Suggestion of a classification table of design modeling elements in cultural dimensions

- Focused on Geert Hofstede's cultural dimensions -

주저자 : 백혜주

홍익대학교 일반대학원 메타디자인학부 제품디자인과

Hye-Joo Back

Hong-ik University

교신저자 : 정주현

홍익대학교 일반대학원 메타디자인학부 교수

Joohyun Chung

Hong-ik University

Abstract

Designers consider cultures in design process, because customer's design taste is influenced by local cultures. Moreover, an expanding internalization can enhance the value of local culture as it reduces the fear of vanishing local identity.

The goal of this study is to suggest a classification table of design modeling elements in cultural types. In the literature research, I studied cultural dimensions and modeling elements. Cultural dimensions are organized by five dimensions through each culture theory from Geerf Hofstede which includes PDI, IDV, MAS, UAI, LTO dimensions. Through each modeling theory from five experts, modeling elements are organized by three elements including material, color and form. Each element has opposite sides.

With two fixed models I designed an experimental module. As a result, a classification table was produced from the compiled statistics, and 'Culture dimensions - Modeling elements' table was completed.

Main purpose of this study is to suggest a classification table of modeling elements in cultural types by integrating experts' opinions. This table presents a design methodology for designers.

Keyword
Cultural design, Modeling elements, Cultural dimensions

1. Introduction

1.1. Background

In today's globalized world, cultural differences and awareness should be considered in most places and processes (Bourges Waldegg & Scrivener, 1998). The influence of local identity on marketing is increasing in order to survive in this global world.

The circuit of culture is an essential component in design. That is because design usually considers sociality and trend in a same period. Van Raij(2005) said, "Cultural differences are here to stay and they will force designers to adapt and to differentiate their products for different cultures" (Van Raaij 2005, p.269). In reality, however, industry design processes are hard to cover cultural differences. Whitney and Van Patter (2004) report that because companies aim to reduce product development time, there is little time left for designers to put cultural characteristics into their designs (Mohammad Razzaghi, 2009). Several conventional research tried blending cultural differences and industry design.

Almost every study concerned is focused on how the existing design items reflect on cultural differences. S. Duygu Dedir Eristi (2009), Cyr, Head Larios (2010) and Kim Jung-ha (2002) did comparison analysis of web site design elements and cultural types. Park Sun-young (2007) analyzed cultural differences through preference of mobile phones. Mohammad Rassaghi, Rmirez Jr, Zehner (2009) performed an experiment targeting two different groups of design students who belong to different cultural areas. Lim Kung-hwa (2010) studied differences of air-tight container designs between China and Korea. Chebat, Morrin (2007) compared two cultural areas for interior colors of department store. Fang Liu (2007) and Mario Galiardi conducted research on how brand sign designs are different in various cultural areas. Despite all those research works, there is a lack of in-depth research and appropriate methods to assist designers on how culture can be consciously integrated into product design (Onibere, Hugo, 2002)

1.2. Object

The study intends to suggest a classification table of design modeling elements in cultural types. There are two detailed objects in this research. The first is to standardize culture types and modeling elements through literature research. The second purpose is to suggest a classification table of modeling elements in cultural types by integrating experts' opinions.

There are such a big rang of target to use the table in design process, so the target must be limited to use it effectively. Limited target is product design department designers in general product company. To be specific, the designers must follow normal design process in company, not beyond designer's personal decision. If a design influence on designer's personal taste too much, the classification table is no need.

The classification table will have three improvement points different from other existing research works. The points constitute 'simple processes, 'apply specific elements', and 'use methodology in two ways.' At the end of this study, I will accomplish two detailed objects and reflect three points.

2 Theoretical study and research model

2.1. Culture dimensions

Culture contains various meanings. Some people define the meaning of culture as a 'civilized' or 'sophisticated mind.' In this research, however, culture means a set of characteristics, such as thoughts, values and behaviors of a certain group (Choi, Lee, Kim, & Jeon, 2005). Hofstede (1991) also defines culture as common thoughts that discriminate an individual who belongs to a certain group or class (S. Duygu Bedir Eristi, 2009).

Through those meanings we can realize that it is very difficult to define certain group's cultural type. To solve this difficulty, listing expert's opinions that can standardized cultural types is important. It is Geert Hofstede who standardized culture in five types. Although there exist some

arguments about Hofstede's cultural dimensions, still he is a well-known pioneer in his research of cross-cultural groups and organizations ('Geert Hofstede', Wikipedia).

