

Exploring the Role of Emotion in the Design Cycle

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ABSTRACT

Scholars have focused on “design and emotion” for more than a decade. Various studies, models, and theories have been proposed and adopted to explore the relationship between design and emotion, and to explain how emotion can be applied in the design process. After the theories are categorised according to the respective focuses, three main components that influence or are influenced by emotion can be identified: designers, design outcome and users or consumers in the design cycle. Based on the relationships amongst these components, numerous similar terms categorised under emotion and design that have clear and concrete rationales and definitions have been developed. For instance, “emotionalised design” refers to design in which designers introduce their emotions into the design process. “Emotional design” is viewed as design that can stimulate users’ or consumers’ emotion. “Emotion design” is design in which emotional concerns are involved in the interactions between designers and users.

However, few studies have focused on designers’ perceptions of these terms and of the role of emotion in design. By conducting an empirical study, we investigated designers’ perceptions of three terms, emotion design, emotional design, and emotionalised design, and explored designers’ experience regarding emotion and design.

Keywords: Emotion Design, Emotional Design, Emotionalised Design

INTRODUCTION

In recent decades, researchers have increasingly focused on the design process that underlies design practice. Numerous studies have used various methodological approaches to explore the optimal management of the design process (Best, 2006; Noble & Bestley, 2005; Peto, 1999). Some studies have explored the durability of materials and the consumption of designs, and used the findings to develop alternative design propositions. After examining various research methodologies, researchers have developed design processes suited to specific outcomes (Chen & Chen, 2004; Cross & Sivaloganathan, 2004; Gayretli & Abdalla, 1999; Reyman et al., 2006). In general, design scholars seek ways to create interesting and engaging designs that provide users with a satisfactory experience. Accordingly, some design scholars believe that emotion can contribute to creating products intuitively and efficiently, and thereby improve the ease of use. Moreover, Desmet and Hekkert (2009) suggested that the influence of emotion on design does not begin when users consume design outcomes, but is integrated into the product development process and the roles of designers in numerous ways. Psychologists and design scholars have determined that emotion affects how humans treat information, management (internal factors), creativity, and other factors (Skinner, 1968) In other words, the emotion of a designer is a factor influencing his or her ability and manipulation of the design process. Exploring design and emotion has generated new perspectives and key terms on the design process, such as “emotional design”, which describes the relationships between emotion and design outcomes, and “emotion design”, which describes the relationships between emotion and designers and design outcomes. The individual meanings of these key terms related to design and emotion as well as how they interact based on the concept of design and emotion must be understood. We reviewed the literature on design and emotion <https://openaccess.cms-conferences.org/#/publications/book/978-1-4951-2109-8>

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to develop a detailed historical understanding of the terms. The results of this literature review provide a theoretical basis for discussion on how emotions influence the design processes of designers.

THE DEVELOPMENT OF THE DESIGN PROCESS FROM THE PERSPECTIVES OF DESIGN AND EMOTION

Emotion has recently been introduced as a supportive element that optimises the design process (Desmet and Hekkert, 2009; Desmet, 2008; Demirbilek and Sener, 2002). Researchers have explored design processes to improve and achieve certain functions. Chen and Chen (2004) proposed the adaptive design process, which was generated by integrating a systematic design process and a design-patent protection mechanism. However, although some research has focused on exploring the relationships amongst designers, design outcomes, and users or consumers, few studies have focused on the three components of the design process. As the topics and research developed further, emotion (including the flow of emotion amongst these three components), like the target audience, had to be applied as a core element at every step in the design process (including users' emotion in design reflections). This enabled the design process to be reshaped into a new paradigm rather than to remain only an auxiliary that facilitates achieving certain design outcomes. Therefore, the role of emotion in the design process must be understood according to three main components: the designer, design outcome, and user. Consequently, theories on design and emotion can be categorised into three main types based on the components involved in the design process and consumption (i.e., user-driven or consumer-driven, designer-driven, and relationships amongst users or consumers, designers, and design outcomes). This method of categorisation enabled us to understand how emotion functions in the relationships amongst designers, design outcomes, and users or consumers, and to address the studies that have focused on how emotion (including designers' emotions) influences the design process (including the design process, the consumption of design outcomes, and reflection after design consumption). The following sections review the literature on these relationships.

