

# WEB SITES INTERACTIVITY AND DESIGN CHARACTERISTICS IN THE ONLINE CONSUMER BEHAVIOR - Survey Article -

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## Abstract

*In the online medium, competition being at one click distance, the success of business web sites comes from their potential to differentiate. It is important for marketers and web designers to know which elements are appealing to users and how these elements influence their behavior. Recent studies suggest that web site failures are due to poor web design and there are various and specific characteristics of web site interactivity and design elements which users may prefer.*

*First, this article aims at identifying and examining the characteristics of web site interactivity and web design, which influence most the users. Second, it finds out how these elements influence the online consumer's behavior and finally, it gives insights into the methodological aspects used in this area.*

*Overall, these findings provide insight into the interactivity and design characteristics, helping marketers and web designers to enhance the web site interface to attract and persuade users and finally to elicit a loyalty behavior.*

**Keywords:** web interactivity, web design, consumer behavior, online consumer behavior, eye-tracking, eye movement.

**JEL Codes:** M15, M50

## 1. Introduction

The actual success of e-commerce environment was stimulated by the rapid technological development which facilitated the problem solving not only in the business area but also in the consumer's area. According to Kearney (2012), e-commerce has grown annually with 13% in the last five years, at global level. All these changes has

brought difficulties in the marketers and web designers job, emerging new problems in what concerns their endeavor to differentiate among e-commerce websites with similar products, in what concerns the premature shopping carts drop out and the appearance of new questions on what kind of methods to use in order to simplify the users decision making process. The competition is now at one click distance and the marketers and web designers must work in such a way that does not give their clients reasons of frustration. There are some elements in a web site's construction which act either in a positive or in a negative way on the consumers behavior.

In line with this, we observe difficulties when identifying precisely the way in which the user acts online and the way in which his behavior can be modified. There is gap in what concern the understanding of the most important components of design and interactivity (in the actual context) which influence, attract and retain the user. Which are those elements of interactivity and design with a major influence on the Romanian consumer behavior online? How does our brain react when exposed in front of these elements, in front of an e-commerce web site which has a structure with a high level of interactivity and which utilizes a large range of design methods?

First, our purpose is to identify the web sites interactivity and design elements which have a major influence on the online consumer behavior. Second, we propose the methodological aspects used in the assessed literature, with most emphasis on the eye tracking methodology which involves the eye movements analysis. Thus, this method identifies the users' reactions and preferences.

Moreover, this study aims to identify and define the relevant theories, concepts and methodologies proposed in the literature.

Therefore, we assessed 22 relevant articles which clarified and proposed new directions of research. We have researched in the following data bases: Science Direct, ProQuest, SpringerLink, Emerald.

This work is organized thematically into the following sections: the first part is an introduction which describes the motivation and the objectives of this work; the second part will define and analyze the concept of interactivity as it was identified in various studies; the third part will examine the visual appeal as an essential element in the online communication strategy; the fourth part will provide an analyze of the online consumer behavior, including the theories underlying its understanding; the fifth part will discuss the most used methodologies in this area; the last part will conclude, discussing the contribution of this work and suggesting areas for future research.

## **2. Web site interactivity: definitions and importance**

Interactivity represents the attribute which stands at the basis of the actual online medium. It is defined, understood and created in various ways. The common approach of the assessed studies defines the changing of the marketing communication process from one to two-way communication. Teena Carnegie emphasizes that interactivity is mainly the result of the interface response to the users actions. The interface is “a place of interaction whether the interactions are between user and computer, user and software, computer and software, user and content, software and content, user and culture, and the user and other user” (Carnegie, 2009, p.165). In fact, the way interactivity appears is the rhetorical way of the interface.

According to Carnegie, interactivity is characterized by three main characteristics:

Multi-directionality is the first attribute and it means that the user responds back not only to the stimulus and to the received messages, but he also “refers back to specific content and indicate how content is related to that of earlier messages” (Carnegie, 2009, p.167). To exemplify this characteristic in today`s online medium, we would refer to users reviews, instant messages. Here, the

user is not only the sender of the message but he is also the receiver to multiple sources.