Geert Hofstede advanced the model of cultural differences most widely used, in the organizations literature (Luciara Nardon and Richard M. Steers) by surveying employees from various communities. He conducted a survey targeting 1,117,000 employees from 50 countries and carried out a factor analysis[1] with the outcomes to find some common dimensions. He established four dimensions based upon the survey, which he added the fifth dimension later. Five main cultural dimensions that show culturally sharp distinctions are listed as follow: Power distance (PD), Collectivism vs. Individualism (IDV), Femininity vs. Masculinity (MAS), Uncertainty Avoidance (UAI), and Long and Short Term Orientation (LTO) (S. Duygu Bedir Eristi, 2009).

The first dimension is power distance (PDI), which is about knowing hierarchical levels or inequality degrees in society. Low power distance means that the leader does not need certain power compared to their subordinate, while high power means the people in positions have power. Austria and Israel are low power distance countries, while Malaysia and Mexico are countries with high power distance.

The second dimension is collectivism vs. individualism (IDV). That shows relative importance of individual and group interests. Group interests generally take precedence in collectivism, and individual interests generally take precedence in individualism. Japan and Korea are typical countries of collectivism, while US and Australia are individualistic countries.

The third dimension, Femininity vs. Masculinity (MAS) is related with assertiveness and passivity, or it can relate in material possessions and quality of life. Masculinity group will focus on material possessions and achieving personal goals. Japan and Austria are masculine countries. A feminine

country that has a strong value in social relevance and quality of life is Sweden.

The fourth dimension is Uncertainty Avoidance (UAI). It shows the degree of uncertainty that can be tolerated in society. Countries with low uncertainty avoidance include Singapore and Jamaica. Those countries do not need many rules. High uncertainty avoidance requires many rules in order to constrain uncertainty.

The fifth dimension, Long and Short Term Orientation (LTO), is about a long or short range of outlook. Countries with short term orientation countries are Pakistan and Nigeria, and those with long term orientation are China and Korea.

Based on Hofstede's cultural theory, I fixed cultural dimension model at [Figure 1]. This cultural dimension model helps to get standardized elements to produce a classification table.

[Figure 1] Culture dimensions

2.2. Design modeling elements

Industrial design is a process of finding the right fit for consumer's physical and mental desires (Bernd Lobach, 2000). That makes designers to focus on establishing figurative elements from the design process. Many experts in design theories studied how to divide figurative elements. I analyzed 5 experts' design element theories.

Five experts were selected by certain standards. Only design department professors who publish a design theory book, were selected as design theory expert. Through the standard, I chose five experts and their books- Bernd Lobuch(Industrial design,
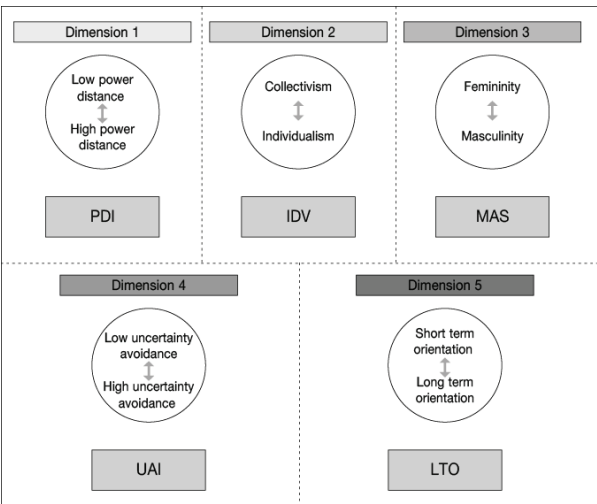
---

1)Factor analysis is a method used to describe among observed, correlated in terms of a potentially lower number of unobserved variables called factors, Wikipedia

2000), Eskild Tjalve(Product design, 1989), Wucius Wong (Principles of form and design, 1993), Heung- ryong Woo(Design thinking and method, 1996) and Yoeun-woong Lim(The study of design methodology, 1992).

Five experts could group into three design elements. The first element contains finishing part including material, surface and texture. The second element is about color in product design. The last element expresses silhouette, such as shape, size, function, form and structure.

	1 element	2 element	3 element		
Heung-ryong Woo	material	color	form		
Yoeun-woong Lim	material	-	function	structure	
Bernd Lobach	material	surface	color	form	
Wuicius Wong	texture	color	shape	size	
Eskild Tjalve	material	surface	color	shape	structure	size

[Table 1] Design modeling elements

Based on the five experts' figurative element theories, I abstracted three design modeling elements. Each element has two adjectives that can explain both ends of element. To fix two adjectives words, I collected four adjective expressions that show emotional characters from preceding research. With collected words I determined similarity and decide two adjectives words for each elements.

