

CHAPTER 1

INTRODUCTION

1.1 Overview

This work addresses the emotional design aspect in the context of website user interface. Existing literature in web design have emphasized on functionality and usability that support the development process for useful and usable website (Backlund 2001; Garret, 2003; Ivory & Hearst, 2001; Krug, 2000; Laderer, Maupin, Sena & Zhuang, 1998; Lam, 2001; Lee, Fiore & Kim, 2003; Marcus & Gould, 2001; Nielsen, 2000; Powell, 2002; van Welie, van der Veer & Eliëns, 1999; Zhang, von Dran, Small & Barcellos, 1999; Veen, 2001). Nevertheless, some researchers have already emphasized on the need to address the emotional aspect of user experience in the web design (Dillon, 2001; Egger, 2001; Kim, Lee & Choe, 2003; Lee, Kim & Choe, 2001; Li & Zhang, 2005; Okada & Tejima, 2003; Overbekee, Djajadiningrat, Hummels & Wensveen, 2004; Schenkman & Jönsson, 2001; Siu & Ho, 2005; Thielsch, 2005; Wong, 2004; Yoon & Lee, 2003; Zhang, von Dran, Small & Barcellos, 2000), and the literature have suggested that emotion plays important role in capturing website visitor's attention.

This research evaluates visitor's emotional response towards website user interface, and strives to produce knowledge to support the development of a website that cultivates emotional connectivity. Such website is targeted to capture visitor's attention at first sight and motivate them to stay longer at the website in the effort to promote consumer conversion and retention. This research investigates associations between visitor's emotional responses and website design elements, and uses the result to produce design requirements for development of website that elicits target emotion. This requires the establishment of a method to evaluate website emotion

and engineer them into emotional design requirements for website development. The contributions of this research are resulted from the derivation of the method to measure and engineer website emotion, the concept of Website Emotion and the design requirements within the scope of emotional aspect of website design.

1.2 Problem Statement

Internet shopping has become popular trend for consumer to buy products or services they desire. Online sales have reached nearly \$39 billion in 2005, and this has been approximately 25% year-to-year increase (Forrester Research Inc., 2005). In line with this encouraging fact, businesses have been putting strength and effort in convincing customers to buy their product. In the physical world, retail merchants convince customers by store design, concept, layout, and product presentation. Similarly, online businesses have also been putting efforts on their web presence. Nonetheless, the approach is different between physical and virtual world. In the absence of physical interaction, online businesses need to focus on capturing visitor's attention, persuade them to stay even longer on the website and influence them to go to further actions and judgements such as purchasing decision.

In the aspect of Human Computer Interaction (HCI), the study of user experience in website evaluations and use have widely focused on cognitive functionality and usability (Backlund 2001; Garret, 2003; Ivory & Hearst, 2001; Krug, 2000; Lederer et al., 1998; Lam, 2001; Lee, Fiore and Kim, 2003; Marcus & Gould, 2001; Nielsen, 2000; Powell, 2002; van Welie, van der Veer and Eliëns, 1999; Zhang et al., 1999; Veen, 2001). The functionality and usability features include active link, loading time, colour, typography, content organization, navigation and other features that may influence user experience with the website. While HCI issues related to web applications were formerly emphasized on cognitive aspects of websites, in recent years the focus has shifted to the aspect of emotional experience of website (Dillon, 2001; Egger, 2001; Kim et al., 2003; Lee et al., 2001; Li & Zhang, 2005; Okada & Tejima, 2003; Overbekee et al., 2004; Schenkman & Jönsson, 2001; Siu & Ho, 2005;

Thielsch, 2005; Wong, 2004; Yoon & Lee, 2003; Zhang et al., 2000). This is due to the evolution of websites function from conveying information to the extent of providing persuasive engagement with visitors through the lively process of perception, judgment and action.

