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USER-DESIGNER INTERACTION IN CULTURE-BASED PRODUCTS: A REVIEW LITERATURE

Ratih Setyaningrum, Andi Rahadiyan Wijaya, Subagyo

Mechanical and Industrial Engineering Department
Gadjah Mada University, Yogyakarta, Indonesia
ratihha@gmail.com or ratih.setyaningrum@mail.ugm.ac.id

ABSTRACT

Culture-based, easy-to-use, and high-tech products are in great demand. Producers compete on attracting consumers by offering all kinds of products that suit almost all levels of the Maslow hierarchy. Nonetheless, only a few products are able to optimize user-designer interaction, despite the fact that if designers can create products suitable for users of different cultures, then those products will be a huge success. Therefore, this research is aimed at identifying articles that yield culture-based and user-designer interaction based products, understanding the methods applied to those products, and formulating the proper methodologies to create cultural products that optimize user-designer interaction.

This research starts with classifying review articles into two major categories; the development of culture-based products and the development of user-designer interaction based products. The next stage is examining the methods used and then defining those methods into three analyses; quantitative, qualitative, and a combination of those two. Evaluations of those methods are conducted by examining inputs, processes, and outputs yielded in each article. The subsequent evaluation process is valuing the articles' quality by referring to their applications and citations.

Results indicate that research on culture-based and user-designer interaction based products is already conducted, but there has not been a proper methodology to precisely design cultural products that optimize user-designer interaction. The Kansei Engineering method dominated quantitative data analysis, whereas qualitative data analysis was conducted by formulating product design concepts and executing statistical analyses. Research model was formulated with the PD-DSS design. This design is recommended for culture-based products that optimize user-designer interaction. The PD-DSS concept applies Hofstede dimension, a formulation model that takes aesthetics and usability aspects into account, and results in a decision support system that generates the concept of product design.

Keywords: *product, culture, user-designer interaction*

1. INTRODUCTION

Humans are creatures with needs to be fulfilled, as described in the theory of needs by Maslow (1970). This statement is in line with that of Jordan (1999) who formulates that hierarchy of needs of product users into levels of functionality, usability, and pleasure. All kinds of products seeking to meet human needs have evolved, thanks to that hierarchy. Culture-based, easy-to-use, and high-tech products are in great demand. Producers compete on attracting consumers by offering all kinds of products that suit almost all levels of the Maslow hierarchy. Nonetheless, only a few products are able to optimize user-designer interaction, despite the fact that if designers can create products suitable for users of different cultures, then those products will be a huge success.

Based on that, problems in this research are outlined as:

1. How does research on culture-based and user-designer interaction based products?
2. What appropriate methods should beapplied in designing culture-based and user-designer interaction based products
3. What research model is recommended to yield cultural products that optimize user-designer interaction?

2. THEORITICAL BACKGROUND

2.1. Culture-Based Products

The word culture (budaya) stems from 'buddhayah', which is the plural form of buddhi (Sanskrit) that means 'rationale' (Koentjaraningrat, 1974). According to Taylor, the oldest definition of culture states that culture included all human activities, such as science, belief, art, moral values, laws, customs, and other kinds of routines (Ratna, 2005). While Marvin Harris (1999) mentions that culture covers all aspects of human life in their community, gained through learning, including thoughts and behaviors. Culture has four aspects; (a) physical or material, (b) behavior, (c) language, and (d) idea or knowledge (Ahimsa-Putra, 2013). Setyaningrum (2013) has identified cultural products flourishing in Indonesia.

Culture-based products are developed using many approaches, such as socio-cultural (Yang Y, 2000; Moalosi, 2005 and Lin R, 2006), Hofstede's national culture (Markus, 2001; Jiang, 2010; Razzaqi, 2004; Coelho, 2011 and Peranginangin, 2011), and a combination of Hofstede and perceived aesthetics (Reincke, 2011; Cyr D, 2006; Cawton, 2007; Moshagen, 2010 and Parizotto, 2005).

2.1.1. Socio-Cultural Approach

The development of culture-oriented product design results in products that follow the 21st century trend (Yang Y, 2000) and harness the potential of modern products (Maolosi, 2005, and Lin R, 2007). Rodger (2003) discovers that the cultural background of a designer affects the product he/she creates, as happens in Japan and China (Beuthel, 2006).

2.1.2. Hofstede's National Culture Approach

The global web design that utilizes the Hofstede approach (Markus, 2011) and online web service enables the prediction of potential design trend (Segelstron, 2010). The native culture, emotion, and aesthetics of a designer influence the products he/she creates (Jiang, 2010). Coelho, (2011) views it as product personality that is affected by culture. On the other hand, Peranginangin (2011) uses the Kansei method to design open spaces, and discovers that male and female have different needs.

