

An Overview On User Interface Design Issues and Impact to Ecommerce Website Success

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ABSTRACT: *The fundamental nature for consumers to access an E-commerce business is via online user interface of its website, therefore the user interface design of E-commerce websites plays a crucial role impacting to the success of E-commerce business. This paper presents a survey study on the key issues of the user interface design for E-commerce websites, and their impact to the consumers' shopping experience and satisfaction. Since the customers who use e-commerce only interact with web interfaces, how to capture the most important perspective of customers by providing attractive and pleasant interface features, and gaining trust and prospect relationships, are becoming one of the biggest challenges for E-commerce businesses. This survey study focuses on what are the main characteristics of successful user interface design for E-commerce websites, and the categorization summaries and analysis on the existing interface design methods and techniques. The evaluation methods of interface performance are also discussed, such as how the user interface design factors influence on the efficiency and popularity of E-commerce websites, etc.*

Keywords: E-commerce, Web user Interface Design, Website Interface Efficiency, Website Popularity Evaluation

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1. Introduction

The success of electronic commerce for any company - exceptionally if it is not a well-known name - is significantly dependent on the appropriate design of its website. In the electronic commerce industry, the customer has virtually no face-to-face interaction with the company. This makes the consumer's first impression be made by the company's website only. This means that a website represents a communication system between the company and the consumer; thus, it is crucial for the companies to provide an effective website as its E-CRM (Customer Relationship Management) practice. The success of electronic commerce website is very much affected by its page view contents and the interface features for supporting accessing the contents. Accordingly, the effectiveness of its user interface design plays an important role for the ease in obtaining the desired information of the business, in the meanwhile gaining with pleasant interacting experience. An interface is about what users can see on a screen when they check any given website. A poor navigation process can contribute directly to buyer's action to switch to other E-commerce websites. In many cases, the interface experience can be the most important factor determining the buyer's willingness to buy online [1, 2].

2. User Interface Design Issues for E-commerce Websites

Turban and Gehrke (2003) proposed 7 basic aspects of the online customer interface for E-business websites as illustrated below [3]:

- a. Commerce: Selling products and services on the Internet.
- b. Context: Designing the website includes functional and aesthetic look and feel.
- c. Content: All subject matters on any website presented with images, text and sound.
- d. Community: How the users interact with each other, such as chatting rooms.
- e. Customization: A website's ability to display content.
- f. Communication: A website's ability to exchange information with the users.
- g. Connection: The connection between the site and other sites.

User interface is a composite mix of images, text, formatting, and other features that may affect the quality of the website. Ivory and Hearst (2002) explain the broad set of activities required when addressing these different aspects [4].

The information design of an E-business should allow to identify its business content and to develop category labels to represent the information structure of the website.

The navigation design of an E-commerce should allow to develop a navigation bar to help the interaction with the website's information structure.

The graphic design should allow to analyze the visual presentation.

The experience design should allow to evaluate a website in terms of user experience (download time, advertisements presentation, popup windows, and web browser compatibility).

Those issues must be considered carefully and incorporated into the interface design of E-commerce websites before implementation development.

3. Impact of User Interface Design to Website Efficiency

The study of Ivory and Hearst (2002) shows a relationship between web-design factors and web efficiency. Their study conducted a statistical analysis of 157 measures of websites in order to identify the main factors that affect design parameters [4]. In their study, three classes of websites are defined, including Good (top 33% of sites), Average (middle 34% of sites), and Poor (bottom 33% of sites) based on the website scores. The scores were given by a team of judges at the Annual Webby Awards competition, an international competition held to honor excellence in website design. It was assumed that all individual web pages are applied by these ratings. Six categories of website communities are used: education, finance, health, living, and services. They studied the websites design in terms of page-level analysis and site-level analysis. Page level analysis considered the website measures of the web pages, which relates to *local interface features* associate to each view page. On the other hand, site-level takes into account the analysis on site architecture, which relates *global interface feature* analysis for the whole website [4].

The statistics analysis tool ANOVA (analysis of variance) is a collection of statistical models, which has been used to identify webpage classes by Ivory and Hearst (2002), i.e., good vs. poor, good vs. average, average vs. poor, in trying to determine whether they are extensively different from other classes [5]. Based on their research, the results are given below.