EMOTION AND DESIGN STUDIES

Research on User- and Consumer-Driven Studies

According to the aforementioned research, scholars in the field of design and emotion first explored the user- or consumer-based approach (i.e., the relationship between users or consumers and design outcomes). Desmet and Hekkert (2009) believed that a greater understanding of the user or consumer experience improves designers' ability to design effectively.

Design scholars have used theories of emotion in developing concepts to improve design outcomes (i.e., to improve design products). Gaver, Dunne, and Pacenti (1999) introduced "cultural probes" as a research method to help designers obtain contextualised and rich insight based on the experience of users and consumers. Gaver (1999) proposed that emotion-based products (i.e., products designed based on emotional concerns) stimulate an intuitive and sensitive interaction style that helps designers interact with users or consumers and, thus, gain their insight.

Hummels (1999) illustrated the growing tendency to include emotional concerns in interactive design products and proposed that this reflected the development of technological complexity. Cupchik (1999) offered valuable theoretical insight into how products elicit emotions and asserted that this insight has helped designers enhance the emotional impact of their designs. He proposed that cognitive and behavioural meanings are the keys to improving design because they integrate the structural, functional, and ergonomic features of designs with user expectations and knowledge. In other words, cognitive and behavioural meanings provide a critical bridge between the purpose and structure of design outcomes and the users who must understand and use them. Simple and clear design properties help users or consumers understand and use the designs. Therefore, design scholars have begun investigating simple and clear design properties that help users or consumers understand and use designs; for example, Harada (1999) proposed "Kansei Engineering", which is a design analysis system developed using a research-based approach, to identify and quantify the relationships between product design features and the emotional responses of product users. Desmet and Hekkert (2002) regarded consumers' appraisals as key factors in determining whether a design outcome evokes an emotion and which emotion is evoked (Frijda, 1986; Desmet,

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2003). To present their perspective on consumers' emotional responses to products, Desmet and Hekkert proposed the "model of product emotions", in which the emotions associated with products are classified into five classes: surprise emotions, instrumental emotions, aesthetic emotions, social emotions, and interest emotions. They illustrated each class of emotion by using an example of interviewees' emotional responses to a particular product. Their study revealed that products can elicit several emotions and that, although the process through which users experience an emotion based on a design outcome is universal, users' emotional responses are complex and personal.

Norman (2004) addressed this perspective in his book *Emotional Design: Why We Love (or Hate) Everyday Things*, which introduced the "three levels of design" concept, which is based on concerns regarding the "user experience". Norman described the user experience of consuming a design as "cognitive processing". He divided cognitive processing into three levels: visceral, behavioural, and reflective. The visceral level refers to users' or consumers' first impression of the design outcome and their intuitive emotional response. The behavioural level refers to users' or consumers' consumption actions based on the emotions stimulated by the design outcomes. The reflective level refers to users' or consumers' reflections on the consumption experience. Norman's three levels of design concept describes how designs provide users or consumers with emotional experiences. Based on this concept, the respective design outcomes that elicit three types of response in users or consumers (i.e., visceral, behavioural, and reflective) when consuming designs can be referred to as "visceral design", "behavioural design", and "reflective design". Norman conducted a comprehensive investigation on how designs are associated with emotion and observed that providing a pleasurable experience enables designers to establish emotional relationships with users or consumers. Other design scholars have conducted further research on how pleasurable experiences enable designers to meet the needs and demands of users or consumers. Choi (2006) concluded that emotional design can create a strong and positive mental attachment (i.e., emotional concerns in design) between the user and the product that strengthens the usability of the design. Hakatie and Ryyänen (2006) conducted a simple research experiment that verified that the three levels of cognitive processing can be linked to the attributes of various products. The results of their experiment indicated that consumers' selection criteria for products were clearer on the visceral and behavioural levels than on the reflective level. Because users usually derive emotional messages and experiences from the visceral and behavioural levels, emotion design is ideally suited to meeting the needs and demands of users or consumers and, consequently, to creating more marketable products.

