Information, User Interface and Network System (Figure 1). These three categories of web design features will be described in details in the following sections.

Information

Information is classified as one category of Web Design Features of e-commerce websites because the main purpose of such websites is to enable consumer to make a purchase online (Turban, et. al., 2002). In order for such purchases to occur, potential buyers need to obtain sufficient information from the e-commerce websites regarding the products that they are interested in (Palmer, 2002; Schubert & Selz, 2002). Besides adequate product information, other aspects of information, such as the way the information is presented (Chau, et. al., 2000) and the accuracy of the information provided (Zhang & Dran, 2002), are important classes of the Web Design Features that have an impact on consumers' likelihood of purchase.

Information can be considered in terms of customer moment of value – time, location and form (Haag, et. al., 2002). The *time* dimension of information encompasses two aspects – providing information when the customer wants it or timeliness (Davenport, 1997), and providing information that describes the time period the customer wants. The location dimension deals with providing information to the customer where he or she wants it. But for the case of this study, since electronic commerce is what we are dealing with, it is assumed that the customer can have access to any information on the e-commerce website anytime he or she wants. Thus, the location dimension is not relevant here. The third dimension, *form* dimension deals with a variety of aspects, such as providing information to the customers in a form they want. It also deals with accuracy. Davenport (1997) introduces another dimension for information, the *information content*. As a result, the information component of Web Design Features is broken down into the three smaller categories, Time, Form and Content. However, for consumers to obtain the product information that they want, they will need to interact with the e-commerce website directly. In other words, consumers will have to interact with the user interface of the e-commerce website. Thus, the next important part of Web Design Features is the User Interface.

User Interface

The user interface of an electronic commerce website is the first thing that consumers will notice because it is through the user interface that a potential buyer comes into contact with the e-commerce company. User interface encompasses many aspects of Web design features such as the Navigation structure (Nielsen, 1999; Waterworth, et. al., 1993), Interactivity of the website (Palmer, 2002; Schubert & Selz, 2002) and the aesthetical aspects of the website or its Visual appearance (Alben, 1996; Kerne, 1998). The key usability issues of efficiency, effectiveness and satisfaction mean improving the ease with which they can identify and access specific information relevant to their individual needs (*Navigational structure*), interact with the e-commerce company through the website (*Interactivity*) and increase their “aesthetic enjoyment” of on-line shopping (Kerne, 1998; Nielsen, 1999), which is also known as the *Visual appearance* (Zhang & Dran, 2002) of the website.

Network system

Besides the Information and User interface part of Web design features, another important category of Web design features for e-commerce websites is the Network system that supports the website. Network system supporting e-commerce websites is constructed from many building-block pieces, such as the hosts that connect the websites to computer networks all over the world, the backend support for website users, programs that enable applications to run on the e-commerce website, and technical support provided by websites (Peterson & Davie, 2000). Since the purpose of this research is to study the impact of web design features on the likelihood of consumer purchase online, the only aspect of the network system that is being considered here is the *Technical support* provided by the electronic commerce website (Zhang & Dran, 2002). Technical support in this case includes the speed of downloads or response time of the website (Palmer, 2002), the reliability of the website (Page & Lepkowska, 2002) and support for different platforms and browsers (Zhang & Dran, 2002).