- If the minimum font size is nine points or less, this indicates that the page is good.
- Good pages tend to use few colors instead of an excessive use of colors.
- In good pages, italicized words are rarely used, while poor and average pages make larger use of Italicized words in the body of the text.
- Good pages tend to have more hidden errors than bad pages. Lots of unseen errors do not conform to web's standards. Correlation is found among the number of errors and interactive objects, table, images, etc. This indicates that highly-rated pages do not conform to accessibility standards.
- Good pages have one graphical ad, and poor pages have more ads than average pages.
- Good pages have more hyperlinks than average and poor pages.

- Good pages tend to be more interactive than poor and average pages. A good page contains three interactive objects, for instance text box, search button, or pull-down menu.

4. Interface Design Parameters for E-commerce Website

The text and graphics elements and various formats which the users see on a web page are web design parameters, which are commonly divided into the following categories [4-11]:

4.1 Text Elements

Text elements are known as typography. The main difference among text on screen and on print media (hard copies) is that the text on a hard copy appears much bigger than on screen, which makes it difficult to read. The kinds of texts usually have three types of headings: main heading, a sub heading, and sub-sub heading [6].

4.2 Text Formatting

The text formatting and text fonts are also known as typefaces. Text formatting is important because it influences readability. Emphasizing text makes skimming easier to users as well as it produces visual contrast through the text. The following are text emphasis standards [6]:

- Italics: Italics give the text a different style to the rest of the body. Italics texts are usually used for conventions such as titles.
- Bold : Bold text is good for headings.
- Underlined : Since the web page sometimes has underlined links, it would not be a good idea to use underlining text because it may confuse the users.
- Colored text: We should note that blue and purple colored text are sometimes used in hyperlink. So, this could also confuse the users.
- Capital letters: Capital letters are the least effective way to emphasize text.
- Spacing and indentation: They are one of the best subtle ways to emphasize text.

4.3 Link Elements and Formatting

The most important part of hypertext is its links which allow users to go to other places on the web with ease (i.e. ease of navigation from the current web page). There are three forms of links commonly used and well generalized in [7]:

- Structural navigation links. These links outline the structure of the information of the website.
- Associative links. These links are communally underlined words. Moreover, these links help users to go to other pages that have more information about the content of the page.
- “See also” embedded links. These links help users to find what they want if the page they are viewing is not the correct one.

Current research does not take color into account; there are four common colors that are used to display links in web page. Blue is the standard color for an unvisited link. When the user clicks over the link, the link changes color; in this case, there is no standard color. On the other hand, some websites use this feature especially if the link is not underlined. An active link, in some websites, displays a standard color of red or purple. An active link refers to the web page that the user is presently browsing. The link turns to red or purple because the user clicked on it [8].

4.4 Graphic Formatting

Graphic formatting refers to the number and type of images on a page. Graphics can affect download speed; however, they can be used to catch the user’s attention. The most commonly used image formats are GIF, JPEG and PNG (not all browsers support transparent PNG). Animated images refer to the images that flash or move [8].

4.5 Page Formatting

Page formatting examines web page characteristics in terms of page size, and frame such as web page width and length. It has

been suggested that a web page should be able to fit into any screen resolution. This lets the design of the web page width be adaptable to any screen resolution [9].

There are four commonly used factors for components of page length [10]:

- Relation between page and screen size.
- Content of the documents.
- Whether the browser is expected to browse the content online, or to print or download the information.
- The bandwidth available for the user. If the user accesses a website with low bandwidth, the page will take a long time to download. Consequently, it will be better to divide the page into multiple pages.

4.6 Functionality

A website's functionality allows the users to interact with the website. It should fulfill the purpose of the website. This study considers the common basic functionalities of electronic commerce websites.

The search function helps the users to locate what he/she is looking for. This feature is one of the most useful tools for electronic commerce websites.

The shopping cart function allows users to keep track of all the items they have selected for purchase. Also, it lets easy access for viewing and removing the previously selected product items [11].

The recently viewed item function allows users to view the previous visited products pages.

Moreover, some electronic commerce websites show alternatives or new products when the users view something specific on the website. This function is one of the seventeen customer directives that Dalyleish (2002) suggests for electronic commerce websites [12].

4.7 Web Interface Style Consistency

While design web interface features, it must be sure that the elements of the features on individual pages are treated consistently. In addition, maintain that consistency as the user moves from one page to another. The understanding what was built on one page is enhanced by giving the user a similar experience throughout visiting the site [13]. The interface style on handling the information on a single page is the same way the information is handled on every single page of the site.