	Various adjectives	Selected adjectives
Material	Metallic/Nonmetallic	Warm/Cold
	Smooth/Rough	
	Fine/Coarse	
	Transparent/Opaque	
Color	Light/Dark	Advancing/Receding
	Similarity/Contrast	
	Greyscale/Color	
	Warm/Cold	
Form	Organized/Chaotic	Simple/Complex
	Light/Heavy	

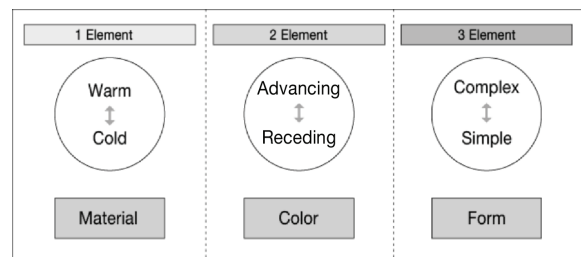|	Mechanical/Hand-drawn	
	Symmetrical/Asymmetrical	

[Table 2] Design modeling elements adjectives

The first element is material. Material includes surface and texture. This element has 'warm' and 'cold' expressions at both ends. Warm material gives stability and comfort feelings to the product. On the other hand, cold material gives clean and fresh feelings.

The second element is color. Color consists of hue, lightness, and saturation. It sticks to consumer's sensibility and mental state more than any other elements (Heung- ryong Woo, 1996)

The third element is form. Form includes silhouette and structure. To be specific, shape, function, structure, and size are all part of it. This element has 'complex' and 'simple' expressions at both ends. Design, emphasizing rhythm or accent at silhouette, shows a complex form. The simple form emphasizes harmonic balance in shape or structure.

Based on 5 expert's design elements I fixed the design modeling element model at [Figure 2]. This design modeling elements model helps to get detailed contents to develop a classification table.

[Figure 2] Design modeling elements

3. Experimental design

3.1. Standard setting of experiment

The cultural dimension model and design modeling elements model are all fixed. Two standardized models will be made in the classification table of design modeling elements in cultural dimensions through experiment. The goal of this experiment is to discovering interconnection between 5 cultural dimensions and 3 design elements through survey.

There are four processes for experiment. First, it needs some standard settings for the survey. Elements for standardization include a country for survey, industrial product, and survey target. Second, survey needs a questionnaire scale for objective analysis. For the scale, SD (Semantic Differential) evaluation scale will be used. Third, statistical analyses will be done with the questionnaire result. Finally, the interconnection between culture and design will be found, with suggestions to be made on the classification table.

As is discussed above, I need to standardize the setting of country, product and target.

① Standard setting of country

Standard	Contents
Standard 1	Countries that belong in extreme end in each culture dimension.
Standard 2	Country that has famous internet shopping site- includes 'best seller' part.
Standard 3	Select two countries at both ends in each 5 dimensions- total 10 countries select.

[Table 3] Standard setting of country

Hofstede made a ranking of 53 countries about 5 cultural dimensions - only LTO dimension ranked 20 countries. With those rankings, I selected two countries at both ends in cultural dimension.

Another standard for choosing a country is to have famous internet shopping sites. It is in general 'E-bay' and 'Amazon'. Based on three standards, ten countries were selected.

	Dimension	grade / score	Selected nation
PDI	A-1 (High power distance)	4 / 94	Philippines
	A-2 (Low power distance)	53 / 11	Austria
IDV	B-1 (Individualism)	1 / 91	USA
	B-2 (Collectivism)	47,48 / 14	Indonesia
MAS	C-1 (Masculinity)	1 / 95	Japan
	C-2 (Femininity)	51 / 14	Holland
UAI	D-1 (High uncertainty avoidance)	1 / 112	Greece
	D-2 (Low uncertainty avoidance)	53 / 8	Singapore
LTO	E-1 (Long term orientation)	1 / 118	China
	E-2 (Short term orientation)	20 / 23	Canada

[Table 4] Selection of 10 countries

In PDI, Philippines and Austria were placed in both ends. In IDV, USA and Indonesia were selected. Japan and Holland were chosen in MAS. Greece and Singapore were placed in both ends of UAI. In LTO, China and Canada were selected.

② Standard setting of design product

Standard	Contents
Standard 1	Appearance is important than function and continuous approach is possible.
Standard 2	Product made in normal design process.
Standard 3	Chose product in www.ebay, www.amazon.
Standard 4	Chose product in best seller, best review.
Standard 5	Product near November 2013.