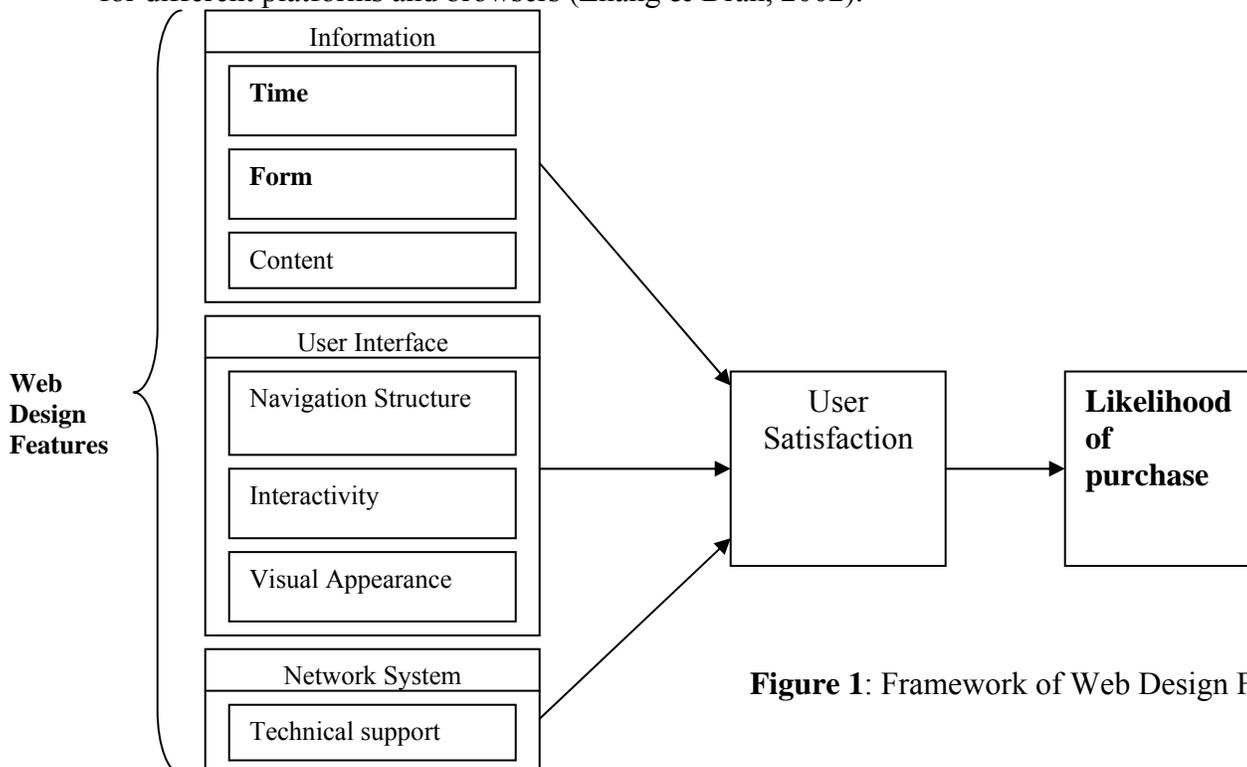


Figure 1: Framework of Web Design Features

Hypothesis

Based on the framework for Web design features of e-commerce websites, a series of hypothesis is derived.

H₁: *The information component of Web design features is positively associated with user satisfaction.*

H₂: *The user interface component of Web design features is positively associated with user satisfaction.*

H₃: *The network system component of Web design features is positively associated with user satisfaction.*

H₄: *User satisfaction is positively associated with the likelihood of purchase.*

Research Design

One hundred students from National University of Singapore (NUS) from various faculties were invited to participate in the survey. The basic requirement for the choice of subjects is that all of them should be computer literate and have been using the Internet. Thus, NUS students were selected as most of them have experiences with computers and the Internet. For the purpose of this research, top three ranking websites for multi-category electronic commerce websites were chosen. The three websites chosen for the survey are namely, Amazon, Yahoo! Shopping and eBay.

The subjects were to browse through the three websites subsequently so that they can get a feel of the web site features. To ensure that they browse through the websites thoroughly, the subjects were required to follow some simple and open-ended instructions that allow subjects to explore the websites at their own pace and according to their interests. Then, the subjects were told to fill in a questionnaire consisting of questions from each of the three main categories of Web design features, namely Information, User interface and Network system. Questions were also asked to find out subjects' satisfaction to the website and likelihood of purchase. After obtaining the completed questionnaires, the data collected and analyzed using various statistical analysis methods.

Data Analysis

A total of 100 valid questionnaires were collected from the survey. All of them have been using the Internet for at least one year. 20 Subjects have been using the Internet between one to three years, 43 of them have been using it between three to five years and 37 subjects have experiences with the Internet for more than five years. Furthermore, there are 23 subjects who have purchased products in the Internet before. Some of the e-commerce websites that they frequent include Yahoo! Shopping, Amazon, Buysell.com and Minitab.com. Out of these 23 subjects, 5 of them usually spend less than \$20 for each purchase, 7 subjects usually spend between \$20 and \$50 and 11 subjects spend more than \$50 from e-commerce websites usually. Since all of the participants for the survey are all Internet-savvy, they fulfill the basic requirement for the choice of subjects as described earlier.

Reliability

Reliability refers to the degree to which observed results are “free from errors of measurement” and is assessed using Cronbach’s α (1951). With the exception of the “Time” construct, all the constructs used are above 0.7 and considered to be reliable. Since the “Time” construct was measured by only one question, there was no need to compute Cronbach’s α . The construct was considered to be reliable.

Construct Validity

Construct validity refers to the appropriateness, meaningfulness, and usefulness of the specific inferences made from the measures (Alreck & Settle, 1995). In this case, factor analysis was used to assess the validity of the Independent variable constructs, as well as the Dependent variable construct. The result shows that six of the constructs are valid, with the exception of the “Content” construct. Therefore, two questions were removed from the “Content” construct to make it valid. The factors that emerged correlates with the eight constructs in the Web design features framework, namely Time, Form, Content, Navigation Structure, Interactivity, Visual Appearance, Technical support and the Likelihood of purchase. Thus, the eight constructs defined earlier are considered to be valid.