5. E-commerce Website Interface Evaluation

Many of the electronic commerce websites today have a short life because they did not meet the minimal quality requirements for websites. Success for any electronic commerce website relies on both careful design and thoughtful evaluation. A lot of decision makers in electronic business companies continued to make huge investments in developing websites without a clear knowledge of the factors that contribute in developing high quality websites and the measure effects on electronic commerce success [14].

From the above discussion, it is clear that any e-business must pay attention to the web design issues and evaluation criteria. Evaluation criteria/measurements include the following aspects: design factors, usability, performance, security, content, user transaction, and the technology employed [15].

5.1 Website Design and Website Usability

Poor design and usability of any E-commerce website can lead to great loss in productivity and revenue. Developing and improving the design of E-commerce websites is of critical importance. Navigation, graphic, information, and experience are the design components, as illustrated in figure 1. The bottom level relates to navigation, information, and graphic design (for instance, text elements and formatting are regarding the information design). The top level relates to experience design. As figure 1 illustrates, link, text and graphic elements are the building blocks of web interfaces, and other aspects affect the accessibility, usability and quality of websites [15]. The next level, which includes page performance and formatting, produces page level. The top level, which is site architecture, produces site level design. In fact, all levels affect the user's experience with the website [16]. Web-interface design is a complicated set of activities to produce various features--navigation, graphic, information, and experience design.

Usability consideration may include the list below:

- Help users easily to accomplish their intended task at desired speed.
- Reduce the amount of training that users need.
- Provide documentation or supporting materials to help the users to find solutions.
- Reduce the number of errors which user may make when interact with the website.
- Help the users to recover from the errors they made, and minimize the steps that users have to do to recover from errors.
- How the product meet user's need.
- Is there one size which fits all approach work or there are differences between the cognitive approaches of users that influence the design.

5.2 Website Homepage & Interface Performance

Response time is one of the website performance measures. Response time is defined as the average lapse of time between issuing a request and receiving the requested data [15].

When the server is under full load, i.e. when it is working on a large number of requests, the latter may take longer to complete than with an unloaded server. A full-load server can result in increased response time for each user sending a request. Typically, a server in full load will be slow, if not unresponsive at all [15].

People who do not like to wait also do not like for Web pages to load. At this point, the interface of a site becomes useful because of the following reasons:

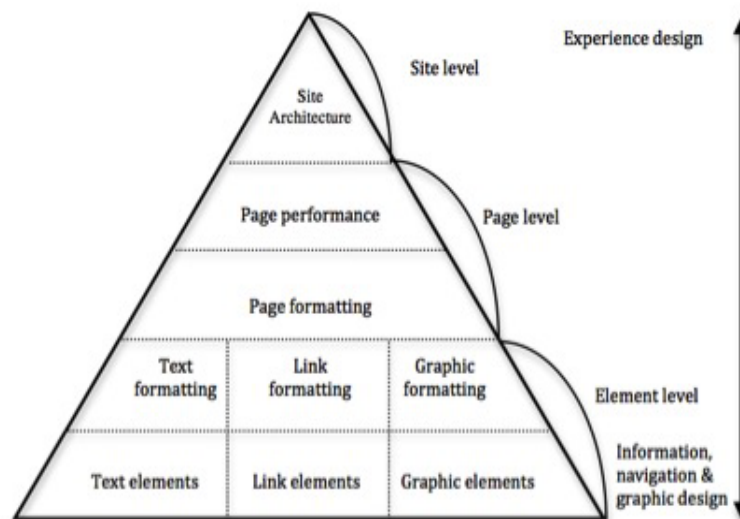


Figure 1. The building blocks architecture of a web site: interface page and site-level features [16]

1. The interface on the first webpage of the website needs to be designed carefully. This page has the same function as the cover of a magazine or a company report.
2. It takes much time to obtain a detailed evaluation of a whole Web site and all of its links, and the process may present some difficulties.
3. The theme and tones of the Web site depend on the interface.

This is why the interface on the homepage becomes crucial when evaluating the website.

The response time for each page depends on the following variables: as page size is measured in Kbytes, the downloading time for the page depends on the page size. Minimum bandwidth can be defined as the smallest pipe between the end user

and its ISP. Nowadays, a large percentage of people still use 56.6K modems for their internet connections, in particular in the developing countries. At these conditions, Round trip time (RTT) represents the time lapse between the sending of a request by the user's browser and the time the first data (measured in bytes) is sent from the Web server to the user's computer. The numbers of TCP connections necessary to fully download a page are defined by term turns. The processing time that the server requires in order to process the user's requested page, so that it can be viewed by the user, represents the last factor in the response time formula [15].