Related to the previous study, the concept of multi-directionality acquires the same meaning to Weon-Sang Yoo (2010, p.90). He gives his contribution with another concept, namely bi-directionality which refers strictly to this condition of the user where the sender and receiver role can be shifted between them but not between multiple sources.

Manipulability indicates the degree to which users may influence and manipulate the shape and the content of the message of the new medium (Carnegie, 2009, p.168). For example, iGoogle offers today the possibility to create your own personalized gadgets.

Presence is the last attribute proposed by Carnegie and it is based on the “integration of system attributes with user perceptions” (Carnegie, 2009, p.169). The supposed attributes of the system are the speed, the number of actions that one can perform and the ability to answer the outside enquiries. Acting together, these attributes can render the feeling of being in a certain space even though it is not true. To exemplify this, one can use images, videos of a high quality in order to build this kind of environment.

On the other hand, in comparison with Carnegie, a new perspective is brought by Weon-Sang Yoo ot.. For them, in order to create interactivity, the user have to adopt a dynamic behavior. Here, interactivity implies a communication with users behind a certain web site, a search for information in an interactive way, including even the transaction process. Further, Weon Sang Yoo ot. define two new attributes of interactivity: controllability which reveals the manner in which the content, time and communication sequence is controlled and synchronicity as the speed of answering in the communication process (Yoo ot., 2010, p.90). These two attributes represents in fact the basic attributes a system has to incorporate before focusing of design elements.

Therefore, it is important to know and understand the attributes of interactivity in order to create new models for analyzing the interactivity`s consequences and the relationship between these and the user`s behavior. Also, the quality of user`s decisions can be improved and the user`s trust in the vendor`s products can also be enhanced.

Thus, these attributes have a positive influence on the users' perceived value.

In addition, Zeng et. suggest that the consumer's perceived value is the result of an overall analysis of the perceived utility of a product, based on the comparison between what is received and what is expected (Zeng et., 2008). On the other hand, Yoo et. speak about satisfaction as a post-consumption evaluation, based on the consumer's value. Thus, it was observed that controllability does not have a significant influence on the consumer's value, meanwhile the attribute bi-directionality has a significant influence on the utilitarian value (Zeng et., 2008, p.91). Based on this, we can conclude that concerning a certain organization with a small budget, the investment should focus more on the improvement of bi-directionality and synchronicity rather on a higher controllability. Blogs, virtual communities, online messages and customer service lines represent the essential constituents of bi-directionality.

As previous outlined, interactivity has relevance in building good customer relations. An alternative viewpoint comes from Jones et al. who outline the importance of interactivity in generating emotions. Here, we observe the transition to another level where users are manipulated. Both in the case of presentation web sites as in e-commerce websites, interactivity generates emotions which ultimately are directed to the brand, to the main participants in the communication process (the customer service representative) or to a certain action (when someone downloads music or is filling his personal data). Hence, the resulted emotions, even though they are evanescent, affect the brand evaluation through a direct transfer of feelings or through releasing certain cognitive processes (a fast response will trigger a pleasant surprise which can generate a long term perception toward the company) (Jones et., 2008, p.421).

Finally, even though a web site interface includes important interactivity characteristics, there is possible that users may not be aware of it and not perceiving it. If we consider the new designs which implies a high level of involvement, we observe that even though it includes elements of interactivity with a positive output in the analyze, these leads to confusions,

disorientation in the web site's virtual space. Thus, the user forgets about his main purpose. This approach constitutes a new direction of research.

### **3. Investigating the visual appeal: design theories and attributes**

Within the web environment, interactivity is not the only one which attracts and engages people. Web design is particularly important in this medium because it depicts a new world and provides an experience. In order to investigate the users design preferences and to determine the effects of certain design elements, it is compulsory to understand them and to settle their boundaries.