Inspired by the research of Norman (2004) and Desmet and Hekkert (2002), Lo (2007) defined emotional design as design that focuses on users' needs and experience, emphasising that emotional concerns can improve the function, form, and usability of design outcomes and, thus, enrich users' experience. Departing from previous studies, Chitturi (2009) stated that an effective design should benefit the user's overall consumption of the product (i.e., in the real market, users experience emotional changes during and after consuming a design outcome). Depending on the quality of a product consumed, users can experience positive or negative emotions. Both positive and negative emotions influence users' evaluations of a product and decision making in subsequent purchasing processes. Therefore, users' positive and negative emotional changes during the consumption of a product affect their loyalty to the product (i.e., design outcome).

The literature has provided few definitions of emotional design. Because some scholars use emotional design to refer to emotion design, the difference between the two terms is unclear. Further research must be conducted in this area. However, according to the aforementioned studies, emotional design focuses on the needs and experience of users and is used to create products that elicit emotion. Other key criteria and conditions related to emotional design are listed as follows:

- Although the process through which users experience an emotion based on a design outcome is universal, each user's emotional response is complex and personal;
- Consuming a product involves three levels of cognitive processing, namely visceral, behavioural, and reflective;
- Emotional design is communicated through the design, function, form, and usability of a product and is developed in relation to users' needs and demands;
- Emotional design affects users' consumption and is likely to appear in the real market; and
- Users' positive and negative emotional responses to the consumption of a product can affect their loyalty to the product (i.e., design outcome).

Although numerous studies have explored the concept of emotional design, a more concrete definition of emotional <https://openaccess.cms-conferences.org/#/publications/book/978-1-4951-2109-8>

design has yet to be proposed. Hence, the findings of the aforementioned studies have been discussed and analysed to obtain a more comprehensive understanding of the concept of emotional design.

STUDIES FOCUSED ON THE RELATIONSHIP BETWEEN DESIGNERS' EMOTIONS AND DECISION MAKING IN THE DESIGN PROCESS

Numerous studies have explored the relationship between designers' emotions and the design process. Some studies have investigated whether designers draw on their own emotional responses when developing designs rather than focus solely on the user's perspective. Based on the existing theories on emotion and experience, Forlizzi, Disalvo, and Hannington (2003) described how emotion is a key element that influences designers, asserting that changes in the external environment, such as social changes and new interactions between people and objects, influence designers' goal setting and reflective emotional responses to design (i.e., emotional experience). Designers' reflective emotional responses are likely to influence their decision making during the design process. However, few studies have investigated the relationship between emotion and the decision making of designers during the design process. Drawing on design process research, Ho (2010) discussed the function of emotions and proposed the E-wheel model¹ (Figure 1) to explain the relationships amongst designers, emotions, and internal factors (e.g., information processing and material allocation) and external factors (i.e., technological, social, cultural, and economic factors) in the design process. According to Scherer (1984), an emotion expresses a pattern of reactions in response to external stimuli and engenders evaluations of the stimuli and of a situation. Thus, introducing emotional concerns into the decision-making process affects the decision-making ability of designers. Ho (2010) explored how internal and external factors affect the design process, which involves numerous decision-making processes. External factors can affect the emotions of designers and cause them to make different decisions that affect the internal factors and, hence, change the design process. This process provides insight into how designers can use their emotions to develop appropriate responses that optimise their designs.

