Ergodesign & HCI
número especial, volume 4, ano 4 (2016)
ISNN 2317-8876, Rio de Janeiro - Brasil

PUC-Rio Pontifícia Universidade Católica do Rio de Janeiro
Departamento de Artes & Design | PPGDesign
LEUI | Laboratório de Ergodesign e Usabilidade de Interfaces

Visual Aesthetic Influence in Usability and User Experience in Human-Computer Interfaces: a Systematic Review about Assessment Tools

Waldeilson Paixão[1], Ana Lúcia Zandomeneghi[2]

Universidade Federal do Maranhão – UFMA, Av. dos Portugueses, 1966, Bacanga, São Luís, Maranhão, Brasil - CEP 65080-805

[1] waldeilsonpaixao@gmail.com, [2]anazandomeneghi@hotmail.com

Keywords: User experience, systematic review, visual aesthetic

1 Context

Interface systems can present failures that interfere in usability and cause problems during interaction. Thus, several methods and technics have been discussed in order to assess and improve them (eg CYBIS et al., 2010; PRECE et al., 2005).

The usability tests are among the most used assessment procedures but, traditionally, these usability assessments are focused on system and user performance trough efficiency and effectiveness assessment. However, other equally relevant aspects need to be taken under consideration. These aspects are mentioned by Hassenzahl et al. (2000) as hedonic qualities, being related to user's perception, satisfaction and preferences. When considering such qualities for assessments it is possible to achieve a more extensive and satisfactory user experience.

Among the hedonic qualities assessed that impact usability and interaction with systems are those related to aesthetical perception (SUTCLIFFE, 2005; CYBIS et al., 2010). The aesthetics in computer systems has been one of the most important non-functional requirements to affect the impressions, emotions and behavior of the user (LIU et al., 2016). If on the one hand we have a favorable range of instruments for system analysis with approaches concentrated in the adjustments of the functional and usability requirements, on the other hand it is necessary to perceive the value of aesthetical perception in HCI and the relevance of analyzing instruments that assess its influences when using graphical interfaces.

The objective of this research it to identify instruments used to collect data and assess aspects the relate aesthetic, usability and user experienced in human-computer interfaces.

2 Method

To achieve our goals we have applied the systematic review method, as acknowledged research method and used on several scientific publications (OBREGON; ULBRICHT, 2011).

The search was conducted in two databases, SCIENCE DIRECT and SCOPUS. The search terms used were: aesthetic, aesthetical, visual aesthetic, hedonic quality, usability, apparent usability, user experience, user interface, HCI, graphic interface, digital interface and methods.

Two different searches were carried out at Science Direct based on the keywords above, while in Scopus, three searches were made. In both search options have been defined as "all fields"; including Arts and Humanities, Computer Science, Design, Engineering, Psychology, Social Sciences; and period from 2010 to present day (April 28 and 29, 2016).

Inclusion and exclusion criteria were applied to gather and manage the results of both surveys, including: a) inclusion of only studies that showed the relationship between usability, user experience and aesthetics in HCI; b) only considered articles in Portuguese, English and Spanish.

The next step was to group publications. 26 articles were found in Science Direct base, 7 remained after the criteria was applied. 16 documents were found in Scopus, 3 after applying inclusion and exclusion criteria.

Ten articles were selected in total.

3 Results

From the 10 articles, 5 from Science Direct presented instruments related to the topic, while only 1 from Scopus, total of 6 articles for reading. The other 4 items not provided sufficient details of the evaluation instrument.

16 assessment tools were found, including half of generic character with wide application. The other half of instruments directly related to the subject followed for the analytical study briefly summarized below.

Visual Aesthetics Perceived (LAVIE; TRACTINSKY, 2004) - Used to measure the perception of visual aesthetics in expressive and classical dimensions interfaces.

The Social Presence Scale (GEFEN; STRAUB, 2004) - Measuring the perception of social presence, “a psychological feeling or perception of contact with another entity that is customizable, sociable, sensitive and humanly natural” (CASEY; Poropat, 2014, p. 155).

Complexity metrics (Michailidou et al, 2008) – intends to determine the level of visual complexity of a website, considering composition and elements of a web page.

Perceived Aesthetics and Attractiveness (WANG, 2014) - It was compiled and adapted by the author of the research to verify the preferences of the participants as their aesthetic perceptions. Divided into two parts: perceived aesthetics and attractiveness.

Website Attractiveness (Sutcliffe, 2002; HARTMANN et al, 2007) - Used to evaluate the attractiveness of websites. It was based on heuristics Sutcliffe (2002) and in studies by Hartmann et al, (2007).

Integrated Scale of Simplicity for Smartphone Interface (CHOI; Lee, 2012) - measurement model developed by the author to measure the perceived simplicity of a smartphone user interface.