5.3 Security and User Transaction

Both privacy and security of an E-commerce website are essential, in that they provide all the details on how a consumer's personal and transaction information will be used, how they will be protected from improper and unauthorized use and access. This is why it is extremely crucial to provide a clear, well designed and easy-to-understand privacy and security for the website. Moreover, what distinguishes some websites, apart from a well-designed privacy and security policy, is the presence of reports of effective enforcement. All these characteristics are what allow the user to make informed decisions, to do transactions and communicate with companies in full security, and with the guarantees of protected privacy[17].

5.4 Content

Unlike modern business, which has long considered information as of essential importance, E-commerce took content in the form of data, information, knowledge or experience to higher levels of consideration. Content has become, in some cases, the product of some E-commerce business models. Thence, content has become a source of value without which containers (transactions, products, services, etc.) cannot be said to have any value. The quality of the content is important, and it refers to how the information, is presented in the E-commerce system. Another way to think of content quality is as attributes pertaining to the content. With the term "presentation", the concept of organization of the information and the degree of customization the user has over the content are included. Organization involves the details such as the amount of information on a page, the need for scrolling down to view the page content, clarity of the content on the page, website browsing technique, ways the information is structured and organized in the website, etc. The success of a website might depend to a more or less large degree on how content and content quality meets the expectations and requirements of customers, and how this will influence their decisions of staying in the same website or clicking away [18].

5.5 Technology Employed

The advancement of the telecommunications infrastructure provides access to the new technology for both business and consumers. Technological factor can be measured by many criteria that can lead to the improvement of E-commerce. According to Tassbehji (2003) the technology is measured by the following [19]:

- Telecommunication infrastructure is measured by:
 1. Backbone infrastructure and architecture
 2. Industry players and competition
 3. Pricing Internet service providers
 4. Range of services available (e.g. ADSL, ISDN)
 5. Ownership (private or public sector)
- Access to new technology developments
- Bandwidth
- Speed of development and implementation of new technology by industry sector.

5.6 External Links

According to (Federici, Borsci Mele and Stamerra, 2008), External links are "total number of unique external links received (in-links) by a site" that can be determined via the following tools:

- Yahoo Site Explorer: Extend the capability to get all external links pointing to a site as listed in the Yahoo.
- Google Link Search: it works in the same way as Yahoo does.
- Del.icio.us: it is an online social book marking system, which lets users to share their bookmarks online with other users.

- Google Page Rank: it is one of the main features that Google considers in the arranging of their search consequences, i.e. their proprietary Page Rank.
- Google generates this score from 1–10 throughout a complex algorithm based on external links and their quality.
- Alexa Rating: it is a popular website metrics system owned by Amazon.com. User who uses the Alexa toolbar can contribute to a ranking of site popularity [23].

6. Case Studies

Some experts agreed on the fact that the front page of Amazon (see Figure 2) has a very clear presentation [?]. It uses, for example, a non-saturated background color; this is helpful, as it avoids overload for the user’s mind. The main menu is highlighted in blue; the search engine can be found on the top-centre, and it is highlighted in dark blue. These colors and position arrangements draw the users’ attention to these points. This is what leads experts to call the menu structure and the search engine, one of the greatest assets of this website. Product novelties, offers, and sales take a central position in the website. Good quality images and colorful headlines reinforce the image of the website, also pointing out the updating features of the website. Some experts consider the front-page scroll as cause of possible negative effects on the user. It might provide too much information at once, while being of no great utility to the user, who may not bother scrolling down to the bottom of the page [20]. In this case, the user would not even see this part of the website, and the front page scroll would eventually become an unnecessary effort.

In a similar way, the evolutions of amazon.com’s website is shown in Figure 2 and Figure 3. Figure 2 shows how the structure of amazon.com’s latest homepage portal is similar to the older homepage. The same L-navigation bar, as well as the same products in the center, are featured in both pages, despite a decrease in the tab rows and a more colorful color scheme for the newer homepage portal. Featured in both pages are also account management and shopping cart, which appear at top-right. As illustrated in Figure 3, the order summery portion of the quick-flow checkout was essentially not altered [20].

Regarding the features of the website structure and navigation, it must be considered that Amazon.com finds the main source of its success in these aspects; this opinion was supported by the experts’ reports in [20]. The search functions are available in all the pages of the website. They are clearly categorized, and the search engine allows for a general or a more refined search, i.e. for the latter more specific items based search engine (see Figure 4).



