# HOW DO WEBSITES ENGAGE CUSTOMERS? AN EVALUATION OF THE IMPACT OF WEB PAGE VISUAL APPEAL ON CUSTOMERS' INITIAL PERCEPTIONS

Supavich (Fone) Pengnate, MSIS Department, Spears School of Business,
Oklahoma State University, fone.pengnate@okstate.edu

Rathindra Sarathy, MSIS Department, Spears School of Business,
Oklahoma State University, rathin.sarathy@okstate.edu

## ABSTRACT

According to the rapid growth of online commerce, the competition landscape has become increasingly aggressive. Consequently, new online vendors are facing more difficulty in capturing customers' attention and engage them in their websites. This study aims to investigate how website design components influence online customers' immediate perceptions and their subsequent responses, such as engagement and intention to use websites. An experiment was conducted to examine the consistency of the relationships between website design components and user responses across different exposure times (1 second vs. 10 seconds). The findings suggest that website engagement could be made quickly (within 1 second) and is determined by high level of visual complexity and visual appeal in website design.

***Keywords: Website Design, Engagement, Visual Appeal, Visual Complexity, Web Page Order, Exposure Time***

## INTRODUCTION

In April 2012, there were approximately 47 billion web pages (de Kunder, 2012), an increase from approximately 35 billion web pages in April 2010. This increase is due to the growing number of businesses that are choosing the Internet as an alternative channel for developing a brand reputation, for transacting with and servicing customers and investors, or simply for public relations purposes (Subramaniam, Shaw, & Gardner, 2000). Specifically in the online shopping context, one main question needs to be answered: when a website is in an extensive list of websites competing to offer products or services that are just one click away from each other, how does it capture online customers' attention and engage them in using the website or, in other words, minimize the chance of the user's switching to another website.

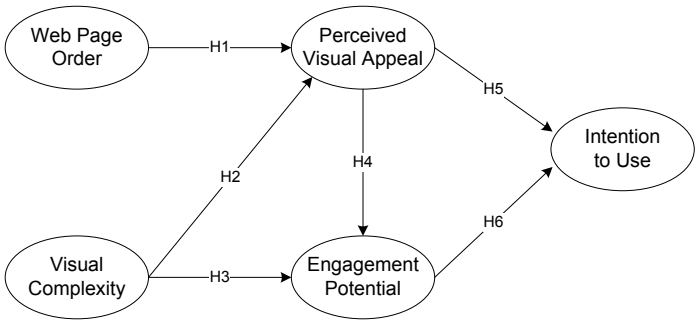
A crucial strategy that many online vendors use to capture customers' attention and engage them with the website is to create a positive online experience (Jakob Nielsen, 2003; J. Nielsen & Loranger, 2006). Past studies have attempted to broaden the theoretical perspectives as to what contributes to the user experience, including the hedonistic elements of a website (van der Heijden, 2004), emotional design (Norman, 2002), and the interactions between user-perceived usability, hedonistic attributes, goodness, and the beauty of systems (Hassenzahl, 2004). Findings from studies in Information Systems (IS) and Human-computer Interaction (HCI) disciplines have demonstrated that visual appeal is an important factor determining user engagement (Deng & Poole, 2010) and that aesthetic impressions can be made quickly

(Lindgaard, Fernandes, Dudek, & Browñ, 2006). In addition, several studies provide empirical evidence that first aesthetic impressions are not only quick, but also reliable and consistent (Lindgaard, Dudek, Sen, Sumegi, & Noonan, 2011; Lindgaard, et al., 2006; Schaik & Ling, 2009; Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006).

## RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

Within our theoretical framework, a proposed research model was developed as shown in Figure 1 to test the impact of different levels of web page order and visual complexity on perceived visual appeal which results in engagement potential and intention to use.

**Figure 1. Proposed Research Model**




### Website Visual Design Components: Web Page Order and Visual Complexity

This study considers web page order and visual complexity as website visual design components in the investigation since they have been studied in aesthetic psychology literature and found to be the prominent dimensions of aesthetics that evoke automatic human emotional responses such as pleasure and preference (Arnheim, 1966; Kaplan & Kaplan, 1983). In this study, we followed Arnheim's (1966) definition of order as "the degree and kind of lawfulness governing the relations among the parts of an entity" (p. 123) and complexity as "the multiplicity of the relationships among the parts" (p. 123).