Visual Aesthetics for Website Inventory - VisAWI (MOSHAGEN; THIELSCH, 2010) - measure the subjective perception of the perceived visual aesthetic in websites. Four general, subjective and interrelated facets are explored in the instrument: simplicity, diversity, colors and perfection (craftsmanship).

Model of Aesthetic Perception (SKULMOWSKI et al, 2016.) - Questionnaire adapted from Leder et al. (2004). In the analyzed article it was intended to measure the aesthetic perception of the users on the website reliability and usability perceived in short period (50 ms).

4 Conclusions

The survey identified a total of forty-two articles, but only ten initially met the objectives, providing sixteen different instruments. During the analysis, half had generic characteristics correlated to the theme. The other half brought directly related instruments. These went to the analytical study.

It was possible to identify and notice many measuring attributes such as color, order, clarity, balance, saturation, and for the objective character defined in the literature defined as “classic style”. On the other hand, more subjective concepts (global scope)

for aesthetic judgment, such as visual attractiveness, pleasure, beauty, among others, were also recurring in measurements.

There was broad application of instruments in web studies involving e-commerce sites, blogs or e-mails, however, were not found studies evaluating software and similar (offline mode).

The research presented the current scenario regarding evaluation instruments. It is expected that the results can contribute to broaden the discussion and at the same time facilitate future work wishing to apply evaluation tools in their research.
Observou-se ampla aplicação de instrumentos em estudos de web envolvendo sites de e-commerce, blogs ou e-mails, porém, não foram encontrados estudos com avaliando softwares e similares (modo off-line).

5 References

1. CASEY, T. W.; POROPAT, A. Beauty is more than screen deep: Improving the web survey respondent experience through socially-present and aesthetically-pleasing user interfaces. Computers in Human Behavior, v. 30, p. 153–163, 2014.
2. CYBIS, W. Ergonomia e usabilidade: conhecimentos, métodos e aplicações. 2. ed. São Paulo: Novatec, 2010. 422 p.
3. CHOI, J. H.; LEE, H. Facets of simplicity for the smartphone interface: A structural model. Journal of Human Computer Studies, v. 70, n. 2, p. 129–142, 2012.
4. GEFEN, D.; STRAUB, D. W. Consumer trust in B2C e-Commerce and the importance of social presence: Experiments in e-Products and e-Services. Omega, v. 32, n. 6, p. 407–424, 2004.
5. HARTMANN, J.; SUTCLIFFE, A.; ANGELI, A. DE. Investigating Attractiveness in Web User Interfaces. p. 387–396, 2007.
6. HASSENZAHL, M. et al. Hedonic and ergonomic quality aspects determine a software's appeal. Proceedings of the SIGCHI conference on Human factors in computing systems CHI 00, v. 2, n. 1, p. 201–208, 2000.
7. LAVIE, T.; TRACTINSKY, N. Assessing dimensions of perceived visual aesthetics of web sites. International Journal of Human Computer Studies, v. 60, n. 3, p. 269–298, 2004.
8. LEDER, H. et al. A model of aesthetic appreciation and aesthetic judgments. British HJournal of Psychology, v. 95, p. 489–508, 2004.
9. LIU, W. et al. How homepage aesthetic design influences users' satisfaction: Evidence from China. Displays, v. 42, p. 25–35, 2016.
10. MICHAILIDOU, E.; HARPER, S.; BECHHOFER, S. Visual complexity and aesthetic perception of web pages. Proceedings of the 26th annual ACM international conference on Design of communication SIGDOC 08, p. 215, 2008.
11. MOSHAGEN, M.; THIELSCH, M. T. Facets of visual aesthetics. International Journal of Human Computer Studies, v. 68, n. 10, p. 689–709, 2010.
12. OBREGON, R. DE F. A.; ULBRICHT, V. R. Revisão Sistemática de Literatura e o Uso de Mapas Conceituais na Visualização do Conhecimento. 2011.
13. PREECE, Jenny; ROGERS, Yvonne; SHARP, Helen. Design de Interação: além da interação homem-computador. Reimpressão Porto Alegre: Bookman, 2005. 548 p.

14. SKULMOWSKI, A. et al. The negative impact of saturation on website trustworthiness and appeal: A temporal model of aesthetic website perception. Computers in Human Behavior, v. 61, p. 386–393, 2016.
15. SUTCLIFFE, A. Assessing the Reliability of Heuristic Evaluation for Website Attractiveness and Usability. v. 00, n. c, p. 1–10, 2002.
16. WANG, H. Picture Perfect: Girls' and boys' preferences towards visual complexity in children's websites. v. 31, p. 551–557, 2014.

6 Acknowledgments

This work was possible due of the support the Fundação de Amparo à Pesquisa e ao Desenvolvimento Científico e Tecnológico do Maranhão (FAPEMA); the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES); and Bruno Azevedo for translation work.