However, most studies dedicated to website evaluation are grounded on the assumptions that visitors spend at least a few minutes on a website and positive experience is evoked by enjoyable features on the website (Li & Zhang, 2005). In real life, visitors will jump from one site to another if the website does not capture their attention. In current scenario, consumers have so many choices of e-Stores to visit, and with the luxury they get over the Internet, it has now become more challenging to online businesses to win over consumers. This indicates that if a website cannot capture visitors' attention at first sight, they can soon be out of business. It is evident in previous literatures that scholars have emphasized the importance of emotion in product design and asserted that emotional engagement in product design influence decision making, perception, attention, performance, and cognition (Norman, 2002; Pettinelli, 2009; Russell 2003; Tractinsky, Katz and Ikar, 2000). Thus, inducing emotional engagement in Website UID is seen to influence visitor's attention and persuade them to stay longer on the website.

The problem is on how to get visitors' attention at first sight and persuade them to stay longer on a website, instead of just browsing from one store to another. In analogy, when consumers go to a department store and browse through physical stores, the store they probably step into is the store that captures their attention at first sight whether be it by the decoration or other persuasive features the store has to offer. Higher order judgement such as influence to purchase occurs only after they surpassed the earlier process. Thus, businesses nowadays must centralise their effort to the implicit needs of users. This is supported by Maslow's Theory of Needs (1943) that suggested people are motivated by internal needs and that managers have to learn to identify those directly to structure work to fit the prevailing needs of employees. In this sense, similarly in designing motivating websites, web designers need to learn to identify user's internal needs, structuring them into website design to

satisfy the needs in order to motivate user's attention. The research argues that to instigate stickiness to website, primary emotional user responses must first be investigated. The underlying motivational features must be analysed so that we could use the knowledge and engineer them into design requirement of website that elicits target emotion.

Previous studies on the emotional aspect of product have widely discussed the emotional dimension per se, and how to enable the measurement of this emotion (Aumer-Ryan, 2005; Bhattacharjee, 2001; Desmet, 2003; Mahlke & Thüring, 2007; Norman, 2004; Overberkee et al., 2004; Schenkman & Johnson, 2000; Scherer, 2005; Siu et al., 2005; Spillers, 2004; Thielsch, 2005; Tractinsky et al., 2000; Zhang et al., 1999), which enable the observation of the structure of emotional response towards a product. However, it is evident from the literature that little is known about how people respond emotionally to products and what aspects of a design trigger an emotional reaction (Aumer-Ryan, 2005; Desmet, 2003; Kim et al., 2003; Mandryk et al., 2006; Norman, 2004; Zhang et al., 1999). There is no sound method that is seen to enable the assessment of how people respond emotionally to Website UID and investigate the aspects of design that trigger the emotional reaction is lacking.

Another problem is that, user experience has often been studied by using market research techniques in which they have been included only as an evaluation source and not as requirement generator (Bouchard, Lim and Aoussat, 2003). The problem with this strategy is that websites will be evaluated and redesigned if deemed necessary and above all in a trial and error basis. Designers face difficulties in deciding whether some of the design elements are more important than others, and whether addressing these elements is sufficient to elicit positive user experience to the websites, to keep their interest in the websites, and eventually to motivate them to revisit the websites (Zhang et al., 1999). Thus, to enable the inclusion of user's experience in devising design requirements, we require methods and instruments that can be used to understand and engineer the relationships between user's experience and web design, and the full repertoire of the underlying concerns.

To fill in the gap of the design requirements of website UID, while most of the available design requirements for website focus on cognitive functionality and usability (Garret, 2003; Marcus & Gould, 2001; Nielsen, 2000; Lederer et al., 1998; Lee et al., 2003; Li & Zhang, 2005; Powell, 2002; van Welie et al., 1999; Veen, 2001; Zhang et al., 1999) largely from designers point of view, this research focus on deriving design requirements for website that focus on emotional user experience. Furthermore, available schemes that could be used for website evaluation only enable the assessment of emotional user experience, and no method enables the discovery of how design elements trigger emotional response. Therefore, this research propose a method that systematically investigates emotional user experience in Website UID, the visible design elements from user's point of view, the associations, and the influence and consequences of the design elements to the user experience, so that how website design elements influence emotion could be discovered. In every stages involved, the method will focus on users viewpoint so that the resulting design requirements is generated focusing on users. Using the result, the research targets to formulate design requirements for website that elicits target emotion, so that the website will capture user's attention and influence them to stay longer and persuade them to go to further judgements and actions.

