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Chapter 16

Standard Kansei-based Web Design for Higher Learning Institution

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Abstract

Emotions evidently play an important role in entirely human accomplishments as emotions aid in decision making, including human-computer interaction. Emotion research in the field of human-computer interaction has only started recently and continuously evolving through the investigation and understanding of emotional effects. Thus, form an intelligent interaction between human and computer by responding effectively to the humans' feelings. Emotional design generates remarkable user experiences for websites as the emotional experiences create an intense impression on our long-term memory. Recent scientific findings recommend emotional elements to be considered in designing websites as emotions influences one's perception, conception and decision-making throughout the interaction with a website. A poorly designed user interface leads to bad user interaction while rising the users' arousal and a displeasing user experience with a website elicits dissatisfaction emotion where consecutively results in avoidance and prevents revisit to the website. This proves the importance of emotional engagement in a website design. This research tries to transform the feelings and emotions of users' into designable parameters using Kansei engineering (KE) technology in order to design an appropriate higher learning institution website by identifying a standard Kansei-based web design that cultivates emotional engagement. A standard web design guideline for the development of the higher learning institution website has been proposed in this research expected to guide designers in the development of university websites which can respond to the emotional needs of users.

Introduction

Emotional design attempts to produce products with emotional appeal that attracts users with positive experience (Carvalho & Oliveira, 2017). Emotional design performs better than functional design as it satisfies users emotional needs (Desmet & Hekkert, 2007; Howard et al., 2014). Previous research have proved that emotions influences one's perception and decision making (Lerner et al., 2015; Howard et al., 2014) . This has inspired proponents to embed emotional aspect in web design as emotion based web design entices users to visit the website with the involvement of positive engagement. Emotional web design has the potential to facilitate the user to have a longer lasting visit to a website and encourages them to revisit the particular website. It is salient to design a user interface of a website that stimulate positive emotional experience in users as the user interface is the medium that connects the user with a website (Kim et al., 2003). Affective user interface attaches a user with a website emotionally and provokes emotional user experience and satisfies users with their emotional needs. Poorly designed website with the lack of emotional approach arouses negative emotions such as anxious, confusion, and frustration in users. The negative emotions were evoked when the users were having difficulties in recognizing the task and finding the necessary information from poorly designed interface (Ward, 2002) which in turn reduces the possibility of retention to the website. Therefore, it is important to design emotional user interface that provokes positive emotions in users such as joy, pleasure and interest.

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In order to elicit emotional response from website visitors through emotional design, web designers needs to understand and meet users' affective requirements. Studies indicated agreement among researchers that emotion of users can be linked and converted to design elements of a product in order to ensure the users experience emotional engagement (Howard et al., 2014; Noori et al., 2015). However, the major challenge in emotional design research is the understanding users' affective needs and transforming the emotional needs to design features in order to create emotional connection between the users and the product (Lim & Zakaria, 2015). According to Guo et al., (2016) web interface designers are having difficulties in enhancing standard of the user experience by designing web user interface that arouse emotional effect on users'. Considering the influential of emotional aspect in web design, this study employs KE technique on user interface design for higher learning institutions' website in Malaysia. Inspired by previous research on KE technique (Guo et al., 2016; Hadiana & Lokman, 2016; Howard et al., 2014; Lim & Zakaria, 2015; Noori et al., 2015; Ramachandhiran & Jomhari, 2013), this study tries to transforms users emotions to design elements for user interface design (UID) of higher learning institution (HLI) websites in order to improve the users' emotional experience. A standard Kansei-based web design guideline for HLI is proposed based on the extracted design elements.

Identify a Standard Kansei-based Web UID

Phase I has the functionality to achieve the objective of this research which is to identify the standard Kansei-based web design for HLI using KE technology. KE was pioneered by Professor Mitsuo Nagamachi, in Hiroshima International University in 1970. KE is known to be a successful user-oriented technology which has the capability to investigate the users' emotional requirements and specifies the connection between the emotions and design features of a product. It has been widely used to develop Kansei-based products that captivate and satisfy the users as emotional products influence once perception and decision making. Due to an ability of improving users' emotional experience along with successful potential in making the link between users' needs and design elements, KE has been a well-known industrial design technique in a wide range of field. Thus, this study strives to employ KE technology into web UID of HLIs. KE approach was used to assimilate the emotional appeal into design elements HLIs' websites and a standard Kansei-based web UID for HLI was identified in Phase I of this research. Inspired by KE practitioners (Chuan et al., 2013; Hadiana & Lokman, 2016; Howard et al., 2014; Noori et al., 2015), this study adopted the popular type of KE known as KE Type I (KE Pack) which is a well-known type for its simplicity and has been broadly utilized in various product development. KE Type I has the ability to associate users' emotions through Kansei words to products' design elements using category classification (Chuan et al., 2013). In this research, Kansei of HLI websites were measured through KE research process in accordance with Kansei Design Model.