Visual complexity and order have been found to affect users' emotional reactions and facilitate desirable psychological states and behaviors (Berlyne, 1970; Berlyne, 1971). Complexity and order are considered two salient dimensions of visual aesthetics that capture distinctions among different environments and that invoke two key components of emotional response, namely feelings of arousal and pleasantness (Berlyne, 1971; Gilboa & Rafaeli, 2003; Kaplan & Kaplan, 1983). In the psychology literature, visual symmetry and complexity have been found to have the highest and second-highest correlations with judgment of aesthetics, respectively (Jacobsen & Hofel, 2002). Therefore, we propose that complexity and order components of website interfaces will impact the visual appeal perceptions of web pages.

> *Hypothesis1: The level of web page order influences the user's perception of perceived visual appeal.*

*Hypothesis 2: The level of web page visual complexity influences the user's perception of perceived visual appeal.*

**Website Design and Engagement**

In the marketing literature, it is suggested that visual complexity and visual appeal are executional cues that enhance customers' attention and engagement in advertising by evoking customers' emotional responses when they view ads (MacInnis, Moorman, & Jaworski, 1991). Morrison and Dainoff (Morrison & Dainoff, 1972) reported that visually complex ads, more than simple ads, increase viewers' attention and time looking at the ads. In the online context, visual complexity has been found to evoke customers' emotional responses, such as arousal and pleasantness (Deng & Poole, 2010). Thus, we propose the following hypotheses.

*Hypothesis 3: The level of web page visual complexity influences the user's engagement potential in the website.*

*Hypothesis 4: Perceived website visual appeal influences the user's engagement potential in the website.*

**Website Visual Appeal, Engagement Potential, and Intention to Use**

Regarding the relationship between website visual appeal and user responses, there has been consistent evidence that visual appeal can stimulate positive emotional states (e.g., pleasantness and joy) or negative emotional states (e.g. fear, frustration, and dislike) (Éthier, Hadaya, Talbot, & Cadieux, 2006; Roseman, Antoniou, & Jose, 1996). These emotional states will shape users' subsequent judgment of websites (Loken, 2006). The first aesthetic impressions may establish a positive (or negative) preference that is hard to overcome because information received early is weighted more heavily in the decision process (Russo, Meloy, & Medvec, 1998) and users may also be motivated by the desire to maintain a positive mood (Meloy, 2000). We thus suggest that perceived website visual appeal will motivate intention to use websites.

*Hypothesis 5: Perceived website visual appeal influences the user's intention to use the website.*

A positive experience is an important factor for engagement. In the website context, engagement has been shown to influence behavioral intentions and user performance on a task (Webster & Ahuja, 2006), intention to revisit the websites (Luna, Peracchio, & de Juan, 2002), and intention to use websites (Lederer, Maupin, Sena, & Zhuang, 1998). Therefore, higher engagement potential should result in higher motivation to interact with the website.

*Hypothesis 6: Higher emotional engagement potential in a website leads to higher intention to use the website.*

## METHODOLOGY

A total of 155 undergraduate students enrolled in a major Midwestern university participated in the experiment. A unit of extra course credit was offered as an inducement. Our measurement instruments were developed from existing valid and reliable scales. We adapted Geissler et al.'s (Geissler, Zinkhan, & Watson, 2006) and Nadkarni and Gupta's (Nadkarni & Gupta, 2007) measures of perceived visual complexity and adapted Palmer's (Palmer, 2002) and Cyr's (Cyr, 2008) measures of web page order. The measures of perceived visual appeal were derived from Cyr, Head, and Ivanov's (Cyr, Head, & Ivanov, 2006) instruments. The measures of engagement potential were adapted from Everard and Galletta's (Everard & Galletta, 2005) and Wells et al.'s (Wells, Valacich, & Hess, 2011) instruments. The measures of intention to use were adapted from Jarvenpaa et al.'s (Jarvenpaa, Tractinsky, & Vitale, 2000) instruments.

To investigate how web page visual complexity and order influence users' responses under different exposure times, 4 conditions of an online shopping website were created (2 levels of web page visual complexity vs. 2 levels of order). Web page order is manipulated by varying the logical organization, coherence, and clarity of the web page layout, while visual complexity is manipulated by displaying different amounts of text, numbers of links, and numbers of graphics.