1.3 Definition of Terms

Presented in Table 1.1 are definitions of terminologies used throughout the thesis. The definitions are provided to facilitate better understanding to the terms used in the thesis chapters.

Table 1.1: Terminologies.

Term	Description
Design Element	The design elements that compose the visual design of a product.
Emotion	A mental and psychological state associated with a wide variety of feelings, thoughts, and behaviour (Ekman, 1999; Russell, 1980). Affect is sometimes referred to as general concept of emotion (Fredrickson, 2001).

Table 1.1: Terminologies (continued).

Term	Description
Kansei	A Japanese term that refers to psychological feelings and images held in the mind towards artefact, situation, surrounding (Nagamachi, 1999).
Kansei Engineering (K.E.)	A technology in product development that enables the measurement and association of Kansei into design specification (Nagamachi, 1999)
Kansei Website	A term introduced to describe website that embeds target emotion in its design.
Kansei Word	The word used to represent emotional impression towards product, situation or surrounding (Nagamachi, 1999).
Primary Emotional Responses	A term used to describe the emotional responses user's feel when first seeing a product.
User Experience (UX)	A term used to describe the experience as a result of interactions with a particular product or service according to their design (Norman, 2002; Garret, 2003)
User Interface Design (UID)	The design of an artefact with the focus on user experience and interaction (Norman, 2002; Vertelney et al., 1990)
Website Emotion	A term introduced to describe emotion elicitation of Website UID.
Website UID	The design of website that focus on user experience and interaction. It covers content and layout aspects of web design, which includes picture style, placement of buttons, tabs, images, and the visual design such as background, colour, and typography.

1.4 Research Objectives

The aim of this research is to provide evidence that K.E. can be used to engineer emotion in Website UID. The research must investigate how emotional experience in Website UID could be measured, and how do design elements affect this experience, so that design requirements for the development of website that embeds target emotion could be formulated. Such website is targeted to capture visitors' attention at first sight and motivate them to stay longer at the website in the effort to enhance stickiness, and hence persuade them to proceed to the next process of actions and judgements. This kind of website is targeted to stimulate emotional connectivity, which asserted by scholars to influence judgement (Norman, 2002; Russell 2003; Tractinsky, Katz and Ikar, 2000), towards the promotion of consumer conversion and retention.

After outlining the issues related to website UID in previous sections, the research develops its objectives, and they are as follows:

1. To propose a methodology to measure and engineer emotion in Website UID.
2. To provide evidence that emotional signature exists in Website UID through empirical study.
3. To investigate the structure of emotion in Website UID, the significant factors, and the influence of design elements to emotion.
4. To propose a design guideline that enables the incorporation of target emotion in Website UID.

The following paragraphs provide detail description to the objectives:

1. To propose a methodology to measure and engineer emotion in Website UID.

To enable the development of website that embeds target emotion, the research must first determine a method that enables the measurement and engineering of emotional user experience in Website UID, which could encompass the system development phases of conceptualisation, requirement analysis, development and testing. The method must be able to discover the structure of emotional response visitors may experience when visiting a website, and enable conceptualisation of emotion in Website UID. The method must also be able to analyse the design requirements to the development of website that embeds target emotion. A testing by the means of empirical study needs to be performed to validate the proposed method.

2. To provide evidence that emotional signature exists in Website UID through an empirical study.

Assumptions made in the emotional aspects of Website UID must be verified empirically. As this research will evaluate the primary emotional responses to website, empirical evidence that emotional signature exists and measurable in Website UID must be pursued beforehand.

3. *To investigate the structure of emotion in Website UID, the significant factors, and the influence of design elements to emotion.*

To enable this research to observe how much the evaluation of emotion affects variables, it must analyse the structure of emotional responses to Website UID. The distribution of variables will show the correlation of variables in each structure of emotion. With the analysis, the research can constructively describe the significant structure of emotion that forms the concept of emotion. Also, to enable the engineering of emotion in Website UID, the research must investigate the interrelation between emotional responses and design elements, and how the combination of design elements influences emotion.

