An Emotional Design Approach to Develop New Cultural Products
Islam Gharib
Lecturer in Faculty of Applied Arts- Helwan University

Abstract:

Global markets receive bulks of similar products every morning from different companies around the globe. Because of tough competition, companies attempt to present attractive products for consumers. Cultural design approach is used by several companies to develop products which based on consumers' cultures. While same cultural product are sold in different countries because of globalization, there is a need for a new approach to design cultural products to be more attractive for consumers from different cultures. As emotion is the key motivation for people while judging things and making buying decisions, emotional design can be considered a good approach for design cultural products. This paper aims to integrate emotional and cultural design processes to help designers to create emotional interaction between the consumer and the cultural products. This interaction can push consumers to buy specific products more than others. The paper firstly reviews emotional and cultural design, cultural features, and design process. Afterward, a framework is developed to describe how emotions can be embedded in cultural design process.

1 Introduction:

Culture plays a key role in societies in modern life. It is a result from a continuous development of a set of contents which includes attitudes, beliefs, mores, customs, and values (Throsby, 2001). It is also a result of social activities that includes creativity, symbolic meanings and intellect of a society (Wang, 2016). People normally use culture to distinguish themselves from others (Hofstede & Hofstede, 2005). Cultural products can be defined as the products that result from the integration between cultures and design (Wang, 2016). It includes a wide range of products such as advertising, architecture, music, crafts, and design. It employ the aesthetic and symbolic values of such culture which make it different from other products (Scott, 2004). This combination make it a representative of the culture that produces it.

Cultural design in general employs cultural features in design. This happens directly through using visual features on products' surfaces to add a cultural appearance or not directly by inspiring the potential aspects of the cultural features in design. Many cultural design models were developed to help designers through the design process (Moalosi et al., 2007; Lin, 2007; Teng & Chuang, 2011; Nijkamp & Garde, 2010).

Emotions play an important role in taking decisions (Reeves and Nass, 1998; Damasio, 1994) especially buying decisions. When it comes to product, emotions result from the connection between the user and the product. It is also related to personal meanings and experiences (van Gorp and Adams, 2012). Cultural products attempts to create this emotional link between products and users through the cultural features that have meanings in users' mind. This process requires that the user has a background about the cultural features used in the product in interact with it. But what about the other users with no cultural background.

Emotional design aims to prevent bad emotions and stimulate good ones. This is considered the ultimate goal of emotional design. Many approaches were developed to design emotional products. Some approaches investigated interaction between products and users in the usage phase (Hummels, 1999; Forlizzi & Batterbee, 2004; Desmet & Hekkert, 2007). Others concentrated on the user to find out their emotional needs (McDonagh et al., 2002; Brinkman & Fine, 2005; Khalid & Helander, 2006). On the other hand, many studies payed more attention to the design and the inspiration process (Dunne, 1999) while others studied the emotional response of the user (Cupchik, 1999). This approach leaded to develop several measuring tools to measure the emotional response of the user towards products.

Connecting between emotional and cultural design can help companies to optimize their competitive position in the markets as emotional and cultural products are important sections in the global industry.

It enables companies to market their cultural products to users without any cultural background such as oriental products sold in western markets. In this paper, we developed a framework for emotional-cultural product design to link between emotional and cultural design. This can help designers get inspiration, create a product, and evaluate it emotionally.

2 Related works:

2.1 Cultural Design:

Cultural design uses cultural features through its process to add a cultural appearance or cultural value to products. Cultural features are elements that represents a specific culture (Wang, 2016). Designers usually use visual features to be applied on products. Other features are used as a source of inspiration to create new products. Several studies attempts to investigate cultural features through different cultures around the globe. As cultures include many features and activities that designers usually use in design, Wang (Wang, 2013) classified cultural features into 7 categories: Art and artistic activities, artefacts, customs, food, architecture, religion, and nature. These categories include almost all features that cultures contain and it helps designers in selecting cultural features through the design process.

Art and art activities are considered a creative representation of a culture (Throsby, 2001) as they were used among all cultures to express the social and cultural life. It includes painting, sculpture, handwriting, and other forms of art (Wang, 2013). Artefacts (Hatch, 1991) and customs which has a social reflection such as fashion (Throsby, 2001) are considered also as cultural features.

In various cultures, food and its context represent culture's values (Wang, 2016). Food habits may be related to religion or nature, but religion and nature are considered as independent cultural feature as they have a big impact on culture in societies. Another cultural feature that reflect life organization in architecture (Voon, 2007). It is a creative design of building and traditional architecture that use local material express cultures in a good way.