Figure 2. Newer interface for amazon.com

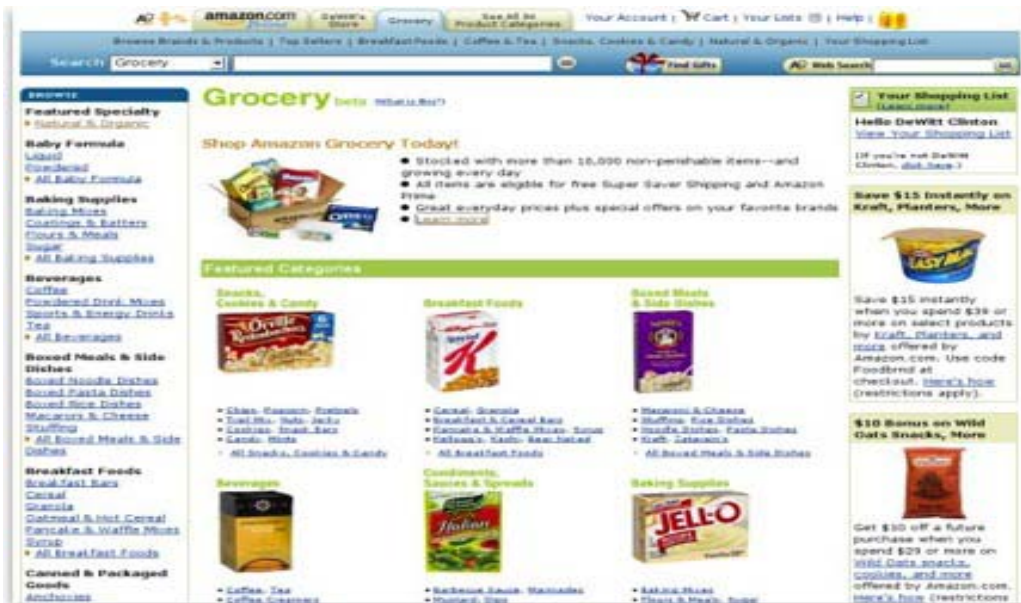


Figure 3. Old interface for amazon.com

Simplicity of navigation and fitness of contents structure have been underlined by all experts as some of the assets. These allow users to navigate the website with a broad degree of freedom. Experts also underlined a complete, comprehensive and accurate quality of the specific information, stressing on its good quality. They also praised the availability of reviews, the possibility of a 360° view, and the good quality of the images. The evaluators mentioned, however, the lack of a “site map” button to allow the users to control their navigation. Regarding this, a good recommendation would be to make shorter scroll down; this could be done by cutting out the content of each page, or by using sprea labels [20].

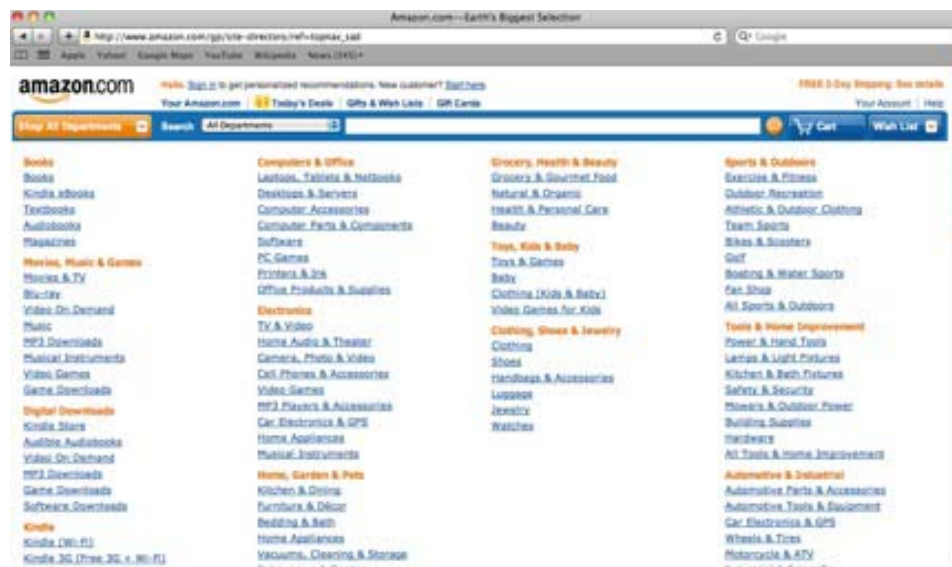


Figure 4. Amazon search functions

The changes adopted in the past six years in the Yahoo homepage are illustrated by figure 5. As it can be seen, the only changes worth mentioning have been an increase in the density of information displayed. The design has remained practically the same, maintaining what is called “common web look and feel” [21].