4. *To develop a design guideline that enables the incorporation of target emotion in Website UID.*

To be useful to the web design community, the study must formulate a guideline to the design of Kansei Website, a website that embeds target emotion in its design, based on the concept of emotion identified from the empirical studies. The novel guideline should be able to assist web designers in devising strategies to produce website that engage emotional connectivity, which is seen to enhance positive user experience and thus persuade them to stay longer on the website. Previous literatures have indicated a lack of guidance in the amalgamation of the concept of emotion in web design practices. To support the design process of Kansei Website, a taxonomy that classifies the concept of emotion and its associated design requirement is suggested to ensure the success of designing Kansei Website. The taxonomy is to be developed based on the developed guideline.

1.5 Research Questions

In order to achieve the research goals, the research will begin with finding the answers to the research questions. The research questions were formulated in to achieve the research objectives. The research questions are as follows:

- **Research Question 1:** Can Website Emotion be quantified?

Although discussions on the importance of the emotional aspect of website design have been increasing, there is no systematic method that has been established to assess emotional responses in Website UID. Thus, using the available scheme of emotion measurement in product design, the research attempt to provide evidence that subjective Website Emotion could be quantified.

- **Research Question 2:** What are the design elements that compose the external appearance of a website from user's view-point?

Conforming to the approach of the research which focuses on users, this research seeks every possible design elements that is visible to visitors' eye. To accurately include users in the determination of design requirements, it is important to emphasize user aspect in every angle of research bearings. Assumptions cannot be made in pursuing the objectives, and doing so will lead to invalid result.

- **Research Question 3:** What is the concept of emotion in Website UID?

This question seeks answers on the concept of emotion that structure from user's emotional responses when visiting websites. This concept provides appropriate understanding of the kind emotion that should be addressed when designing website that embeds target emotion.

- **Research Question 4:** What are the design requirements for website that embeds target emotion?

This question requires knowledge on the relations between emotion and the design elements of a website. It seeks answer whether Website Emotion can be categorized according to its significance and the consequences resulting from the combination of design elements. The answer will determine which design elements having what influence to emotional responses in Website UID. Thus, it will facilitate the formulation of design requirements for website that embeds target emotion.

- **Research Question 5:** Can a website that embeds target emotion be designed? This question pursues answers whether website that embeds specific target emotion can be designed. The answer will verify the soundness of the anticipated guideline, and the validity of the proposed method.

1.6 Theoretical Research Framework

The main limitations of addressing emotion in Website UID that have been discussed in the literature concern with the method to assess and incorporate emotion in its design and is addressed in this theoretical research framework that is developed based on K.E. methodology. The theoretical framework for engineering emotion in website UID begins with the adoption on K.E. to web environment. Nagamachi (1999) has brought strong cases of consumer's satisfaction with product that occur when the product design match their imagination, which links to their feelings and emotion. The presence of the physical characteristic of a product that match consumer's implicit needs and emotion is believed to relate to the positive perception and the market success of a product (Nagamachi, 2004). K.E. was developed to enable the assessment of how consumers respond emotionally to a product, situation or surrounding, and analysis of the aspect of design that triggers the emotional responses (Nagamachi, 1999, 2003).

Similarly, user's positive experience with their website is one of the many goals that online businesses want to achieve. Zhang et al. (1999) posited that satisfied users may spend longer at a website, may revisit the website later, and may recommend the website to others, and this is particularly important with the increase of electronic commerce. In relevant with emotional engagement that is believed to influence user's satisfaction (Nagamachi, 1999; Norman 2004), it is duly important to determine what aspect of the design of a website makes a user feel emotionally engage to a website.

Based on K.E., this research hypothesized that there are specific design elements associated with Website UID that can be classified as highly influential in eliciting target concept of emotion. In its theoretical framework, this research adopts the theory of K.E. into Website UID by assessing user's emotional responses to website design, and analysing design elements that influence the responses. First, the framework considers the knowledge of the structure of emotion that form from user's reaction. Second, the design elements that are visible from user's viewpoint are integrated. Third, a comprehensive analysis on influencing elements that contribute to user's emotional reaction offers a foundation for guideline in incorporating the emotional user experience during the design process. Fourth, the framework considers the success of designing product that embeds target emotion. Table 1.2 describes the research theory, the associated research questions, and the anticipated outcome that are addressed.