In the online medium, we all know that information is basically communicated through the perceptual elements, such as image and text. As a benchmark in the process of visual appeal investigation, we propose the study initiated by Soussan Djamassbi (2010). In this study, we discriminate between two fundamental theories which propose the analysis of the user's answers in what concerns the aesthetics background:

In the first study, we witness an approach whose propose is the analysis of the user's reactions to the entire object, as a whole. This study is based on the Gestalt theory which suggests that "one's perception of an object cannot be decomposed into its elementary parts" (Djamassbi et., 2010, p.308). Because perception is not necessarily composed by all its parts, when understanding the visual appeal, one has to appraise stimuli as a whole. If we take web sites into consideration, the evaluation has to be a subjective understanding of the page, as a whole and not of its elementary parts.

The second theory investigates the reactions (behaviors) to the individual parts of a certain object. Experimental aesthetics asserts that "aesthetic preferences are governed by mathematical rules such as the golden ratio" and that "one's aesthetic preferences can be predicted through functions that depend on the inherent qualities of a stimulus" (Djamassbi et., 2010, p.309). Thus, the question raised here and which request an answer is the following: which of the web pages components have a

significant influence on the user perception?

The study which is based on these theories, entitled "Generation Y, web design and eye tracking", proposed by Sousan Djamasi ot. (2010), provides us a direction of analyzing design elements. The first phase, establishes four characteristics which could attract Generation Y: a main large image, pictures of celebrities, search features and little text (Djamasi ot., 2010, p.310).

Therefore, it was organized various evaluation groups depending on the previously mentioned variables, as follows: the first phase, randomly selected retail web pages from the ForeSee Results Gold Standard American Customer Satisfaction Index; in the second phase, four experts offered different scores to the previously chosen pages by the presence or absence of the four variables. 98 participants assessed the visual appeal of top 50 retail web pages. They proceeded in this way in order to establish if the answers they gave corresponded with the established scores by the experts. The results indicated that the group with a high characteristic score received high values from the participants, significant values in comparison with the pages from the low characteristic score group.

These results were not sufficient to confirm the fact that the analyzed participants have indeed understood and evaluated the 4 variables which were to be analyzed, because the visual appeal represents a holistic appraisal of the whole reaction of a page, not of the individual characteristics. Thus, in order to test if these characteristics have indeed attracted the users attention, it was used the eye tracking device, Tobii 1750, which recorded the gaze and fixation.

The results of this research have important implications on studies which involve human-computer interaction (HCI), especially for those who study the web sites visual appeal. Moreover, this research outlines the fact that the characteristics score was a reliable predictor of the Generation Y preferences, concerning the retail web pages visual appeal. For this group, the visual appeal is reached when the web pages include a main large image, pictures of celebrities, search features and little text.

In addition, this study offers a set of design characteristics on which we can relate

in our research directions: large and high quality images, pictures which include celebrities, search features and little text.

Besides interactivity and design approaches, Liang Zeng ot. (2008) have created an instrument for measuring the web site creativity and its influence on the consumer's behavior. In this respect, 289 participants completed a survey in which they evaluated 7 dimensions: interactivity, visual appeal, novelty or flexibility, importance, simplicity, personalization and emotion. As a result, interactivity, novelty and flexibility were the main factors which modified the user's behavior.

When we talk about design, we automatically think about the range of colors we are to use. Colors represent an enormous potential in stirring emotions. This is why we are going to discuss various approaches from this perspective.

We identified two studies which evaluated the color influence on the user's cognitive processes. Nathalie Bonnardel (2010) has conducted a study in which she investigated the colors preferred first by web designs and second, the colors preferred by users. In the next phase she chose three of them (blue, orange and grey) and analyzed how are they related to the entire web site. People have different reactions to various colors. It was proved that colors have important consequences on people's thinking. The most important result consisted in the fact that colors are conditioned by the general design on the web site and by the way in which users are navigating.