Based on the aforementioned research, the criteria and conditions related to the relationships between designers and design outcomes can be generalised as follows:

- Changes to the external environment influence designers' emotions;
- Designers' emotional changes influence the design process and the structure and function of design outcomes;
- Introducing more personal experience and emotion into the design process can improve the management of the design process;
- Including emotions in design outcomes (including material and visual expressions) can create closer relationships between designers and users;
- Designers tend to use more emotional and intuitive methods in the design process than they did in the past.
- External factors (i.e., external stimuli) can affect the emotions of designers and cause them to make different decisions that affect the internal factors (e.g., information processing and material allocation) and, hence, change the overall design process. This process provides insight into how designers can use their emotions to develop appropriate responses that optimise their designs.

RESEARCH ON THE RELATIONSHIP BETWEEN USERS OR CONSUMERS AND DESIGNERS AS REFLECTED IN DESIGN OUTCOMES

In addition to the user- or consumer-driven- and designer-driven-based research, research has been conducted on how communication between users or consumers and designers is reflected in design outcomes or, in other words,

¹ In the name of the E-wheel model, "E" refers to "emotion".
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the relationships amongst users or consumers, designers, and design outcomes. Funke (1999) studied how emotions relate to design outcomes (i.e., design products) in satisfying subjective expectations, and proposed that design acts as a semiotic instrument in an experience market. He observed that emotional concerns were transformed into products (i.e., design outcomes) that fulfilled users' personal expectations and enriched their experience. Hence, the emotional aspects of use should be regarded as more crucial considerations than function in the design process. Jordan (2000) conducted a holistic study of the relationships between people (including designers, users, and consumers) and products, and the criteria for judging the quality of designs, indicating that thoughtful designers are sensitive to the needs of users and apply skill and judgment in designing products that empower users and afford them pleasure. Because the products affect the users' moods, the users gain emotional benefits while using the products. Fulton Suri (2003) studied how design influences the quality of the experience consumers enjoy. In her research on "design expression" (i.e., designer-driven studies) and user experience (i.e., user-driven studies), she observed that emotional concerns affected both designers' and users' relationships with design outcomes. Because design outcomes (i.e., design products) are becoming increasingly similar in many ways, including technology, functionality, price, and quality, designers are required to design more differentiated outcomes to fulfill the needs of users or consumers (Fulton Suri, 2003). In other words, designers must influence people's behaviour and perception through their design outcomes.

Emotional concerns affect both the design process and the consumption of designs, and are a crucial factor driving designers to explore ways of contributing to users' experience and communicating experiential ideas (between users and designers). Based on a concept similar to that of Fulton Suri, Cupchik (2004) proposed the idea of "designing for experience" to describe the interactive relationships amongst designers, design outcomes, and users. In the process of experience design, a designer imbues an object with given meanings or messages. Users or consumers then use the design according to the prescribed function and are thus influenced by the designer's planned creative message. According to this perspective, emotion can be incorporated into design to realise both the expectations of users and consumers and the designers' plans in the interactive experience. Tzvetanova (2007) suggested a similar concept which emphasises the interactive emotional relationships between users and designers. In this context, the factors relating to users (i.e., the feedback from the users) are the most crucial criteria for evaluating the quality of emotion design.

Although some studies have explored how emotion influences design, few studies have focused on how emotion influences the design process. Most of the aforementioned studies provided basic concepts of emotion design, but did not offer specific terms to describe or identify the concept of how emotions influence design outcomes, users, and designers. Therefore, key criteria and conditions regarding emotion design are listed as follows to provide a foundation for further discussion.

- Design often acts as a semiotic instrument that delivers the designer's message to the user.
- Users or consumers and designers interact through the planned function or design of a product. The emotional concerns of users or consumers and designers affect both the design process and the design outcome. By understanding users' needs, a designer can explore design concepts to contribute to users' experience. The design process enables users or consumers and designers to communicate their experiential ideas.
- Emotional concerns affect both the design process and the consumption of design by communicating an understanding of the users' experience, thereby enabling the designer to explore design concepts that contribute to the users' experience and, thus, experiential ideas related to the product to be relayed between the user and the designer.