Product design is also developed based on Asian culture (Ching Ho, 2000) and the United States culture (May & Anderson, 2006). Fisher & Fauchet (2013) examine the correlation of technology, information, design, and power on minorities or immigrants. Feredouni (2008) analyzes the effect of Hofstede dimension on advertisement intended for Malayan women (Malaysia, China, and India). Astuti & Satriani (2012) analyze the color composition of Dayak tribe that forms the image of their interior design. O'Brien (2012) states that visual aesthetic is one of the factors affecting the process of decision making in India.

2.2. User-Designer Interaction Based Products

Products that integrate the wishes of both consumers and designers will gain great market success. Attempts to achieve that include:using semiotic approach, utilizing aesthetics and usability approach, catering for consumer's emotional response, and combining those three approaches or using the multi-objective method.

2.2.1. Product Design Based on Semiotics

Semiotic-based product design has been developed widely, including the one by Mandragon et al. (2005) that applies differential semantic to design machines, and that of Alcantara et al. (2005) who designs footwear products. Development of design interaction was also conducted by Sauza (1993) and it was also perfected by him by making the response time more efficient.

Kansei engineering is a method to interpret the image or feeling from consumers into real design components, as noted by Nagamachi and Mitsuo in Gunady (2011). This method applies semiotic approach in the form of Kansei words. Kansei engineering has been utilized in a lot of research; Jiao (2006) applied Kansei mining, Hasio and Wang (1998) combined Kansei and artificial intelligence in designing their products. Schuttle (2005) applied Kansei engineering system and Hsu et al. (2000) combined Kansei with semantic differential to capture perceptions from both users and designers. Other than those, Fukusima et al. (1995) used fuzzy approach to formulate images in video printers in Japan.

The application of Kansei in food products resulted in the Seven Axes Chart Diagram (Ueda et al., 2008). Namagachi and Noor (2008) used semantic differential to design a clothing website and yielded 40 Kansei words that describe the feelings of his consumers. Hasio and Chen (1997) managed to design a chair using 27 Kansei words and Gunady (2011) employed 14 Kansei words to design a special wheelchair for the elderly. Hasio and Wang (1998) designed a car using 15 Kansei words. And cell phones are the products most often researched using Kansei words. Some of those researches are the ones by Jiao (2006), and Chen & Hiu (2007) that figured 27 Kansei words.

2.2.2. Product Design based on Aesthetics and Usability

Factors of aesthetics and usability greatly influence consumers' decision to purchase and be loyal to certain products (Cyr D, 2006, and Cawton, 2007). Cyr D (2006) examined M-Loyalty Mobile consumers and concluded that visual designs with aesthetics, usability, and enjoyment values affect the loyalty of customers. Cawton (2007) analyzed the effect of aesthetics on data visualization, and concluded that aesthetics visualization actually measures data usability. Moshagen (2010) gauged visual aesthetics that affects the performance of an inventory website. Parizatto (2005) measured aesthetics and usability on the layout design of Virtual Learning Environment (VLE).

Development of product design based on human intelligence and aesthetics has been conducted by Ulrich (2006). Liu (2000) developed the ergo-aesthetics method and implemented it on her subsequent research (Liu, 2001). Sondereger (2009) used usability test to measure performance and then developed it further by combining it with aesthetics (Sondebeger, 2011).

2.2.3. Product Design Based on Emotional Response

Humans are both emotional and rational. Those two aspects might sometime be in conflict, but most of the time, emotion is dominant. Jordan (1999) formulated the hierarchy of needs into three linear levels of functionality, usability, and pleasure. Two psychological research conducted by Dion (1972) and Eagly (1991) revealed that perception against someone is influenced by his/her appearance. Norman (2002) concurs that humans are users who determines the quality of products based on their first impression. Rafaeli (2004) outlined three items that triggers emotional response; instrument, aesthetics, and symbol. Some other research that are developed by taking emotion into account includes; Jiao (2006) who designed a cell phone, Khalid and Helander (2004) who applied semantic differential based on consumers' affection for electronic device in automobiles, Schuttle (2005) who used Kansei words to design rocket switches, and McDonagh (2009) who evaluated visual designs that involves emotion.

3. METHODOLOGY

This paper classifies articles into two major categories; development of culture-based products and development of user-designer interaction based products. The next stage is examining the methods used and then defining those methods into three analyses;

a. Quantitative
b. Qualitative
c. Combined Quantitative and qualitative

Evaluations of those methods are conducted by examining inputs, processes, and outputs

gained in each article. The subsequent evaluation process is valuing the articles' quality by referring to their applications and citations.