In addition, Cyr ot. (2009) analyzed the relation between the colors of a web site and culture (Canadian, German and Japanese). Unlike the previous study, Cyr utilizes the eye tracking technology, the interview and the survey. Theory of colors has a strong relation with the cognitive-affective model of communication. The last one suggests that the process of communication (including the medium and the form of message) has an influence on the way in which the communication is received. The model of this study is related with the model described by Hausman (2008, p.10). Hausman outlines the importance of colors in the decision making process and then, in the e-loyalty behavior. If a certain user is attracted by a certain color and the last one stirs reactions

of trust or satisfaction, we will expect that users will revisit the web site or he will buy from it in the future and finally he will adopt a loyalty behavior.

Moreover, Hausman et. (2008) brings a new modality of factor structure. They divide them into computer factors and human factors. The human factors include those hedonic elements which bring value to the web site, thus contributing to user's satisfaction. Hausman mentions as human factors those described by Zhang and von Dran, "enjoyment, cognitive outcome, user empowerment, credibility, visual appearance, and organization of informational content" (Hausman et., 2008, p.6).

On the other hand, computer factors are "those whose presence provides functionality" (Hausman et., 2008, p.6). This organization indicates the fact that a rich medium, which provides a realistic setting (through the improvement of the human factors), has a positive influence on the users involvement when working with the computer factors.

This review provides us useful theories when investigating the visual appeal, the attributes of the web site design (interactivity, attraction, novelty and flexibility, importance, simplicity, personalization, emotion) as well as the most important elements of design which influence most the consumers visual appeal (a main large image, little text, pictures with celebrities, search features).

#### **4. Online consumer behavior**

We defined the concepts of interactivity and design. Now, we are able to understand better the theories used to identify the users actions in the online medium. When we talk about the online user behavior, we refer both to the exploratory and the involvement behavior. We also discuss about e-loyalty behavior, which means the "consumer's intention to buy from a website, and that consumers will not change to another website" (Cry et., 2009, p.852). This definition is addressed from the perspective of the motivational theory. If we will start from the idea that web design represents a predecessor of e-loyalty behavior, then this behavior refers to the "intention to visit or use a website in the future and to consider

purchasing from it in the future" (Cry et., 2009, p.852).

Further, we identified two studies which were based on the technology acceptance model in the consumer behavior analysis. Hausman et. (2008, p.6) support that this model is based on two specific actions which affects the behavioral intention: „perceived ease of use (PEOU)" (Hausman et., 2008, p.6) and „perceived usefulness (PU)" (Hausman et., 2008, p.6). Perceived ease of use decreases when the user becomes familiar with that technology. Perceived usefulness is better understood through the way in which a certain user believes that the technology will improve his performance. As a result, this study emphasizes that the cognitive and psychological factors make sense when we try to understand the reasons underlying the buying behavior.

On the other hand, Cyr et. (2009) identify a different direction concerning the technology acceptance model. According to this model, the intention to use or accept a new technology is determined by the perceived usefulness and the perceived ease of use (Cry et., 2009, p.852). In this case, if the user perceives the web site as being efficient (this means the web site is easy to use and gives the possibility to find the information you search), effective (the quality of the information), entertaining (as games and various methods of entertainment) and trusty (even if it is for the vendor or for the security of transaction), he will finally assume a loyalty behavior. What is new and original in this model is the fact that it includes cognitive elements, as efficiency and effectiveness, cognitive-affective elements as trust and finally an affective element as the playful element.

In addition, Hausman et. (2008, p.8) reaches the same conclusion. For him, when a user comes back to a web site or that user has only the intention to revisit it, this is believed to be triggered by his attitude toward that technology used in the development of the web site. Here, different behaviors are interpreted as the perceived ease of use. The fact that a user revisits the web site, repeatedly purchases from it, gives recommendation to others about it, gives positive reviews or comments, it means that he has a positive attitude toward the used technology.

Furthermore, Cyr ot. (2009), finds a good start in the theory of reasoned action in which the attitude influences the behavioral intention. According to this theory, "an individual's behavior is predicted by his or her intention to perform this behavior" (Cry ot., 2009, p.851). Thus, in this context, e-loyalty represents the behavioral intention of a certain user.