We selected two exposure time conditions, 1 second and 10 seconds. For the first condition, 1 second exposure time was selected based on Lindgaard et al.'s (Lindgaard, et al., 2006) and Tractinsky et al.'s (Tractinsky, et al., 2006) studies where 500 milliseconds of exposure time was used in the experiment. For the second condition, a 10-second exposure time was used since we believed that it is long enough for participants to form a first impression while short enough to ensure that visual appeal ratings are relatively uncontaminated by impressions unrelated to visual appeal such as the semantic content of web page text. Before the experimental stimuli, a block of trial web pages was administered to get the participants acquainted with the rating method and the short display time.

## ANALYSIS AND RESULTS

Manipulation checks were performed and deemed successful. The data set contains a total of 107 usable responses. The sample consisted of 49 females (45.8 percent) and 58 males (54.2 percent). The majority of the subjects were between 18 and 21 years old (62.6 percent). From all the participants, 95 participants (88.8 percent) checked or sent email messages everyday and 58 participants (54.2 percent) made 1-3 online purchase per month.

The measurement model was assessed for the quality of the constructs by testing reliability, and the convergent and discriminant validities of the research instrument. In our study, composite reliability (CR) values ranged from 0.814 to 0.953 and the alpha values ranged from 0.593 to 0.930. In addition, the square root of the variance shared between a construct and its items is greater than the correlations between the construct and other constructs in the model. Therefore, the measures satisfied criteria for discriminant validity. The research model was then tested using the partial least squares (PLS) technique.

Table 1 summarizes the results of hypothesis testing for the overall model, 1-second model, and 10-second model. For the overall model, all the hypotheses are supported. Approximately 38.9% of variance explained in visual appeal, 47.2% in engagement potential, and 50.6% in intention to use. For the 1-second exposure time model (n = 53), the results are consistent with the combined exposure time model and all causal paths are significant ($p<0.05$). Approximately 34.4% of variance explained in visual appeal, 27.1% in engagement potential, and 34.7% in intention to use.

For the 10-seond exposure time model (n = 54), only three casual paths remain significant ($p<0.05$): paths from web page order to visual appeal, visual appeal to engagement potential, and engagement potential to intention to use. Regarding visual appeal, only the path from web page order is significant in the 10-second exposure time model. None of the relationships from visual complexity are significant. Path coefficients from visual appeal to engagement potential and engagement to intention to use are much stronger than those in the combined and 1-second exposure time models. Approximately 46% of variance explained in visual appeal, 71% in engagement potential, and 66% in intention to use.

**Table 1. Summary of Hypothesis Testing (* p < 0.05)**

| Hypothesis | All Exposure Times Model (n=107) | | 1-Second Model (n=53) | | 10-Second Model (n=54) | |
|---|---|---|---|---|---|---|
| | Std. Coef. | t-val | Std. Coef. | t-val | Std. Coef. | t-val |
| H1: Order to Perceived visual appeal | 0.519 | 7.367* | 0.371 | 2.731* | 0.622 | 7.998* |
| H2: Complexity to Perceived visual appeal | 0.217 | 2.996* | 0.321 | 2.330* | 0.150 | 1.628 |
| H3: Complexity to Engagement | 0.188 | 2.429* | 0.304 | 2.430* | 0.157 | 1.756 |
| H4: Perceived visual appeal to Engagement | 0.593 | 7.963* | 0.301 | 2.179* | 0.777 | 12.650* |
| H5: Perceived visual appeal to Intention | 0.320 | 3.386* | 0.353 | 2.884* | 0.209 | 1.752 |
| H6: Engagement to Intention | 0.457 | 4.807* | 0.340 | 2.843* | 0.634 | 5.078* |

## DISCUSSION AND CONCLUSIONS

### Summary of the Findings

In general, the results of the experiment confirmed the proposition that a web user's engagement is evoked by the visual complexity and visual appeal of a web page the user encounters, and they influence subsequent responses to the website. The major findings of this study can be summarized as follow.