The foregoing review of the literature indicates that the use of the phrase "design and emotion" is inconsistent (Ho & Siu, 2009). The few studies analysed in preceding sections are the only studies that have explored the basic definitions, natures, and characteristics of emotion design and emotional design (Ho & Siu, 2009). Most of the studies used these terms to refer to design that contained or related to emotion. Moreover, most of the studies investigated the relationships amongst users or consumers, design outcomes, and emotion rather than those between emotion and the design process. The E-wheel model was proposed to clarify the relationship between emotion and the design process. The E-wheel explains the relationships amongst designers, emotions, and internal factors (e.g., information processing and the allocation of materials) and external factors (i.e., factors not directly controlled by designers, such as technological, social, cultural, and economic factors) of the design process. The role of emotion in the interaction between the external and internal factors that affect the design process was discussed. The E-wheel model explains the effect of emotion on designers' decisions in the design process. All of the aforementioned theories were used to describe the effect of emotion on designers, design outcomes, and users or consumers in the

cycle of design, consumption, and reflection.

THE NEW CONCEPT OF EMOTIONALISED DESIGN AND NEW PERSPECTIVES ON EMOTIONAL DESIGN AND EMOTION DESIGN

The foregoing literature review revealed that several similar terms are used to refer to design and emotion. However, the definitions of terms such as the emotional aspects of design, emotional design, and emotion design have not been defined adequately. This section provides a clear and concrete definition of design and emotion to enable a comprehensive understanding of the concept to be attained.

The New Concept of Emotionalised Design

Before a final design outcome is sold on the market, designers must complete the design process. Designers often introduce various emotional concerns into the design process before realising the final design outcome (Ho, 2010). Alternatively, the design outcome can embody certain facets of the designer's emotion. In this case, the designer introduces his or her own emotion into the design process to achieve a design outcome, which can be regarded as an "emotionalised design" from the perspective of the designer.

A typical example of emotionalised design is the case of the book *RMX Extended Mix* (Alexander, 2001), which was designed by Rinzen, a group of Australian artists, in 2001. Adrian Clifford, one of the group's members, stated that everyone in the group produced an initial piece on one of eight themes. The files were then passed between the designers, who progressively modified, augmented, and erased the content at each step in the process. The designers were able to express their personal perspectives on the topics that interested them while applying their professional skill. Consequently, the designers were able to introduce their personal emotions, interests, and intuitive evaluations into the design process. However, the consumers' perspective was not initially considered in this process.

Another example of emotionalised design is student design assignments. Student designers often introduce aspects of their emotions into their assignments when striving to achieve the learning objectives of their projects. Although, the design outcome motivates the emotional responses of users in this case, users typically do not consume this outcome in a real market. Therefore, student design assignments can be regarded only as examples of emotionalised design.

Recognising examples of emotionalised design is not easy because designers may introduce certain types of emotion into the design process, and most outcomes are likely to transform into emotional designs when they are sold on the market. Design outcomes can carry certain types of emotion intended to stimulate communication and interaction with users or consumers. These emotions motivate users or consumers to respond to the appearances or functions of designs. *RMX Extended Mix* may have induced emotional responses from the users or consumers because it was sold on the market. Hence, from the perspective of the final design stage, the book can be regarded as a form of emotional design.

The two previously described examples fully support the proposed concept of emotionalised design and the conceptual structure of the E-wheel model. According to the E-wheel model proposed by Ho (2010), when external factors affect designers' emotions, their emotions then affect various decision-making processes related to the internal factors of the design process. This altering of the design process leads to the development of different design outcomes. Thus, the designer's emotions, which are elicited by external and internal factors, become the key element in the design process.