3. RESULT AND DISCUSSION

A method that accommodates development of culture-based product which optimizes user-designer interaction is highly recommended. Classification of articles based on quantitative, qualitative, and combined data analyses is depicted in Figure 1.

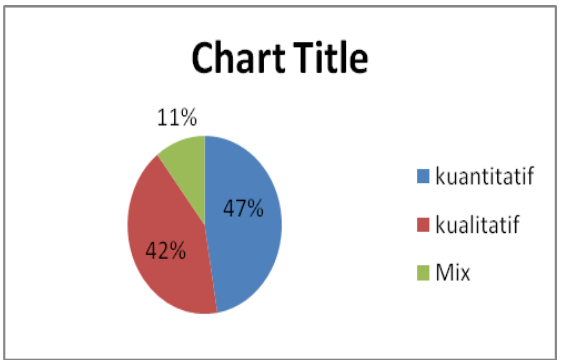

Figure 1. Article classification based on the method of data analysis.

Product development based on user-designer interaction that utilizes quantitative method includes the ones by Jiao (2006) who applied Kansei mining, Shuttle (2005) that implemented Kansei engineering system, Khalid and Helander (2004) who used semantic method, Hasio & Wang (1998) that combined artificial intelligence and semantic, and also that of Genno (1995) who applied image processing and fuzzy logic to optimize user-designer interaction.
Qualitative method was developed in the research by Rafaeli (2003) who developed a model in transportation, Lenau (2003) that classified product attributes using semantic, and McDonagh (2000) who evaluated the concept of visuals on home appliance, and also the one by Sauza (1993 & 2005) that developed conceptual design on human-computer interaction.

Meanwhile, a combination of both quantitative and qualitative method was developed by Spiller (2006) by combining Kansei and affective response. Hsu et al., (2000) applied semantic differential and Kansei to design telephone sets.

Therefore, culture-based product development has been researched widely using quantitative, qualitative, and a combination of them. Nonetheless their number is way behind research on user-designer interaction based products. In this product category, qualitative research was developed by Vatrapu (2004) who implemented Hofstede dimension in many countries and then analyzed the resulting data statistically. A similar research was also carried out by Karlsson et al., (2003) that evaluated vehicle interior using Semantic Environmental Description (SED).

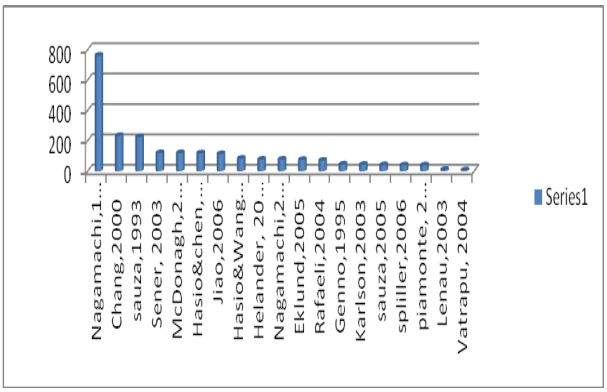

Figure 2. Frequency of article citation.

Figure 2 indicates that some articles are referred to in research. The following is a list of cited articles from the most to the least quoted; Nagamachi (1995), Hsu, et al (2003), Sauza (1993), Demirbilek and Sener (2003), McDonagh (2002) and Hasio & Chen (1997). This is further explained in Figure 3 that depicts the relation of citation frequency to the type of articles, which are categorized into three types: A, B, and C. Type A articles are the ones discussion the development of generalizing ideas and models to solve wide-ranging issues. Whereas type B contain information, and type C are hypotheses. Hence, it can be inferred that most quoted articles are from category A that discusses the generalization of ideas and models. And the second most quoted are the ones that formulate models and implement them in product design.

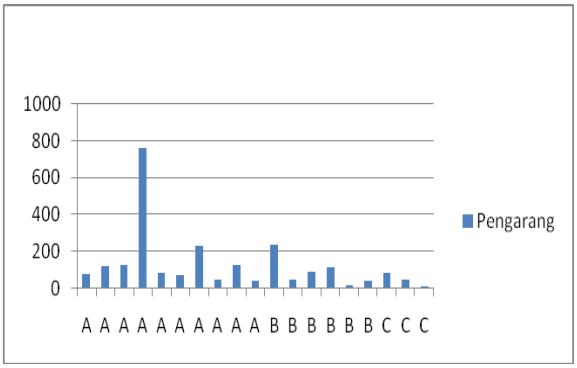

Figure 3. Types of articles and citation frequency.