The main elements featuring the majority of commercial websites are: a three-column grid with the most important content and navigation above the fold; a navigation bar (or a tab row) along the top; a search action module can be found at top-right or

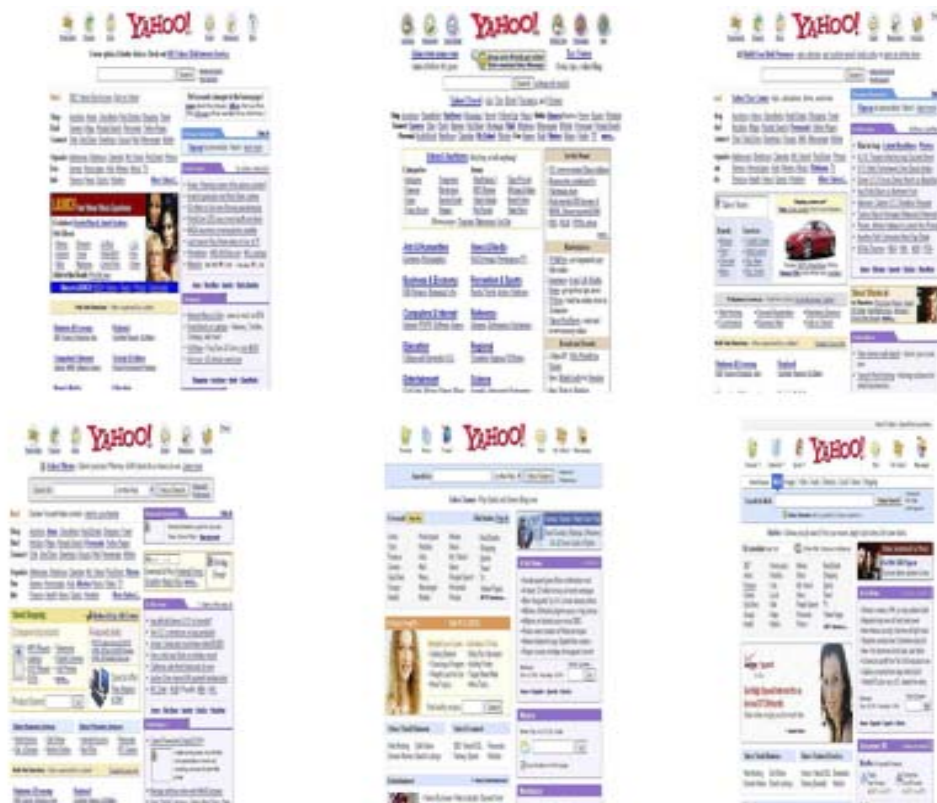


Figure 5. Yahoo homepages from 2005-2009

middle-left; a “home” button, a “privacy policy” link, and an “about us” link at the bottom; shopping carts and quick flow checkouts; content modules in the center and right side, etc [21]

Despite the use of AJAX technologies and mobile web, the risk of tectonic shifts in the way web pages will be designed is erased [21].

There are four reasons, or criteria, which are crucial in a user’s decision to return to certain websites and not to others. These criteria represent the foundations of good web design. Summarized under the acronym HOME, they represent what the user wants most [22]:

- High-quality content
- Often updated
- Minimal download time
- Ease of use

These four basic design considerations are used to ensure the popularity of a website. In order to obtain even greater and outstanding websites, it is necessary to move beyond these four basics into something called HOME RUN design [22]. In order to do this, three extra aspects must be added:

- Relevant to users’ needs
- Unique to the online medium
- Net-centric corporate culture

The website must not only provide high-quality contents, but they must be presented in a unique way, which points out the special characteristics of the website.

Furthermore, the site must provide this relevant high-quality content in a way that is unique to the online medium’s special characteristics.

7. Conclusion

This paper presents a short survey study on the website interface design issues and their impacts to the success of E-commerce. With the new emerging internet technologies and the fast changing world, to achieve success on E-commerce website development, it is essential that the website designer and developer must have better understanding on what are the key factors or attributes which affecting the success of E-commerce websites and in which ways. For this, the user interface design issues play crucial role, which must be further studied. In addition, more standardized website evaluation criteria and usability evaluation procedure should be established, and evolved continuously in providing useful general guidance on E-commerce website development.

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