In the case of *RMX Extended Mix*, external factors, such as the development of technology and the cultural background contributing to the theme, affected the logical thinking and the emotional responses of the designers as they developed their design themes. Instead of focusing on the consumers' perspective, the Rinzen artists introduced their personal emotions into the design process. Each designer introduced his or her emotional responses into the decision-making process when he or she began to alter or edit a design. The designers' emotional responses to the external factors, which reflected their professional knowledge, personal interests, and intuitive evaluations, affected their decision making and, consequently, the overall design process.

In the case of student design assignments, factors external to the design process (e.g., the cultural background of the student) can affect the emotions of students while they develop their projects. Moreover, students introduce their

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emotions into the design process when they make decisions about certain internal factors, such as information processing and the allocation of materials. Therefore, altering the design process affects the design outcomes. According to this example, external factors affect the emotions of designers, and their emotions can cause them to make various decisions regarding internal factors, thus affecting the design process and the design outcome.

This process whereby designers introduce their emotions into the design process to realise a design outcome supports the concept of emotionalised design. Before a final design outcome is sold on the market, designers must complete the design process. Designers often include or introduce various emotional concerns into the design process prior to realising the final design outcome. Consequently, the design outcome conveys certain qualities, aspects, and attributes of the designer's emotions.

A New Perspective on Emotional Design

When a design has been completed and is sold on the market, it may have the capacity to affect the emotions of users or consumers. This emotional attribute (or motivation) is derived mainly from the style, function, form, and usability of the design and the users' experience when consuming the product. In other words, the design outcome may affect the users emotionally by causing them to feel happy, annoyed, or excited. Thus, the design outcome may motivate users to connect, recall, or imagine related events or relevant experiences that cause their emotions to change. This can be regarded as emotional design from the perspective of the user.

A clear example of emotional design is the signage for Umeda Hospital in Tokyo; this signage was designed by the Japanese designer Kenya Hara in 2005. The signs are made of cotton cloth, which elicits a sense of comfort and softness to soothe the patients and ease anxiety and worry. Hence, because this signage can evoke a certain type of emotional response in the user, it can be regarded as a form of emotional design.

A New Perspective on Emotion Design

The foregoing discussion of the process of emotional flow, from the designers who incorporate their emotion into designing an outcome (emotionalising design) to users who respond emotionally to the design outcome (emotional design), revealed that the interactions between designers and users can affect the design outcome and lead to the establishment of strong relationships amongst the designer, the user, and the product (design outcome). This relationship provides the foundation for emotion design.

Emotion design refers to reflection on a design that is generated after the design outcome has been consumed. Although designers can obtain reflections on their designs directly from the users through feedback, they can also indirectly reflect on their designs.

Typical examples of emoticons to illustrate the theory of emotion design. Emoticons are used in electronic communication to express how a sender feels. According to the Microsoft Network (MSN), an eminent developer of emoticons, "Emoticons are emotion graphics—visual ways to express the way you feel when words alone just aren't enough" (MSN.com, n.d.).

This statement suggests that emoticons enable users to convey emotions. The user can choose particular forms and styles of icon to represent their feelings. Thus, emoticons are clearly a form of emotional design, because the design outcomes (emoticons) are designed to evoke certain emotions in users. In addition, based on how these icons are designed, they also embody a form of emotionalised design. Because the icons are designed based on the designers' emotions, emotion is introduced into the design process. In this case, emotionalised design and emotional design coexist, because designers can interact with users within the emotion flow. Hence, emoticons are a typical example of emotion design.

The Proposed Model (3E Model)