The above discussion reveals that development of culture-based products using Hofstede approach that optimizes user-designer interaction, aesthetics, and usability is not researched yet. This kind of development is especially urgent in Indonesia as it is very diverse in terms of culture and ethnicity. It should be very interesting to see a product development guideline that caters the aspects of Hofstede, usability, and aesthetics applied in Indonesia. Therefore, a method to meet that need is suggested.

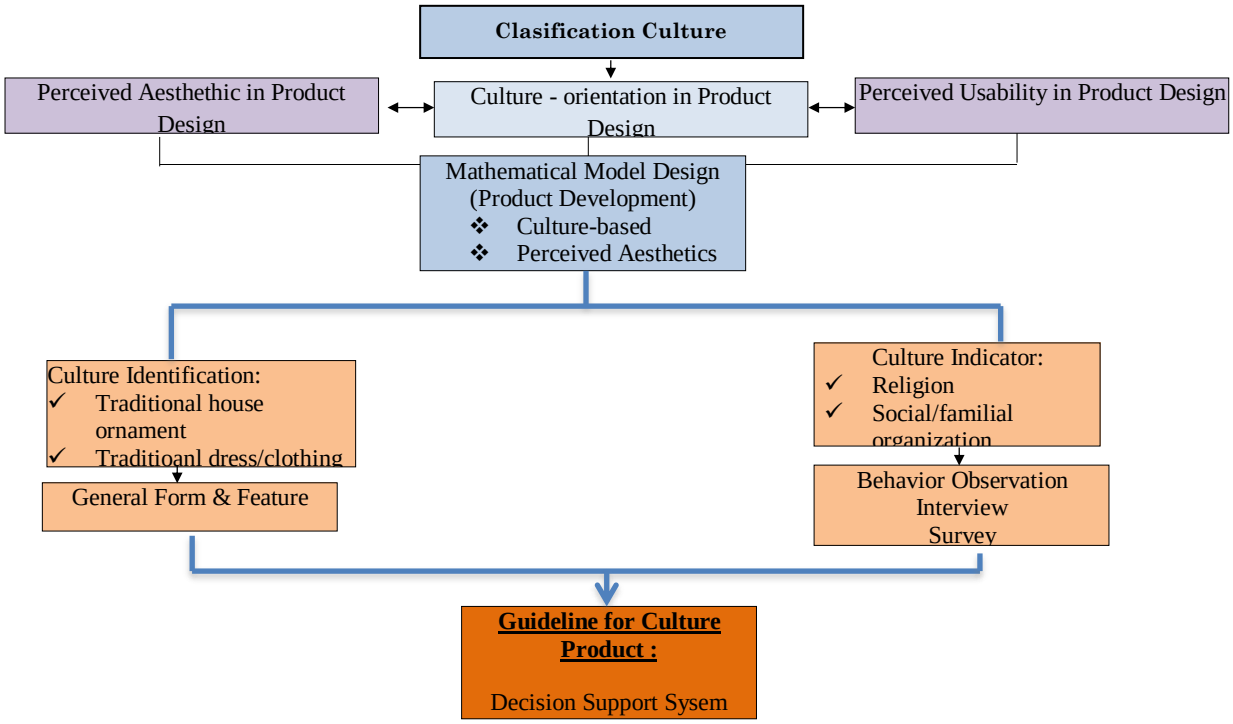

Figure 4. PD-DSS design to optimize user-designer interaction in cultural products.

In general, Product Development for Decision Support System (PD-DSS) is an integration of three main processes (Figure 4). They are: classification of Indonesian culture dimensions, formulation of product development model based on CAU (Culture, Aesthetics, and Usability), and construction of PD-DSS prototype. Hence, the critical and conceptual approaches to be used in this research cover the followings:

1. The process of culture classification is formulated using the Hofstede approach. The result will then be compared with that published by Hofstede, which hypothetically does not represent cultural conditions.
2. The formulation process of CAU-based product development model involves CAU variables. This formulation starts with correlating the three aspects using statistical method, and then designing product development model based on the three aspects of culture, aesthetics, and usability.

4. CONCLUSION

Discussions above lead to the following conclusion:

1. Research that results in culture-based and user-designer interaction products is already done, but no single method suitable to design cultural products that optimize user-designer interaction is available yet.
2. The data in this research are analyzed either quantitative, qualitative, or a combination of both. Kansei engineering method dominates quantitative data analysis, while qualitative data analyses are done by formulating models/concepts of product design and by using statistical method.
3. PD-DSS design is recommended to create culture-based product that optimize user-designer interaction. The PD-DSS concept involves application of Hofstede dimension, formulation of models that incorporate aesthetics and usability, and results in a decision support system that generates suitable product design concepts.

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