Regarding engagement potential, we proposed that both visual complexity and visual appeal would play a role in determining websites' engagement potential. In the 1-second exposure time model, both H3 and H4 are significant; therefore, it appears that both visual complexity and

visual appeal contribute to engagement potential with approximately equal standardized path coefficients (0.304 and 0.301). Thus, the results demonstrate that website engagement can occur quickly and is determined by a high level of visual complexity and visual appeal in website design. However, it is interesting that when subjects had more time to evaluate the website, as shown in the 10-second exposure time model, the effect of visual complexity was attenuated such that H3 is not supported. Therefore, the results indicate that visual complexity can elicit web users' engagement in after a very brief exposure, before the users evaluate other components of website interface. Furthermore, the standardized coefficient of the path from visual appeal to engagement in the 10-second exposure time model is much greater than that of the path in the 1-second exposure time model (0.777 vs. 0.301), indicating that after the initial phase of the exposure in a very brief period of time, visual appeal becomes a stronger predictor of engagement than visual complexity.

According to prior research on environmental aesthetics, we proposed that both web page order and visual complexity would play a role in determining website visual appeal (H1 and H2). Both H1 and H2 are supported in the 1-second exposure time model; however, when users have more time to evaluate a website as in the 10-second exposure time model, only web page order (H1) remains significant in predicting visual appeal. Furthermore, the standardized path coefficient of the path from web page order to visual appeal in the 10-second exposure time model is much higher than the coefficient of the path in the 1-second exposure time model (0.622 vs. 0.371).

In testing H5, there is an inconsistency between the two exposure time models. H5 is supported in the 1-second exposure time model but is not supported in the 10-second exposure time model. Therefore, the difference in the results of H5 testing from the two models suggest that in the very initial state of user and web page interaction, both visual appeal and engagement equally contribute to the users' emotional states, while only engagement is the major factor that evokes and captures the users' emotional states over time. This explanation also could be applied to the large differences in the path coefficients from visual appeal to engagement in both models (0.301 vs. 0.777).

## Limitations and Conclusions

Some limitations of this study should be noted. First, we have only preliminary data in the investigation (n=107), which is relatively small. However, the analysis signals interesting results, so that further investigation with a larger sample size should be designed to replicate these findings. Second, this study focuses on only online vendors providing consumer electronic items, so future study should explore other online seller categories.

To conclude, the current research demonstrates the importance of design components and exposure times as they impact engagement and intention to use in an online shopping environment. Overall, this study suggests that while both web page order and visual complexity are important factors in capturing customers' attention, visual complexity is an especially effective factor influencing visual appeal and engagement in a very brief exposure time.

## REFERENCES

Arnheim, R. (1966). Order and Complexity in Landscape Design. In R. Arnheim (Ed.), *Toward a Psychology of Art* (pp. 123-135). Berkeley, CA: University of California Press.

Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Attention, Perception, & Psychophysics, 8*(5), 279-286.

Berlyne, D. E. (1971). *Aesthetics and Psychobiology*. New York: Appleton-Century-Crofts.

Cyr, D. (2008). Modeling web site design across cultures: relationships to trust, satisfaction, and e-Loyalty. *Journal of Management Information Systems, 24*(4), 47-72.

Cyr, D., Head, M., & Ivanov, A. (2006). Design aesthetics leading to m-loyalty in mobile commerce. *Information & Management, 43*(8), 950-963.

de Kunder, M. (2012). The size of the World Wide Web (The Internet), from www.worldwidewebsize.com/

Deng, L., & Poole, M. S. (2010). Affect in web interfaces: A study of the impacts of web page visual complexity and order. *MIS Quarterly, 34*(4), 711-730.

Éthier, J., Hadaya, P., Talbot, J., & Cadieux, J. (2006). B2C web site quality and emotions during online shopping episodes: An empirical study. *Information & Management, 43*, 627-639.

Everard, A., & Galletta, D. F. (2005). How presentation flaws affect perceived site quality, trust, and intention to purchase from an online store. *Journal of Management Information Systems, 22*(3), 56-95.

Geissler, G. L., Zinkhan, G. M., & Watson, R. T. (2006). The influence of home page complexity on consumer attention, attitudes, and purchase intent. [Article]. *Journal of Advertising, 35*(2), 69-80.

Gilboa, S., & Rafaeli, A. (2003). Store Environment, Emotions and Approach Behavior: Applying Environmental Aesthetics to Retailing. *The International Review of Retail, Distribution and Consumer Research, 13*(2), 195-211.

Hassenzahl, M. (2004). The interplay of beauty, goodness, and usability in interactive products. *Human-Computer Interaction, 19*(4), 319-349.