Synthesizing Specimen

Since, this study tries to employ KE on HLI website, public and private universities in Malaysia were the specimens for this research. Initially, all the 63 public and private HLIs websites were collected as specimens. All these websites were than analyzed in detail in accordance with the adapted physical design elements from (Noori et al., 2015) and were categorized into attribute and value. Attributes are the elements of the specimens such as page background color, header and footer color, whereas, the values indicates elements values such as white, blue, or black (Fig. 1). The identification of the detail design elements was utilized in requirement analysis process to extract and associate the users' emotion with particular design element in order to determine the standard Kansei-based web UID guideline for HLI.
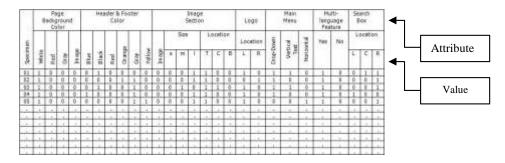
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Fig. 1 Detail design elements

During the specimen synthesizing process, the specimens were inspected to have all the adapted design elements from Noori et.al, (2015) in order to assure the validity of the design elements that will be identified as the result of the requirement analysis process. KE practitioners Lokman and Nagamachi (2009) stated that it is salient to include the entire possible physical design elements as the products form an impression as a whole in users. As the result of the analysis of initially selected specimen for differences in accordance with the previous practitioners' principles, only 12 HLI websites with visible different designs were chosen as valid specimens for this research.There are Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Putra Malaysia (UPM), Universiti Tekonologi Mara (UiTM), Universiti Utara Malaysia (UUM), Universiti Tun Hussein Onn Malaysia (UTHM), Universiti Malaysia Sabah (UMS), Al-Madinah International University (MEDIU), Limkokwing University of Creative Technology, UCSI University, HELP University and SEGI University. These websites as valid specimens were used for the Kansei measurement process.

Establishment of Kansei Checklist

Kansei checklist was established with Kansei words. Kansei words are specific words that illustrate emotional responses and are used by users to convey their feelings. This research adopted 16 Kansei words related with university website interface from previous literature of Noori et al., 2015. The adopted Kansei words are: Convenient, Creative, Simple, Messy, Professional, Waste of time, Unique, Confusion, Beautiful, Lovely, Efficient, Modern, Appealing, Disappointment, Perfect, and Up-to-date. The 16 adopted Kansei words were used to construct a Kansei checklist in the form of five point Likert's scale.The Kansei checklist along with the 12 HLI websites as valid specimens was used in Kansei measurement process in order to evaluate users' feelings towards the selected websites and later was analyzed to identify standard Kansei-based web UID for HLI.

Determination of Kansei Concept and Requirement

Users' emotional responses towards the selected website were measured through an online survey and were analysed for design requirements. As for the Kansei measurement, an online survey was designed with the valid specimens and Kansei checklist. The online questionnaire was designed in two sections; Section A: Demographic and Section B: Kansei Measurement. Section A was designed to obtain demographic information of the respondents, whereas Section B was designed to collect the respondents' impressions towards the 12 selected HLI websites. Snapshots of the valid websites along with the URL of the websites were displayed in the Section B and the Kansei checklists in the form of five-point Likert's scale were attached at the bottom each websites. The snapshots were included in line with the study by Howard et al., (2014) who indicated that snapshots should be displayed in order to provide the respondents with the overview of the websites on how it looks. The arrangement of Kansei words in the Kansei checklist was shuffled for each website in order to avoid bias during Kansei measurement process. As for the recruitment of participants as subjects, this research targeted the users HLI websites in Malaysia following the rule defined in KE by KE practitioner, which is to approach particular target users of the product. Thus, this study focused on the user who uses websites

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of HLI in Malaysia. The online survey was distributed through social media and email as well as face to face session was conducted at two HLIs, which were Universiti Tenaga Nasional (UniTEN) and UiTM. The participants were instructed to explore the selected HLI websites by clicking the link attached with the snapshots of the websites and were asked to rate their impressions towards the website on the Kansei checklist of five point scale. They were required to rate for all the Kansei words by giving a score from the range of five to one, where five indicates the strong agreement whereas the one refers the poor agreement. A total of 125 participants answered the online survey which was conducted for three months. The majority of the participants who involved in the online survey were students from the HLI in Malaysia.