Regression Analysis

Linear regression is performed to access the degree and character of the relationship between the dependent and independent variables. To get an overall view of the data collected, multiple regression is performed on the combined data collected from the three websites namely, Amazon, Yahoo! Shopping and eBay. With the three main constructs of Web design features namely, Information, User interface and Network system as the independent variables and user satisfaction as the dependent variable, the relationship between each group of Web design features and user satisfaction is studied. Considering those constructs with a significant value of smaller than 0.05 to be valid, both the Information and User interface constructs are significant. In other words, both the Information and User interface constructs are important for the prediction of the user satisfaction. Thus, Hypothesis H₁ and Hypothesis H₂ are supported. Only the Network system construct is not significant in this case. Thus, Hypothesis H₃ is not supported.

Next, regression is performed on the User satisfaction and Likelihood of purchase constructs, with User satisfaction as the independent variable this time and Likelihood of purchase as the dependent variable. This is to test if there is a linear relationship between User satisfaction and Likelihood of purchase. The significant value is 0.000. Thus, it can be concluded that user satisfaction is positively associated with consumers’ likelihood of purchase, and Hypothesis H₄ is supported.

Discussion

This paper makes several contributions to our understanding of the effects of website design features on user satisfaction and consumers' likelihood of purchase. One of the contributions of this research is that a new framework for Web Design Features is designed, with three main groups of features, namely, Information, User interface and Network system. Next, each of these groups of Web design features are further categorized into smaller components to facilitate the study of how each of these components influences user satisfaction and eventually, the likelihood of purchase. With these new classifications of Web design features, website designers can then make improvements to e-commerce websites according to the amount of influence that each of these groups of Web design features have on user satisfaction. This will result in e-commerce websites that will satisfy consumers and result in a more enjoyable purchasing experience for consumers.

Findings from the data analysis suggest that only the Information and User interface constructs are important in influencing user satisfaction. Firstly, information provided by e-commerce websites will affect user satisfaction because according to Palmer (2002), a website that provides better information will result in more successful websites. Since one of Palmer's (2002) measures of success is user satisfaction, it coincides with the findings of this research that the Information component of Web design features is positively associated with user satisfaction. Next, Lohse & Spiller (1999) suggest that interface design will strongly influence user manipulation and utilization of the information provided via websites. Thus, it is only when a website has a good user interface that consumers can make better use of the information provided. Therefore, according to the results of the data analysis, the User interface construct of Web design features is positively associated with user satisfaction too. However, this research's findings suggest that the Network system supporting e-commerce websites have no association with user satisfaction. This might be due to the reason that most users have little knowledge about the technical aspects about the websites. To them, the technical support provided by e-commerce websites is all similar. According to Zhang & Dran (2002), features of the technical support provided by e-commerce websites are found to be classified as basic features of websites. In other words, they are taken for granted and users usually pay little attention to such features (Zhang & Dran, 2002). Thus, this explains why the Network systems have no association with user satisfaction.

Another contribution of this paper is that a relation between the website success factors as described in previous literatures is derived from Davis's (1989) Technology Acceptance Model (TAM). Results from the data analysis suggest that user satisfaction is positively associated with consumers' likelihood of purchase. Therefore, since the Information and User interface component of Web design features has a positive relationship with user satisfaction, it can be deduced that these two components of Web design features will positively affect the likelihood of purchase too. As a result, website designers can try to add value to the Information and User interface part of Web design features in order to have greater satisfaction among the consumers. In addition, this will lead to a higher likelihood of purchase among consumers. Therefore, by improving the Information and User interface of their websites, e-commerce companies are more likely to earn greater revenue through the increased sales.

Limitations and Conclusion

There are several limitations to this paper which calls for further research. Firstly, this paper only looks at the influences of Web design features to consumer decision making. However, there are many other factors such as psychological factors and demographics that will also affect consumers' purchase decision. Thus, in order to have an all-rounded view of consumer decision making and website success factors, all the other factors that affects consumer purchase decision should be examined. Secondly, this research only takes in 100 subjects. Although this number is enough to see the relationship between Web design features, user satisfaction and the likelihood of purchase, it will be better to include more subjects especially from different educational levels, age and income groups, and occupation. This is because people with different demographics may have different perception of e-commerce websites. Thirdly, this research only uses three websites namely, Amazon, Yahoo! Shopping and eBay. These websites are the more popular websites among consumers. Thus, they might have certain influences on consumers' likelihood of purchase due to their reputation. Therefore, future research can be done on other less popular websites to see if there is a difference in the results obtained.

To conclude, although this research provides an in depth view of the effects of each categories of Web design features on user satisfaction and likelihood of purchase, there are still some issues as mentioned in the limitations above that are not addressed. This research contributes to a set of constructs of Web design features that will influence user satisfaction and purchase decision. Thus, web designers can make use of the results of the findings to improve e-commerce websites, with the help of continuing process of improving e-commerce website designs.

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