Table 1.2: The Adoption of K.E. in Website UID.

Theory	Research Question (RQ)	Research Output
Emotional assessment in product design improves understanding on the concept of emotion that is perceived by users.	RQ1: Can Website Emotion be quantified?	i) A method to measure emotion in Website UID. ii) Evidence that emotional signature exists in Website UID.
The design elements that visible to user's viewpoint improve understanding of how users perceive a product.	RQ2: What are the design elements that compose the external appearance of a website from user's view-point?	i) The design elements that is visible to the eye of users.
The knowledge of how design elements influence emotion enhances understanding on how to design product that embeds target emotion.	RQ3: What is the concept of emotion in Website UID? RQ4: What are the design requirements for website that embeds target emotion?	i) A method to engineer emotion in Website UID. ii) The concept of emotion in Website UID. iii) The influence of design elements to emotion. iv) The design guideline that enables the incorporation of target emotion in Website UID.
The design of product that matches user's emotion improves user's perception.	RQ5: Can a website that embeds target emotion be designed?	i) Evidence of improvement in the structure of emotion. ii) Hypothetical credence that Website Emotion can be designed according to the proposed guideline.

1.7 Research Scope and Limitations

The research was performed to explore the possibility to engineer emotion in Website UID, and formulate design guidelines to the development of website that embeds target emotion. Such website is targeted to attract user's attention at first sight and thus enhance stickiness to the website in the effort to promote consumer conversions and retentions.

While there were so many classification of emotional dimension described by scholars and philosophers in the emotional research domain, and several other domain such as psychology and social sciences (Aristotle, 350 B.C.E., Damásio, 1980; de Sousa, 1980; Ekman, 1999; Frijda, 1986; Griffiths, 2002; Leighton, 1982; Scherer, 1994; Russell, 1980; Russell, 2003; Tractinsky, 2004), the emotional dimension addressed in the research refers to valence (pleasure to displeasure) and arousal (sleep to arousal) dimension explicated by Russell in his circumplex model of affect (Russell, 2003). This is based on the findings that both valence and arousal formed fundamental components of affective constructs in e-commerce website evaluation studies (Li & Zhang, 2005). The notion of emotion investigated in the study of e-Commerce website evaluation is confined to the visceral factor (Norman, 2004) or affect (Engelsted, 1989 as in Aboulaflia and Bannon, 2004) that is a brief emotional state that results from a response to the external stimuli. This is aligned with the study that targets to capture the primary emotional response to the external stimuli. Temporal notion of emotion is not covered. In this research the measured emotion was limited to forty dimensional keywords. Thus, the resulting guideline is confined to these dimensions.

The design element addressed in the research focused to content and layout aspects as described in web design literature (Garret, 2002; Powell, 2002; Veen 2001). They cover elements such as picture style, placement of buttons, tabs, images, and the visual design such as background, colour, and typography. The research did not cover elements such as navigation and functionality. The identification of design

elements were centralised to what the actual users might see on a website, to ensure the intended results are largely centralised to users.

The empirical studies were focused on a specific online retailing area. In this research, e-Commerce demonstrating clothing artefacts was chosen as stimuli. This is based on its tremendous interest among clothing consumers (Johnson et al., 2003; Rodriguez, 2004; Smith, 2006; Sullivan, 2007), and the visual design of online clothing is considered diversified. Although the studies focus on area of online clothing websites, the theoretical assumptions, methodological recommendations and even most of the empirical results should be transferable to other domains.

In terms of research instruments, first, all the empirical studies were performed using e-Clothing websites as evaluation specimen. Second, subjects employed to provide input in the evaluation were chosen from specific target consumer group, which were 120 young consumers recruited from the researcher's university. Third, the emotional keywords used for the measurement purposes were limited to forty words. Thus, the resulting guideline may not be universal and require further research to generalise its applicability.