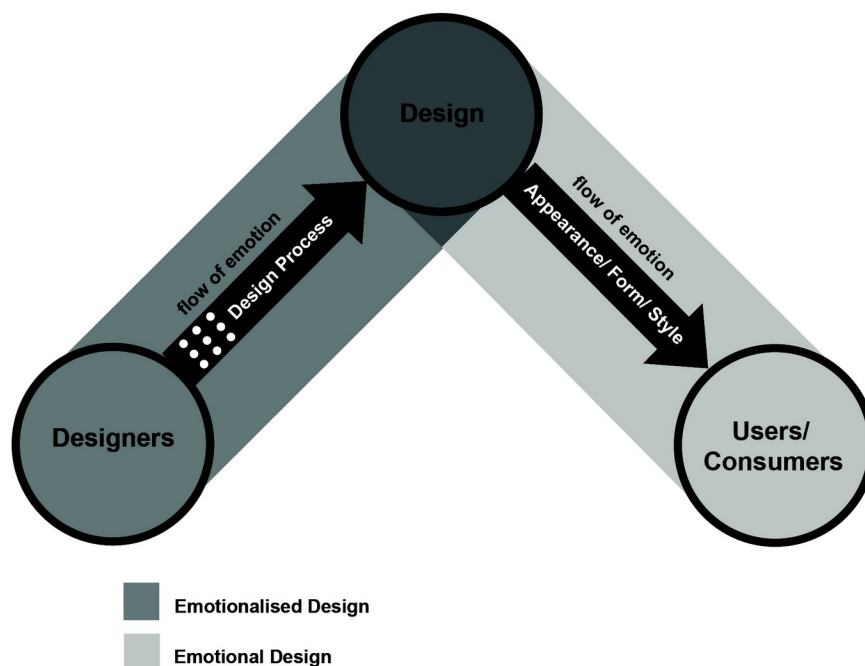
Based on the foregoing review of the theory of emotion design, the role of emotion in the design process consists of three main components: designers, design outcomes, and users or consumers. When designers encode information <https://openaccess.cms-conferences.org/#/publications/book/978-1-4951-2109-8>

and consumers decode it, the emotional expressions (the design attributes developed based on emotional concerns) of the designer and the user or consumer serve a critical communicative function.

The design process involves a process of information encoding and decoding² (Wogalter, Dejoy & Laughery, 1999) in which the interactive relationships amongst the three components (i.e., designers, design outcomes, and users or consumers) are identified. The focus of most scholars such as Desmet (2002) and Norman (2004) has been on the relationship between design outcomes and users or consumers. However, scholars who have studied the design process have proposed that the design process comprises three main components: designers (Vosburg, 1998; Tan, 1999), design outcomes, and users or consumers (Jardon, 2000). To investigate the influence of emotion on the design process, the relationship between emotion and design outcomes and that between users and designers must be carefully addressed. This paper proposes three new design and emotion research categories, namely user- or consumer-driven research, designer-driven research, and research on the relationship between users or consumers and designers as reflected in design outcomes. According to this categorisation method, emotion in the design process involves the three components (i.e., designers, design outcomes, and users or consumers). Emotion should be closely linked and considered throughout every step in the design process. The close relationships between emotion and the three components were developed into three key terms: emotionalised design, emotional design, and emotion design.

A 3E model is proposed to illustrate the relationships amongst the three design types. The 3E model (Ho & Siu, 2009) (Figure 1) provides a framework that explains the close relationships amongst designers, design outcomes, and users or consumers in the topic of design and emotion. The framework models the flow of emotion in the overall design and consumption cycle from the designers who introduce emotional concerns into the design process (i.e., emotionalised design) to the users who experience certain emotional responses in response to the design outcome (i.e., emotional design). The relationships amongst emotions, designers, and design outcomes (i.e., the core elements of emotionalised design) and the relationships amongst emotions, users or consumers and design outcomes (i.e., the core elements of emotional design) are clearly illustrated in Figure 1. The interactions between designers and users shown in the design outcome indicate that strong relationships exist amongst these three components, providing a foundation for emotion design.

In addition, reflection is generated after a design has been consumed. Designers can directly obtain users' reflections through user feedback, and users can provide indirect reflections to the designers. Figure 2 shows user reflection in the 3E model.