[Table 5] Standard setting of design product

Since design product needs to well express modeling elements, appearance needs to be considered more importantly than its function. As the study mentioned in '1.2 Object', target is product designers who are using general design process. Design product should not influence by typical designer's taste, or unique marketing strategy. I chose mobile phone cases for design

product through standard 1 and 2. Through standard 3, 4 and 5, best selling 'iphone' cases were selected from 10 countries.

③ Standard setting of survey target

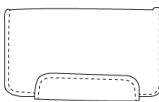| Standard	Contents
Standard 1	Graduate with a bachelor's degree in industrial design.
Standard 2	More than 1 year job experience in design.
Standard 3	Select 30 people who major in design.

[Table 6] Standard setting of survey target

Purposive sampling method[2] is used to standardize a survey target. To answer the survey, appropriate targets are experts in design. Through standard 1 and 2, I selected random targets for the mobile phone case's design elements.
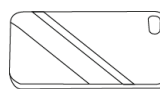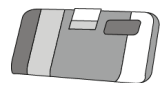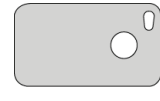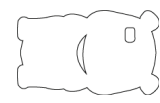
3.2. Experimental stage

Ten countries were decided based upon three standards. Also, iphone case is chosen as a design product based on five standards.

To make three design elements as a questionnaire, I used SD (Semantic Differential) evaluation scale. The SD evaluation scale that was developed by Osgood (1957) is one of vocabulary evaluation tools. It is a rating scale to measure a connotative meaning for particular case or target(Jong, 2008). Each iphone case will have 5-point SD scale from three design modeling elements. For example, if the material of the iphone cases is 'very warm' I can score material as 1.

Elements	Design product	Adjectives	Evaluation scale
Material		Warm	Very - 1
			Little - 2

		Middle - 3
	Cold	Little - 4
		Very - 5
Color		Advancing	Very - 1
		Little - 2
		Receding	Middle - 3
		Little - 4
		Very - 5
Form		Complex	Very - 1
		Little - 2
		Simple	Middle - 3
		Little - 4
		Very - 5

[Table 7] 5-point SD scale from design elements

Questionnaire arranges iphone cases from 10 countries. The design elements of iphone cases divided into 5-point scales. Thirty experts will mark at 5-point scale by estimating the phone cases design.

(Example of design item)	Material Worm ↔ Cold					Color Strong ↔ Relax					Form Complex ↔ Simple				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

[Table 8] Example of questionnaire

4. Results of experiment

4.1. Statistical analysis

During the period between November 1 and 23, the survey was carried out targeting 30 experts. The result of the survey targets was analysed in percentage.
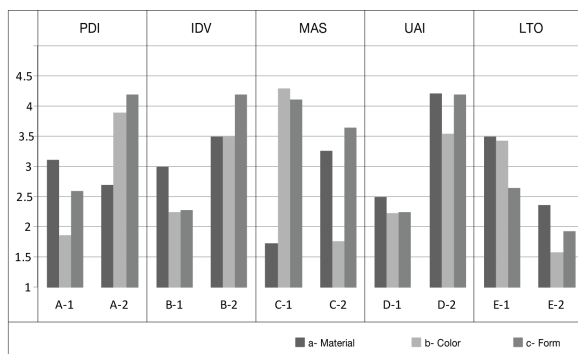
Category	Contents	Frequency	Percentage
Gender	Male	12	40%
	Female	18	60%
Age	20s	20	67%
	30s	9	30%
	40s	1	3%
	50s	0	0%
Education	BA	25	83%
	MA	5	17%
Work experience	1~3 years	22	73.3%
	3~5 years	7	23.3%
	Over 5 years	1	3.3%