As mentioned previous, cultural features play a key role in cultural product design. Designers attempt to create a link between products and consumers by adding cultural features to their designs (wang, 2013). Many studies aimed to develop design methods for cultural product design in order to stimulate design process (Lin, 2007).

Moalosi et al. (Moalosi et al., 2007) presented a culture-oriented design method based on Botswana's cultural features. It works in conceptual design stage by pushing designers to understand the social and cultural context of the user.

Lin (Lin, 2007) suggested that designers should begin design with understanding the meanings of cultural features as this can help in forming a message to the user. After that, a designer creates a cultural scenario for the proposed product, and then proceeds through the design process to reach the ultimate idea of a product. This model can be summarized in three stages: identification, translation (scenario), and implementation (design).

Teng and Chuang (Teng & Chuang, 2011) developed another three stages method for cultural design. It includes preparation, transition, and design development. It is similar to Lin's (Lin, 2007) method in the steps but differs in the resources of cultural features used in each study.

Nijkamp and Garde (Nijkamp & Garde, 2010) proposed a four steps method for cultural design. It attempts to translate cultural patterns into new designs. It begins with regeneration of style characteristics or cultural features. In this stage, designers should analyze the cultural features and proposed products to reach the second stage: transformation. In transformation, a new form of cultural feature is developed and in the same time it is related to the product. In the third stage, the interaction between the product and the user is investigated. Finally, designers try to think about the integration between the function and the form.

2.2 Emotional Design:

Emotional design can be considered as an approach to design with an emotional intent. This means the designer attempts to prevent unwanted user's emotional response or to stimulate specific emotions through design (Jacobs, 1999). Researchers developed many approaches to emotionalize products such as interaction-based approach, user-based approach, designer-based approach, and theory-based approach.

Interaction-based approach attempts to pay more attention to the context design to support a more involvement for the user during the interaction with the product in the usage phase (Hummels, 1999). Many studies analyzed the interaction between the user and the product such as Forlizzi and Batterbee (Forlizzi & Batterbee, 2004), Desmet and Hekkert (Desmet & Hekkert, 2007), and Lim et al. (Lim et al., 2008). These studies attempts to find out how interaction can help users to be satisfied.

User-based approach focuses on involving users in the design process by investigating their emotional needs in products (McDonagh et al., 2002; Brinkman & Fine, 2005; Khalid & Helander, 2006). Different tools are used to explore users' need such as cultural probing and generative techniques. Cultural probing is a set of different tools such as questionnaires and surveys that used by designers when designing for unknown group of users. It was firstly presented in 1999 by Gaver et al. (Gaver et al., 1999) to help in exploring the involvement of elder people within communities. Generative techniques are similar to cultural probing and work in the same context to help designers getting inspirations from users' answers (Stappers & Sanders, 2003).

Designer-based approach depends on designer's vision for the product and his innovation and talent play a key role in the design process (Dunne, 1999). Design in this approach aims to dazzle the user by the beauty, abilities, and novelty of a product.

Theory-based approach investigates the user emotional response with current products to improve it emotionally. This investigation is happened in three levels: aesthetics, cognition, and personal aspects (Cupchik, 1999).

Many methods and tools were developed to measure the emotional reaction of users towards products such as PrEmo (Desmet, 2003), and 2DES (). The aim of these methods is to help designers to understand the emotional reaction of users to make their designs more emotional. In this section, we concentrates on PrEmo and 2DES methods as they are the most used tools in emotional design domain. PrEmo is a non-verbal method that contains 12 pictures represent 12 different emotions, sex positive and sex negative. This variety of emotions' pictures enable the method to measure distinct emotions. It also can be used in different cultural context because of its non-verbal nature. Many studies used it in measuring the user emotional reaction such as Kjellerup et al. (Kjellerup et al., 2014), Smith (Smith, 2008), and Dalenberg (Dalenberg, 2014). Figure (1) shows the different emotions representations of PrEmo.

Two-dimensional emotion-space (2DES) is a self-report method that measure the emotional reaction. It firstly used with music, then it becomes popular in different domains such as design. 2DES was presented to overcome the limitations of other emotion measurement methods as emotional response can be affected by social and personal experiences or context (Schubert, 1999). This method was used to evaluate products emotionally in many studies such as Desmet (Desmet, 2003), and McDonagh et al. (McDonagh et al., 2002).
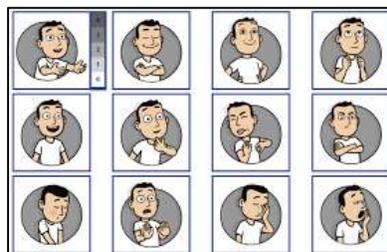
Figure (1) shows the different emotions representations of PrEmo.