Contrary to these studies, analyzed till now, Sang Myung Lee ot. (2011) formulate the hypothesis, according to which the performance of a web site (meaning large conversion rates, loyalty, etc) is determined by two dimensions: "transactional dimension" (Lee ot., 2011, p.68) which refers to the consumers' actions in their process to find the best price for a product or their involvement in various transactions which assume a previous experience; the "engagement transaction" (Lee ot., 2011, p.68) which refers to the type and degree users involve in the navigation process. This study does not relate to the interface design, neither with interactivity, but it comes from a user's perspective. Nevertheless, the only level in which the marketers and web designers can act is that of interactivity and design. The two cannot be directly modified.

As a result, in this section we identified two main theories which are useful in the user's behavior research: the theory of reasoned action and the technology acceptance model. Both of them were used by different authors in major studies concerning the user behavior.

## 5. Methodological aspects

Further, we will discuss the most used research methods in the identification of the relations between interactivity, design and consumer behavior online. Among these, eye tracking method has a special place in our discussion because nowadays, it raises interest in our domain and we are interested how we can use it.

First, the online survey and interviews are the most used methods in this area of study. In the most studies, the participants were part from various panels, from different companies, universities or from social networks.

Second, eye tracking technology was used as much as the online surveys but it gave

best results. Here we are interested to use it in different studies in the Romanian. Elaborated by Tobii Technology AB and implemented by IRSOP in Romania, eye tracking technology is becoming more and more used in the marketing research, as it is the most efficient method in online behavior research. First utilized in psychology and medicine, nowadays this technology is met in marketing research plans.

Eye tracking technology is based on some digital cameras with infrared rays as well as a soft for processing the image. Basically, the eye tracking device records the gaze path on a stationary or moving surface. The output of the eye tracking process is represented by a heat map which indicates the areas where the user gazed most and for a long period of time. Also, it shows if the user looked more or less to a certain image, to a certain block of text or to a specific structure (the arrangement of the layout with menus bar, side bars, etc.) (Satu, 2012).

The resulted data can be analyzed either by using the cognitive theories or by observing them without apriori constructs which refers to the ocular movement and cognitive activity. Using the eye tracking device, we can measure the gaze (time spent on certain areas, the number of the most interested areas), the most fixated areas, the path followed by gaze. The most important contribution is the fact that it tells us why a web site fail. Thus, it can shorten the testing process of various types of design.

The eye tracking devices can be divided into compulsory and non-compulsory devices, wearable, contact or non-contact devices. In order to overcome some interferences triggered by the eye tracking devices, there was conceived a non-interfering eye tracking method. This method uses a technology based on the image processing. Here, a video camera has the role of catching the eye images and to process them. This new method has the main advantage that the participants are no longer limited and they do not need to wear special equipment. This device can be used in any type of human-computer interaction studies.

One of the assessed studies (Simola ot., 2008), used this method in order to analyze the entire sequence of gaze fixation and of the eye movement, to obtain data which were hard to obtain and that indicated the way in

which these processes alternate during the reading activities. The relation between the eye movement and the cognitive states was modeled by using the discriminative Markov model.

S. Djamasbi (2010) has used this technology in order to analyze the fixation, to test if users are really captivated and if they are looking more than 300 milliseconds to the small blocks of text, images of large dimensions, pictures of celebrities, and the search features. The resulted heat map indicated which elements were fixated most: images of large dimensions and pictures of celebrities.

Unlike the previous studies, Han-Chin Liu et. (2011) used the eye tracking technology in another manner. He was interested to see how the redundant information included in a web site structure, influences the cognitive processes, especially the multimedia information. The study was based on the cognitive theory of multimedia learning which asserts that the information comprised in various formats is processed at the cognitive level through two different channels (Liu et., 2011, p.2411). The illustrated information or the graphics are processed through the visual channel, while the information rendered in the text form, is processed through the verbal channel.