The development and testing phases described in this research were meant for confirmatory purposes in validating the proposed guideline. It does not cover actual implementation of the guideline in real world. The result could be used to lend some hypothetical credence that the implementation of the proposed guideline have made it possible to engineer emotion in the developed prototypes.

All of the above limitations could be useful to strategise future research to expand the research findings and extend more promising result to the establishment of further comprehensive and universal guideline.

1.8 Research Contribution

This research makes methodological, empirical and practical contributions to the web design literature in HCI discipline. An overview of the contribution is presented below. The contributions could be classified into the novelty, importance and usefulness it yielded.

1.8.1 Methodological Contributions

1. **A novel method to engineer emotion in Website UID.**

Method to measure emotional response in Website UID established by the research overcome the lacking of existing approach in website design, which have largely focused to cognitive functionality and usability. The method includes technique to engineer the aspect of emotion and the underlying relations with design elements on a Website UID. It includes the phase of identifying the concept of emotion in website design, the requirements analysis to discover design requirement for website that embeds target emotion, the implementation and testing. The method would be highly beneficial to researchers, practitioners and user advocates as it provides solution to investigate and embed target emotions in Website UID.

2. **A novel Kansei Web Design Guideline©, a guideline to the design of website that embeds target emotion.**

The guideline is in the form of translation from the concept of emotion to website design elements. It exemplifies value for each influential design elements to embed target emotion in website design. The guideline provides design requirements to enable designers, researchers and user advocates to devise strategies in producing website that embeds user's target emotion in its design. Although by its current form the guideline is seen to be specific to the case study domain, it offers a basis to the extension of existing scheme on website design such as the renown Nielsen's Heuristic (Nielsen, 1993),

IBM's design principles (IBM Design, 2008), a three-phase model for website evaluation (Sutcliffe, 2002), and design factors for emotional homepages (Kim et al., 2003), which either heavily focused on functionality and usability or did not consider users involvement in its requirement analysis activity.

1.8.2 Theoretical Contributions

1. A novel Kansei Website Taxonomy.

The taxonomy classifies concept of Website Emotion to the elements of emotion to the influential website design elements. This taxonomy is important and required as a reference to ensure the success of Kansei Website design. The taxonomy categorizes emotion to the design of Kansei Website and classifies the concept of emotion identified from the experimental studies. The Kansei Website Taxonomy is established to facilitate web designers to focus on all significant factors, creating a holistic form of the concept of emotion in website design. Similar to the design guideline described in earlier section, although by its current form the taxonomy is seen to be specific to the case study domain, it offers a basis to the extension of existing scheme on website design.

1.8.3 Empirical Contribution

1. Research findings on the evidence of existence of emotional signature in Website UID.

These findings provide important evidence that emotional signature exists in Website UID. They justify the need to address the aspect of emotional user responses in Website UID, and reset the research agenda in website evaluation, which implicates the industry and academia to not only focus on

functionality and usability, but also address emotional aspect of user experience in website design.

2. Research findings that subjective emotional response to Website UID can be quantified.

The findings provide important evidence that website visitors' subjective emotional responses can be systematically quantified, so as to deliver input to the study of emotion in Website UID. The result could also be used as hypothetical basis that the developed research framework is valid.

3. Research findings on the structure of emotion in Website UID.

These findings discover the structure of emotion in Website UID. The structure represents visitor's emotional responses towards Website UID, enabling the determination of the influential concept of emotion in Website UID. Thus, it facilitates web designers, e-businesses, researchers and other stake holders to have a reference in determining strategies in developing website that embeds target emotion.

4. Research findings to the design elements that structure the external appearance of website from user's view-point.

These important findings discover all visible characteristics on a web page that have been indefinite and most of the time granted as unimportant. The findings exhibits common practice in Website UID that becomes visible to visitor's eye. The result thus facilitates designers to better understand the insights of users and extend their creativity in fulfilling implicit users need and emotion.