To link emotional design and cultural design, Wang (Wang, 2016) presented a cultural design toolkit that depends on the measurement of the emotional response of Chinese cultural features. The toolkit is a set of cards that is used in the early design stage to inspire designers with cultural features and the proposed emotional response.

3 Emotional Framework for Cultural Product Design:
The proposed approach aims to employ the emotional design principles with cultural design process to create new emotional cultural product design. From previous models of cultural design, there is a focus on inspiration and context (Lin, 2007; Teng & Chuang, 2011; Nijkamp & Garde, 2010). It is also noticed

that there is two paths for the designer to take through design process. The first path is to apply visual features on the product surface to add an aesthetic appearance. The other one is to analyze the cultural features and find out how they were built visually and understand the context of them in society through the history. The second path is more difficult and take a longer time. After the analyze phase, a designer should create a new concept that has the soul of culture. This differs from a designer to another according to his talent and innovation.

To design emotional products, many approaches were developed as mentioned previously. Each approach concentrate on one factor of the design process such as the user, the designer, or the interaction and context. In addition to that, there is a bulk work focused on measuring the emotional response of the emotional products. Various tools were developed to help designers measure the user emotional response to products. We didn't surveyed these works in the related work as we focused on emotional design approach for more understanding of how emotional product are designed. The study of Wang (Wang, 2016) that present a toolkit for emotional culture design used some of these measuring tools to measure the emotional response of cultural feature. We argued that this toolkit is limit for Chinese cultural features and gives inspiration with a limited cultural features. We attempt through this approach to develop a more general approach for emotional cultural design that can be used with different cultures and in different contexts.

The proposed framework suggests 5 stages of an emotional-cultural design process: inspiration, analysis, redesign, measuring, and refinement. In the first stage, a designer get inspiration from different cultural sources which differ according to Wang's classification (Wang, 2016). These 7 categories, mentioned previously, are the main categories of cultural features in almost cultures around the globe. A designer chooses the cultural features that are suitable for his/her concept, user, and production process. He/she can get cultural features from books and other knowledge resources such as internet (Lin, 2007) or real life through looking for it in societies which may require travelling and taking photographs (Teng & Chuang, 2011).

The second stage is analysis where a designer analyzes the cultural features chosen in the inspiration stage. This analysis may be differ from a designer to another according to design situation. A cultural feature can be analyzed visually. This analysis is related to the form, shape, color, lines and curves, and spaces. It can be also related to the materials that are used in making it. Another point of view in analysis in to pay more attention for the context of the cultural features. Here a designer look for the historical view beyond the cultural feature.

In the redesign stage, a designer begins to redesign the cultural feature in a modern shape or build a new product concept from the previous analysis. This stage leads to a creation of a new thing. It may be in the shape of feature or in the form of the product itself. This depends on the imagination and innovation of the designer and also the design situation.