Jacobsen, T., & Hofel, L. (2002). Aesthetic judgments of novel graphic patterns: Analyses of individual judgments. *Perceptual and Motor Skills, 95*(2002), 755-766.

Jarvenpaa, S., Tractinsky, N., & Vitale, M. (2000). Consumer trust in an Internet store. *Information Technology and Management, 1*(1), 45-71.

Kaplan, S., & Kaplan, R. (1983). *Cognition and Environment: Functioning in an Uncertain World*. Belmont, CA: Praeger Publishers.

Lederer, A. L., Maupin, D. J., Sena, M. P., & Zhuang, Y. (1998). *The role of ease of use, usefulness and attitude in the prediction of World Wide Web usage*. Paper presented at the Proceedings of the 1998 ACM SIGCPR conference on Computer personnel research, Boston, Massachusetts, United States.

Lindgaard, G., Dudek, C., Sen, D., Sumegi, L., & Noonan, P. (2011). An exploration of relations between visual appeal, trustworthiness and perceived usability of homepages. *ACM Trans. Comput.-Hum. Interact., 18*(1), 1-30.

Lindgaard, G., Fernandes, G., Dudek, C., & Browñ, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression! *Behaviour & Information Technology, 25*(2), 115-126.

Loken, B. (2006). Consumer psychology: Categorization, inferences, affect, and persuasion. *Annual Review of Psychology, 57*(1), 453-485.

Luna, D., Peracchio, L., & de Juan, M. (2002). Cross-cultural and cognitive aspects of web site navigation. *Journal of the Academy of Marketing Science, 30*(4), 397-410.

MacInnis, D. J., Moorman, C., & Jaworski, B. J. (1991). Enhancing and Measuring Consumers' Motivation, Opportunity, and Ability to Process Brand Information from Ads. *Journal of Marketing, 55*(4), 32-53.

Meloy, Margaret G. (2000). Mood-Driven Distortion of Product Information. *Journal of Consumer Research, 27*(3), 345-359.

Morrison, B. J., & Dainoff, M. J. (1972). Advertisement Complexity and Looking Time. *Journal of Marketing Research, 9*(4), 396-400.

Nadkarni, S., & Gupta, R. (2007). A task-based model of perceived website complexity. *MIS Quarterly, 31*(3).

Nielsen, J. (2003). Usability 101: Introduction to usability, from http://www.useit.com/alertbox/20030825.html

Nielsen, J., & Loranger, H. (2006). *Prioritizing Web Usability*. CA: New Riders Press.

Norman, D. A. (2002). Emotion & Design: Attractive Things Work Better. *Interactions, 9*(4), 36-42.

Palmer, J. W. (2002). Web site usability, design, and performance metrics. *Information Systems Research, 13*(2).

Roseman, I. J., Antoniou, A. A., & Jose, P. E. (1996). Appraisal Determinants of Emotions: Constructing a More Accurate and Comprehensive Theory. *Cognition and Emotion, 10*(3), 241-278.

Russo, J. E., Meloy, M. G., & Medvec, V. H. (1998). Predecisional Distortion of Product Information. *Journal of Marketing Research, 35*(4), 438-452.

Schaik, P. v., & Ling, J. (2009). The role of context in perceptions of the aesthetics of web pages over time. *Int. J. Hum.-Comput. Stud., 67*(1), 79-89.

Subramaniam, C., Shaw, M. J., & Gardner, D. M. (2000). Product Marketing and Channel Management in Electronic Commerce. *Information Systems Frontiers, 1*(4), 363-378.

Tractinsky, N., Cokhavi, A., Kirschenbaum, M., & Sharfi, T. (2006). Evaluating the consistency of immediate aesthetic perceptions of web pages. *International Journal of Human-Computer Studies, 64*(11), 1071-1083.

van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly, 28*(4), 695-704.

Webster, J., & Ahuja, J. S. (2006). Enhancing the Design of Web Navigation Systems: The Influence of User Disorientation on Engagement and Performance. *MIS Quarterly, 30*(3), 661-678.

Wells, J. D., Valacich, J. S., & Hess, T. J. (2011). What signal are you sending? How website quality influences perceptions of product quality and purchase intentions. *MIS Quarterly, 35*(2), 373-A318.