5. Research findings on the influence of design elements to user's emotional responses in Website UID.

These findings discover the influential design elements in eliciting emotion. The findings are important in providing balanced, well-placed and appropriate combination of design elements with consideration of differences

of influential elements in different target emotion. Thus, it facilitates web designers, e-businesses, researchers and other stake holders to have a reference in determining strategies in developing website that embeds target emotion.

6. Research findings on the relationship between emotional responses and design elements.

These findings discover the relations between user's emotional responses and website design elements. The findings are important in which it discovers that emotion can be associated to design elements. The outcome could be used as a basis to analyse design requirement for the development of website that embeds target emotion. It serves as a reference for web designers, e-businesses, researchers and other stake holders in determining design influence to emotion.

7. Research findings that Website Emotion can be designed.

These findings are important to provide evidence that with the use of appropriate method, designers and user advocates can determine design requirements for the development of website that embeds target emotion into its design.

1.8.4 Practical Contribution

1. A paradigm shift from WYSIWYG to WYSIWYD.

Findings from the research have implications for educating designers and users in terms of product emotion in general and website emotion in specific. They facilitate designers to better understand user's feeling when interacting with their product. With the implementation of the guideline, designers can devise strategies to produce an interface design that embeds target emotion, enhancing positive user experience and persuasion. Thus, the research contributes to paradigm shift from 'What You See Is What You Get'

(WYSIWYG)to ‘What You See Is What You Desire’ (WYSIWYD); users do not only get whatever delivered by designers, but their feelings are already accounted in advance into the production of design requirements.

1.9 Publications Relating to this Research

The research that forms part of this thesis has led to several publications. Table 1.8 summarizes all of the publications.

Table 1.3: The Research Publication.

Contribution	Publication
An approach to emotional usability in e-Commerce website.	Anitawati, M.L., Nor Laila, M.N. (2006). Engineering Emotional Usability in e-Commerce Website: The Kansei Approach. BIZIT '06. Kuala Lumpur, Malaysia: UPENA.
A model on building Kansei product.	Anitawati, M.L., Nor Laila, M.N., Nagamachi, M. (2008). Validation Of Kansei Engineering Adoption In E-Commerce Web Design. Article accepted for publication in the journal of Kansei Engineering International (KEI): Japan Society of Kansei Engineering (JSKE).
Concept of affect / emotion in e-Commerce website, Framework of Kansei Engineering in e-Commerce website.	Anitawati, M.L., Nor Laila, M.N. (2006). "Kansei Engineering Concept in e-Commerce Website." International Conference on Kansei Engineering and Intelligent Systems 2006 (KEIS '06). Aizu-Wakamatsu, Japan: KEIS '06, Aizu Univ. pp 117-124.
Dominant pattern in web design. Model of visual technology in online clothing website.	Anitawati, M.L., Nor Laila, M.N., Nagamachi, M. (2007). "Dominant Pattern of Visual Design in Online Clothing Website." Proceedings of 3rd International Conference on Web Information System and Technologies (WEBIST '07). Barcelona, Spain: INSTICC PRESS, ISBN 978-972-8865-78-8.
Pilot study on existence of emotional signature in web interface design.	Anitawati, M.L., Nor Laila, M.N., Nagamachi, M. (2007). "Engineering Kansei in e-Commerce Web Design." HCI International 2007. Beijing: SPRINGER, ISBN 978-3-540-73738-4.
Exploratory study on visitor's emotional responses towards online clothing website. (PCA)	Anitawati, M.L., Nor Laila, M.N., Nagamachi, M. (2007). "Kansei Engineering: A Study on Perception of Online Clothing Website." 10th International QMOD (QMOD '07). Helsingborg, Sweden: Linköping University Electronic Press, ISSN 1650-3740.

Table 1.8: The Research Publication (continued).