The measuring stage is related to emotional response measuring. The measuring tools of emotional response such as 2DES (Schubert, 1999; Grewe et al.; 2007) and PrEmo (Smith, 2008; Patermans, 2009; Dalenberg et al, 2014; Kjellerup et al, 2014) are used in this stage to get the emotional response to the product concept from proposed users. After that, more refinement to the concept can be added and other requirement of a product such as materials, details, and functions can be optimized to reach the ultimate goal. Figure (2) shows the framework stages.
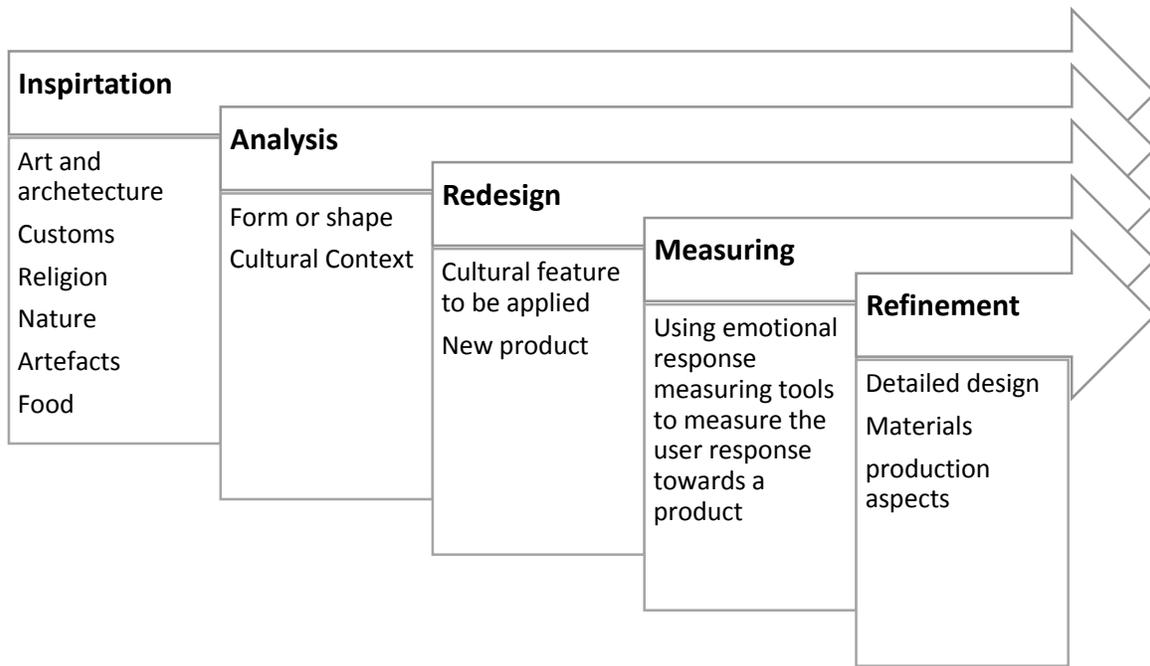
Figure (2) shows the framework stages

4 Case Studies:

Two case studies was conducted to examine the emotional framework for cultural product design. This help in putting the framework in practice for evaluation and refinement.

4.1 Case Study 1:

The dictionary of online Marriam-Webster defines Calligraphy as "The art of making beautiful handwriting" (Marriam-Webster, 2016). In Arabic calligraphy, letters has an aesthetic form and are used in different forms through writing according to its position in the word (Mohamed & Youssef, 2014). Through the Islamic civilization, Muslims used Arabic calligraphy to be applied on mosques' walls, furniture, and other products to add an aesthetic value. They used the traditional forms of Arabic calligraphy such as Naskh and Diwani. Arabic calligraphy represents an important culture feature in Arabic societies and still used in many products to add a cultural appearance.

Cutlery is one of products that all people use and buy it. There are several designs in the markets and according to globalization customers have a good chance to choose between different brands that were imported from other countries. This makes the competition harder. Cultural design can add a value for cutlery designs and that may support companies' position in markets. This is the reason beyond choosing cutlery for the first case study.

In the first stage of the framework, inspiration, many Arabic calligraphy books and Internet websites were used to get inspiration. In the second stage, analysis, chosen examples of calligraphy and Arabic letters were analyzed to investigate the technique of writing and the form of each letter. Books of Arabic calligraphy learning were used in this stage to improve analysis.

In the redesign stage, many conceptual designs were developed. It depends on using Arabic letters in an aesthetic form without thinking about the meaning. By the end of this stage, 6 sketches were selected to be measured emotionally. All of these sketches inspired an Arabic letter to be used in forming the cutlery handle. Figure (3) shows these sketches.
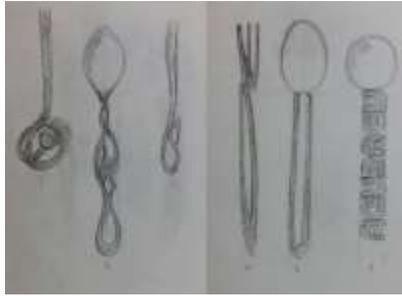
Figure (3) shows case study 1 sketches

In emotional response measuring, PrEmo method was used to measure the user's emotional response. Sketches were numbered and showed to 10 users. User's ages range between 25 to 60 years old. Users selected the emotional reaction that they felt when seeing each designs. Results shows that designs number 3, 4 and 6 generated positive emotions for users. 20% of participants showed their desire to buy these designs in case they are produced. Other positive emotions includes satisfaction, pride, hope, and joy. Design number 1 generated fear for 20% of participants. Another 20% of users were dissatisfied with it but 40% of participants said they have felt positive emotions. For designs number 2 and 5, results were similar as 80% of participants showed positive emotions towards them while the rest felt negative feelings.