² According to Wogalter, Dejoy, & Laughery (1999) designers encode the information and consumers decode it, and the designers and users or consumers interact in the design process through the design outcome. <https://openaccess.cms-conferences.org/#/publications/book/978-1-4951-2109-8>

Figure 1. Model to illustrate the relationship between ‘emotionalised design’ and ‘emotional design’

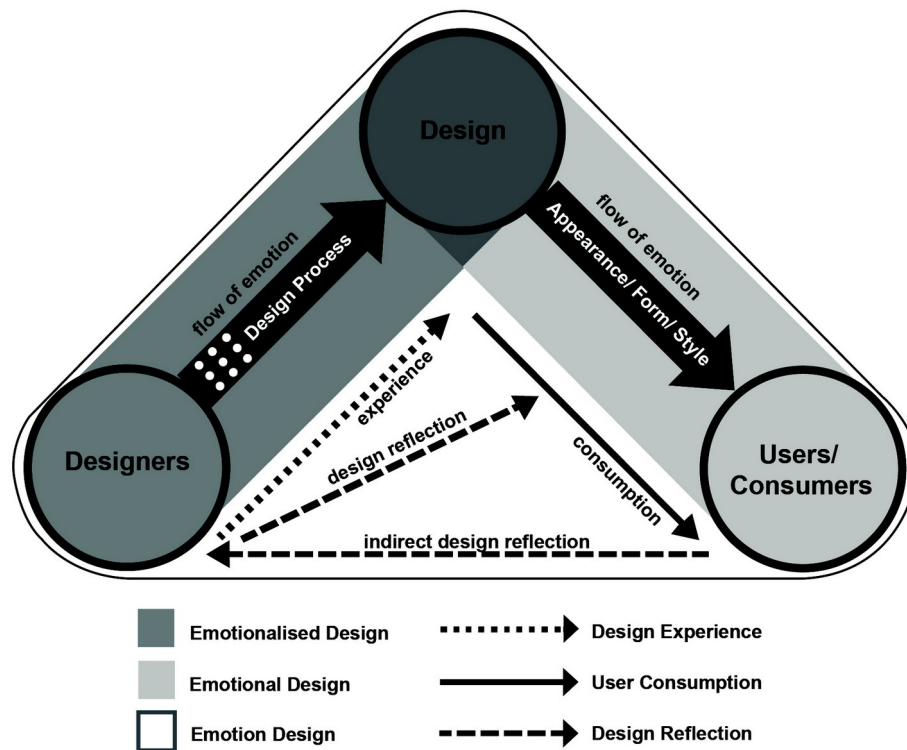


Figure 2. 3E Model (including user reflection)

According to the 3E model, designers introduce certain emotions into the design process to manipulate the design outcomes; in other words, they emotionalise design. The design outcomes embody certain emotional concerns that designers introduce during the design process to elicit the emotions of users. Hence, emotion plays a vital role in the design process and may, in turn, affect the emotional responses of users. Thus, this model provides an understanding of how emotion influences the design process from the designer’s perspective. This approach differs from that of other research that has focused mainly on outcomes such as ergonomics (Wickens & Hollands, 2000), sustainability (McLennan, 2004), and accessibility (Mace, Hardie, & Place, 1996) from the user’s perspective. In addition, the model explains the flow of emotion and the extent to which it affects designers, design outcomes, and users in the design process.

CONCLUSIONS

The foregoing theoretical review describes various concepts and theories related to design and emotion. The exploration of how emotions influence the design process inspired the application of the 3E models. The 3E models explain the relationships amongst emotions, designers, design outcomes, and the design process by providing new perspectives on key terms (i.e., emotionalised design, emotional design, and emotion design). Different from previous studies of the design process, it addresses the influence of emotion from the user’s perspective as well as designers’ decisions in the design process. These concepts and terms can be applied and explored in future studies on the role of emotion in the design process. In addition, this approach should be introduced to and understood by designers (Ho and Siu, 2009), because it can enable them to understand how emotion functions in the relationships amongst designers, design outcomes, and users or consumers. Designers must learn this new concept and include emotion along with other design theories throughout the design process. They should consider emotion as a means for optimising certain parts of the process and should combine emotion with the design process to manipulate the

process effectively.

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