Analysis of Design Requirement

Table 1. Standard Kansei-based Web Design Guideline for HLI

Physical Features		Value	
Page Background Color		White, Image	
Header & Footer Color		Blue, Grey, Black	
Image Section	Size	Large	
	Location	Top	
Logo	Location	Left	
Main Menu		Drop-down, Vertical	
Multi-language Feature	Location	Top Right	
Search Box	Location	Top Right, Top Left	
Utilities Bar	Location	Top Right, Top Left	
News Section	Location	Center, Left	
Other Section	Location	Center, Bottom	
Links	Text		
	Colorful Image	Size	Small, Medium
	Same Color Image	Size	Medium
Font Size	9 - 11, 11 - 13, > 13		
Font color	White, Orange, Grey, Black, Blue		

Descriptive statistics was used as in study Ramachandhiran and Jomhari (2013) and Noori et al., (2015) to analyze the Kansei measurement data. The mean was calculated and analyzed in order to identify requirement design feature for a HLI websites. The mean for each Kansei words and its relation with the particular selected HLI websites. It is found that a total of 11 websites with 91.7% of websites elicits neutral and positive Kansei, whereas one HLI website with 8.3% provokes negative Kansei. The website of Limkokwing acquired the highest score with the Kansei words convenient, professional, unique, beautiful, efficient, appealing, perfect, creative, lovely, modern, and up-to-date. It has obtained the highest score for all the positive Kansei words except simple. In addition, it has obtained the lowest score in the negative Kansei words which are messy, waste of time, confusion, disappointment compared to other HLI websites. UM website obtained highest score with the Kansei words convenient and simple. UiTM has gained highest score with the Kansei words convenient and professional. The one HLI website that elicits negative Kansei was UTHM. This is because it has the

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lowest score for all the positive Kansei words and highest score for all the negative Kansei words. Based on these findings through the descriptive statistical data analysis a standard Kansei-based web UID for HLI was identified as requirement design features that can invoke positive emotions in users and satisfies users emotionally as emotions influences once perception and decision making. The identified standard Kansei-based web UID guideline for HLI is shown in the Table 1.

Conclusion

Users' feelings towards the HLI website interface has been evaluated using KE and the emotional features have been transformed and translated into product characteristics which can be used as a guideline for designing Kansei-based HLI website that elicits emotional engagement. A standard Kansei-based HLI web design has been proposed (Table 1) in this research.

References

Carvalho, M., & Oliveira, L. (2017). Emotional Design in Web Interfaces. *Observatorio (OBS*) Journal*, *2017*, 14–34.

Chuan, N. K., Sivaji, A., Shahimin, M. M., & Saad, N. (2013). Kansei engineering for e-commerce sunglasses selection in Malaysia. In *Procedia - Social and Behavioral Sciences* (Vol. 97, pp. 707–714). Elsevier B.V. https://doi.org/10.1016/j.sbspro.2013.10.291

Desmet, P., & Hekkert, P. (2007). Framework of Product Experience. *International Journal of Design*, *1*(1), 13–23.

Guo, F., Liu, W. L., Cao, Y., Liu, F. T., & Li, M. L. (2016). Optimization Design of a Webpage Based on Kansei Engineering. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *26*(1), 110–126. https://doi.org/10.1002/hfm

Hadiana, A., & Lokman, A. M. (2016). Kansei Evaluation In Open Source E-Learning System, *3*, 135–139. https://doi.org/10.11113/jt.v78.10031

Howard, T. J., Achiche, S., Zheng, S., &Özkil, A. G. (2014). Kansei Engineering and Website Design. In *Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference* (pp. 1–11).

Kim, J., Lee, J., & Choe, D. (2003). Designing Emotionally Evocative Homepages: An Empirical Study of the Quantitative Relations Between Design Factors and Emotional Dimensions. *International Journal ofHuman-Computer Studies*, *56(6)*, 899-940

Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. (2015). Emotion and Decision Making : Online Supplement. *Annual Review of Psychology*, 1–14.

Lim, S. C. J., & Zakaria, A. F. (2015). A Collaborative Tagging System Design Framework for Supporting Affective Design. In *Proceedings of the 2015 IEEE IEEM* (pp. 401–405).

Lokman, A. M., Noor, N. L. M., & Nagamachi, M. (2009). Expert Kansei Web – A Tool to Design Kansei Website Emotional Design of e-Commerce Websites, *24*.

Nagamachi, M.(1995).Kansei engineering: a new ergonomics consumer-oriented technology for product development. *International Journal of industrial ergonomics, 15(1)*, 3-11.

Noori, F., Zadeh, S. S., & Kazemifard, M. (2015). Designing a University web site by Considering Users ' Emotion and Using Kansei Engineering. In *International Conference of Cognitive Science* (pp. 66–70).

Ramachandiran, C. R., & Jomhari, N. (2013). Kansei Engineering : Emotion Exploration in Blogs. In *International Conference on Biometrics and Kansei Engineering* (pp. 7–12). https://doi.org/10.1109/ICBAKE.2013.3

Ward, R. D., Marsden, P. H., Cahill, B., & Johnson, C.(2002).Physiological responses to well-designed and poorly designed interfaces. In *Proceedings of CHI Workshop on Physiological Computing.*