The refinement phase was carried out for designs number 3, 4 and 6 while other designs were ignored. This included more work on proportions and appearance which is related to material selection and production. Other design details and documents were prepared also.

4.2 Case Study 2:

Ancient Egyptian art is rich of cultural features that were used in painting, sculpture, architecture, products, and jewelry. Ancient Egyptian people are famous by the big amount of jewelry pieces which were found in different places in Egypt. They used gold, silver, and copper to make unique jewelry pieces for different life situations. In this case study, 5 design students participated in a design session to design jewelry inspired from old Egyptian art. At the beginning, they attended a 20 minutes lecture that contained a brief definition of emotional design, cultural design and Egyptian cultural features. The emotional framework for cultural design was described and questions were answered to reveal any confliction.

The second phase was the design session which lasted 5 hours. Students firstly investigated different cultural resources such as internet websites and different books brought from the faculty library. Many sketches were produced but at the end of the session, 5 sketches were chosen to be emotional measured by using PrEmo method. Sketches were numbered and showed to 10 users. User's ages range between 25 to 60 years old. Users selected the emotional reaction that they felt when seeing each designs.

Results shows that designs number 3 and 4 caused positive emotions for all participants. 20% of them express their desire to buy design number 4 in case of production while 60% of them express their pride. Few users shows that they felt hopeful for the two designs. On the other hand, other designs generated negative emotions for 60% of participants such as fear, disgust, and dissatisfaction.

The refinement phase included more work for designs number 3 and 4 on proportions and appearance which is related to material selection and production. Students also continue to produce a 3D models using Rhino software. Figure (4) shows some sketches of case study 2.

Figure (4) shows some sketches of case study 2

5 Conclusion and Future Works:

Cultural design is one of the most growing product design trends in the world as it allows companies to present new shapes of product with a cultural taste. This enables designers to design products for specific groups of users or to globalize local cultural features in their designs. On the other hand, emotional design attempts to affect emotions through design. It aims to prevent negative or bad feelings and evoke or generate positive or good emotions.

In this paper, we presented a new framework to link between emotional design and cultural design in practice. It aimed to help designers to design emotional-cultural products with the availability of evaluating them emotionally. It includes 5 stage: inspiration, analysis, redesign, measuring, and refinement. The advantage of this framework is that it evaluate the final product emotionally by using different emotional response measuring tools according to the design situation. The future works will concentrate on how designers get inspiration from cultural resources and how they create their cultural designs. It will also investigate emotional response measuring tools and what is more suitable to be used with this framework.

6 References:

- Dalenberg, J. R., Gutjar, S., ter Horst, G. J., de Graaf, K., Renken, R. J., & Jager, G. (2014). Evoked emotions predict food choice. *PloS one*, *9*(12), e115388.
- Desmet, P., & Hekkert, P. (2007). Framework of product experience.*International journal of design*, *1*(1).
- Dunne, Anthony. "Hertzian Tales: Electronic Products." *Aesthetic Experience and Critical Design: RCA Computer Related Design Research* (1999).
- Grewe, O., Nagel, F., Kopiez, R., & Altenmüller, E. (2007). Emotions over time: synchronicity and development of subjective, physiological, and facial affective reactions to music. *Emotion*, *7*(4), 774.
- Hatch, M. J. (1991). *The Dynamics of Organizational Culture*. Copenhagen business school.
- Jacobs, J. J. (1999). How to teach, design, produce and sell product-related emotions. In *Proceedings of the 1st International Conference on Design and Emotion* (pp. 9-14).
- Khalid, H. M., & Helander, M. G. (2006). Customer emotional needs in product design. *Concurrent Engineering*, *14*(3), 197-206.
- Kjellerup, M. K., Larsen, A. C., & Maier, A. (2014). Communicating Emotion through Haptic Design: A Study Using Physical Keys. In Proceedings of the Kansei Engineering and Emotion Research International Conference (KEER 2014).
- Lim, Y. K., Donaldson, J., Jung, H., Kunz, B., Royer, D., Ramalingam, S., & Stolterman, E. (2008). Emotional experience and interaction design. In*Affect and Emotion in Human-Computer Interaction* (pp. 116-129). Springer Berlin Heidelberg.
- Lin, R. T. (2007). Transforming Taiwan aboriginal cultural features into modern product design: A case study of a cross-cultural product design model. *International Journal of Design*, *1*(2).
- McDonagh, D., Bruseberg, A., & Haslam, C. (2002). Visual product evaluation: exploring users' emotional relationships with products. *Applied Ergonomics*, *33*(3), 231-240.
- Moalosi, R. (2007). The impact of socio-cultural factors upon human-centred design in Botswana. Queensland University of Technology.
- Mohamed, N. A., & Youssef, K. T. (2014). *Utilization of Arabic Calligraphy to Promote the Arabic Identity in Packaging Designs*. Arts and Design Studies, 19, 35-49.
- Nijkamp, M., & Garde, J. (2010). A practical approach to translate social cultural patterns into new design. In *DS 62: Proceedings of E&PDE 2010, the 12th International Conference on Engineering and Product Design Education-When Design Education and Design Research meet..., Trondheim, Norway, 02.-03.09. 2010*.
- Petermans, A., Van Cleempoel, K., Nuyts, E., & Vanrie, J. (2009). Measuring emotions in customer experiences in retail store environments.*International Journal of Retail and Distribution Management*, *2009*, 2257-2265.