In addition to the eye tracking method, complementary methods can be used. The study can include a previous survey or interview, before using the eye tracking device. First, the survey will provide certain results which finally will be confirmed by the eye tracking method. This method will provide an objective measure of the user's reactions. It will give us a large image of the user's reactions, of the brain reactions. The results provided by the combination of these methods or by the eye tracking device, have practical implications for companies targeting different demographics. There are certain audiences who may not like the same attributes identified for a certain audience. Some may agree with large blocks of text and some may not. This is important for marketers and web designers. Future research may analyze similarities and differences between certain groups, to investigate the ways in which companies can personalize their web sites in order to avoid failures due to the misunderstanding between

visual appeal preferences and the targeted audience.

## 6. Conclusions

This article suggests a reference background for human-computer interaction studies. It discussed theories and concepts from the assessed literature in this area of interest, the most important terms, starting from interactivity and web design definitions and characteristics. Moreover, it analyzed the most important theories involved in the visual appeal investigation and in the online consumer behavior, as well as in the research methods identified in the assessed literature.

In the first section it described the followed objectives; in the second section it defined and analyzed the concept of interactivity as it was identified in various studies; in the third section it examined the visual appeal; in the fourth section it provided an analyze of the online consumer behavior, including the theories underlying its understanding and the fifth section discussed the most used methodologies in this area of study.

The most important contribution of this paper lays in the fact that it outlines and fixates the concept of interactivity with all its constitutive elements as well as with the presentation of eye tracking technology and its use in the marketing research, especially in the online consumer behavior.

The main findings suggest that a loyal behavior will be acquired when the perceived interactivity will result in positive effects or perceptions on the user. Hence, if marketers and web designers have as main purpose the attraction and revisiting behaviors, they need to focus on the enhancement of web features that involves interactivity. Furthermore, they need to give attention on those attributes which proved to be the most attractive for users. In this respect, they need to assess the existent literature as there are certain features which proved to be the most effective. As we mentioned above, there are certain human features to which users respond better, for example, the use of humor, attractive graphics or 3d virtual models. On the other hand, they should take into account the primary features, which are the computer

factors and which have to be compulsory, as they provide positive perceptions of informativeness and usefulness.

The identified works from this area of study did not indicate a similar direction on the Romanian market. The research plan involves the relation between the highest levels of actual e-commerce web sites interactivity and the complex types of design which influence the online consumer behavior. The theories and concepts discussed above have major implications for a better understanding of the online consumer behavior, on the most used and discussed interactivity and design attributes. Our work provides a clear understanding about various aspects of interactivity in the e-commerce context and the role each attribute has in the creation of the consumption values and satisfaction.

Each of the attributes mentioned in this work can be used in order to make the user more willing to personation. All these attributes create a different interface which is a design for human experience. In this respect, we need to reshape our notions of design and interactivity and thus, to prepare the users for the process of buying.

In addition, we could include in the research process only the e-commerce web sites with the most complex types of design which are specific to the actual trend, in a continuous development. Furthermore, a new market can be researched, as Romania. An intercultural point of view would also be a further direction of research. We should be aware that there are different perceptions in different cultures. A relevant example could be that of color with different perceptions by culture. Different people with different backgrounds have different perceptions in what concerns color, some types of layout structures and the list can continue.

We also consider that prior investigations on the used methodologies from the assessed literature, indicated the eye tracking methodology as the best method which can provide us the most relevant data and which can answer to our research problem. The use of eye tracking method may give answers to questions regarding the failure of web sites. Also, it tells us exactly where the user's gaze is focused more, where are his problems. A simple gaze does not tell us that the user gives importance to a certain area. There can

be a dull gaze and this method tells us if there is a focus on certain areas or if there is only a dull gaze.

This work contributes to human-computer interaction literature. It supports future research, providing a background for the visual appeal and interaction attributes and the methodological aspects. With the advance of technology, focusing on a specific online market is easier to understand the users behaviors and thus, to create new strategies in order to attract, persuade and induce a loyalty behavior

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