Contribution	Publication
Hierarchical cluster of Kansei words and website. Visualization of website Kansei cluster.	Anitawati, M.L., Nor Laila, M.N., Nagamachi, M. (2008). Kansei Structure and Visualization of Clothing Websites Cluster. <i>ITSim 2008</i> . Volume 1, Issue , 26-28 Aug. 2008 Page(s):1 - 8. ISBN 978-1-4244-2328-6.
Kansei structure and subject's demography for K.E. studies	Anitawati, M.L., Nor Laila, M.N., Afdallyna, F.H., Nagamachi, M. (2009). Website Affective Evaluation: Analysis Of Differences In Evaluations Result By Gender And Educational Background. Paper submitted to 6 th International Conference On Information Technology In Asia 2009.
Kansei structure and data population size for K.E. studies	Anitawati, M.L., Nor Laila, M.N., Afdallyna, F.H., Nagamachi, M. (2009). Website Affective Evaluation: Analysis Of Differences In Evaluations Result By Data Population. Paper accepted for 13th International Conference on Human-Computer Interaction. San Diego.
Kansei Database System – KAnseiExpertWeb, KAnseiCollaborativeWeb, KAnseiHybridWeb	Anitawati, M.L., Nor Laila, M.N., Nagamachi, M. (2008). Kansei Database System For Emotional Interface Design Of E-Commerce Website. The Fifth International Cyberspace Conference on Ergonomics.
Tool to Design Kansei Website, Database for Kansei and design elements	Anitawati, M.L.; Nor Laila, M. N.; Nagamachi, M. (2009). EXPERTKANSEIWEB – A Tool to Design Kansei Website. Paper accepted for publication in ICEIS 2009. Milan.

1.10 Structure of the Thesis

The research focuses on emotional signature in Website UID. Adopting the methodology of K.E., the research quantifies visitor's primary emotional response in e-Commerce website and discovers relationship between emotional response and web design elements. These findings were used to construct design requirements for the development of website that embeds target emotion. The following summarizes the work performed in each chapter.

Chapter 1 provides overview to the thesis, summarizing all chapters so that audience can have a clue to the overall content of the thesis.

Chapter 2 discusses the issues in web design, the review of literature in psychology and emotion, and specific attention to e-Commerce website evaluation. It goes on to argue for the relevance to address emotional aspect of e-Commerce Website UID, and discuss possible method to measure user's emotional responses to website design and engineer them into design requirements for website that embeds target emotion.

Chapter 3 reviews K.E. as a potential method in the engineering of emotion in e-Commerce website. As it has been successfully implemented in many physical products, for the first time in its implementation history, the research attempts to employ the method in e-Commerce Website UID.

Chapter 4 presents the research framework and describes the experimental procedures. It depicts the instruments, participants, and experimental approach taken by the research. The chapter provides detail of instrument building, commencing with the process of synthesizing specimen. It continues with the selection of website specimen having visually different design, investigation of detail design elements, and identification of valid specimen. The chapter then describes the process of building a checklist as an emotion measurement tool. It concludes with a set of valid specimen, and checklist to be used in the experimental procedure.

Chapter 5 presents results of Exploratory Study, which is the main experimental procedure in the measurement of emotional responses in website design. The chapter describes details of experiment results and the outcome. The chapter describes the pilot study performed to seek evidence of the existence of emotional signature in Website UID and justification of the research instruments as well as the developed research framework. The result is then described elaborating the concept of emotion in Website UID and the associated design requirements. The chapter concludes with proposing Kansei Web Design Guideline©, a guideline to develop Kansei Website.

Chapter 6 presents a Confirmatory Study that is performed to validate the outcome of the Exploratory Study. The chapter describes the selection of five concept of emotion in Website UID from the proposed guideline, and development of

prototypes according to the guideline. It then describes the selection of fifteen good subjects from the participants of Exploratory Study in order to facilitate a consistent and reliable result. Emotion Measurement is then described, and analysis results are elaborated including a comparative analysis of confirmatory and exploratory datasets, targeting to provide validation of the guideline. The chapter concludes with justification of the successful use of the Kansei Web Design Guideline© to embed the five target emotion, which lend some hypothetical credence that it is possible to develop website that embed target emotion with the use of the guideline. Also, based on the findings, the chapter describes the generation of method to engineer emotion in Website UID.

Chapter 7 summarizes the research findings and discussions, providing the research implications, challenges, and limitations. The chapter concludes with several recommendations for future works.