- Schubert, E. (1999). Measuring emotion continuously: Validity and reliability of the two-dimensional emotion-space. *Australian Journal of Psychology*, *51*(3), 154-165.
- Smith, H. S. (2008). *Emotional evaluation of a product/system* (Doctoral dissertation, University of Central Florida Orlando, Florida).
- Stappers, P. J., & Sanders, E. (2003). Generative tools for context mapping: tuning the tools. In *Design and Emotion*.
- Teng, C. and Chuang, M. (2011) 'Method for applying culture characteristics to emotional product design', IASDR (The International Association of Societies of Design Research), 4th World Conference on Design Research : diversity and unity. Delft.
- Throsby, D., & Throsby, C. D. (2001). *Economics and culture*. Cambridge university press.
- Voon, T. S. (2007). Cultural products and the world trade organization. Cambridge: Cambridge University Press.
- Wang, Y. H. (2016). *Chinese cultural features for new product design development* (Doctoral dissertation, Brunel University London).
- Wang, Y. H., Qin, S. & Harrison, D. (2013). *Culture-inspired design principles, methods and tools in current products.* International Conference: Consilience and Innovation in Design. Tokyo, Japan.
- Scott, A. J. (2004). Cultural-products industries and urban economic development prospects for growth and market contestation in global context. *Urban affairs review*, *39*(4), 461-490.
- Desmet, P. (2003). Measuring emotion: Development and application of an instrument to measure emotional responses to products. In *Funology* (pp. 111-123). Springer Netherlands.
- Kjellerup, M. K., Larsen, A. C., & Maier, A. (2014). Communicating Emotion through Haptic Design: A Study Using Physical Keys. In Proceedings of the Kansei Engineering and Emotion Research International Conference (KEER 2014).
- Smith, H. S. (2008). *Emotional evaluation of a product/system* (Doctoral dissertation, University of Central Florida Orlando, Florida).
- Dalenberg, J. R., Gutjar, S., ter Horst, G. J., de Graaf, K., Renken, R. J., & Jager, G. (2014). Evoked emotions predict food choice. *PloS one*, *9*(12), e115388.
- McDonagh, D., Bruseberg, A., & Haslam, C. (2002). Visual product evaluation: exploring users' emotional relationships with products. *Applied Ergonomics*, *33*(3), 231-240.
- Marriam-Webster, (2016), http://www.merriam-webster.com/
- Cupchik, G. C. (1999, November). Emotion and industrial design: Reconciling meanings and feelings. In *Proceedings of the 1st International Conference on Design and Emotion* (pp. 75-82).
- Gaver, W. W. (1999, November). Irrational aspects of technology: Anecdotal evidence. In *Proceedings of the 1st International Conference on Design and Emotion* (pp. 47-54).
- Hummels, C. (1999, November). Engaging contexts to evoke experiences. In*Proceedings of the 1st International Conference on Design and Emotion* (pp. 39-46).
- Forlizzi, J., & Battarbee, K. (2004, August). Understanding experience in interactive systems. In *Proceedings of the 5th conference on Designing interactive systems: processes, practices, methods, and techniques* (pp. 261-268). ACM.
- Brinkman, W. P., & Fine, N. (2005, September). Towards customized emotional design: an explorative study of user personality and user interface skin preferences. In *Proceedings of the 2005 annual conference on European association of cognitive ergonomics* (pp. 107-114). University of Athens.