[Table 9] Survey target distribution

[Table10] shows the percentage of the survey. The score of the evaluation scale is written by second digit numbers. For convenience, I indicate material as "a", color as "b" and form as "c". Both extremes of the cultural dimensions were also marked as A-1 and E-2 each.
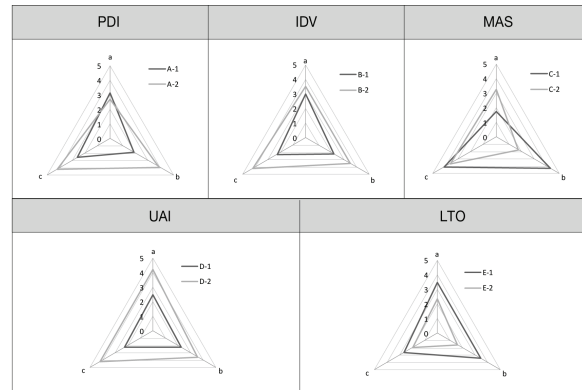
	PDI		IDV		MAS		UAI		LTO	
	A-1	A-2	B-1	B-2	C-1	C-2	D-1	D-2	E-1	E-2
a-Material	3.12	2.70	3.00	3.50	1.73	3.27	2.50	4.22	3.49	2.36
b-Color	1.86	3.89	2.24	3.50	4.29	1.76	2.23	3.55	3.43	1.58
c-Form	2.59	4.20	2.28	4.20	4.12	3.64	2.24	4.19	2.64	1.93

[Table 10] Statistics of evaluation scale

[Figure 3] Pictograph of modeling elements by culture dimensions

[Figure 3] and [Figure 4] are graphs of the survey result. They show statistics to help understand relations between two elements. The pictograph shows that each cultural dimension has different numbers of design modeling elements. MAS, in particular, shows an extreme gap between three modeling elements.

[Figure 4] Radial graph of culture dimensions

4.2. Suggestion of a classification table

Finally, I suggest a classification table about relationship between three design modeling elements and five culture dimensions.

With the percentage of survey I decide adjective words for 'Culture dimensions-Modeling elements' table, to measure level of design elements. Material has 'Extremely warm – Warm – Middle of warm and cold – Cold – Extremely cold' adjective words steps. Color has 'Extremely advancing – Advancing – Middle of advancing and receding – Receding – Extremely Receding' adjective words stages. Finally, Form has 'Extremely complex- Complex – Middle of complex and simple – Simple – Extremely simple' adjective words steps. Though these steps, [Table 11] is tabulated.

The classification table [Table11] shows how design elements have an influence on cultural dimensions. With this table, designers can apply 'culture' simply in the process. They can make approach in the classification table in two ways.

		Material	Color	Form
PDI	High power distance	Middle of warm and cold	Advancing	Middle of complex and simple
	Low power distance	Warm	Receding	Extremely simple
IDV	Individualism	Middle of warm and cold	Advancing	Complex
	Collectivism	Cold	Receding	Extremely simple
MAS	Masculinity	Warm	Extremely receding	Extremely simple
	Femininity	Cold	Advancing	Simple
UAI	High uncertainty avoidance	Middle of warm and cold	Advancing	Complex
	Low uncertainty avoidance	Extremely cold	Receding	Extremely simple
LTO	Long term avoidance	Cold	Receding	Middle of complex and simple
	Short term avoidance	Warm	Extremely advancing	Extremely complex

[Table 11] 'Culture dimensions -Modeling elements' table

The first is to find right design modeling elements. From a questionnaire survey, you can get consumer's cultural dimensions and choose one of the cultural dimensions. When a specific cultural dimension is selected, you can use the classification table to select a right design element.

The other way of using the classification table is to analyze a product design element. With the element, you can find out some correct cultural areas that can influence the most. First, you should analyze the design product to select a modeling element. And then, use the classification table to find the right cultural dimension.

5. Conclusion

If design has no concept or contents, it's nothing but a sculpture. Design needs to focus on human, which is one of the unchangeable purposes in design (Lee,1992). Furthermore, design and culture always influence each other. To reflect design on the culture we need to have a specific methodology. Therefore, this research suggests 'cultural dimensions - Modeling elements tables.' The table has 30 types combining 5 cultural dimensions and 3 design modeling elements.

The research fulfills two main objects. The first object is to standardize culture types and design modeling elements. After studying literature research about Hofstede's theory and design experts' theories, a standardized model was completed in [figure1] and [figure2].

The second goal is to suggest a classification table using the standardized models. To make the table, I made an experiment. Experiment requires a standard setting for country to survey, design product and survey target. A questionnaire was made in a 5-point SD evaluation scale and 30 experts were checked by the scale. With the questionnaire result, I carried out statistical analyses and found out an interconnection between culture and design.

The study reflects three improvement points different from other existing studies. Points include 'simple processes', 'apply specific elements' and 'use methodology in two ways. 'Cultural dimensions - Modeling elements table' is a result of this research, composed of specific elements. In the design process, designers will use the classification table to find a cultural relationship with their designs. While doing the process, they may find the table very simple to apply. Also,

using methodology in two ways is possible. One way is to find out consumer's cultural dimension and catch the right design modeling element. The other way is to understand the design element and use the classification table to find right cultural dimensions. As a result, all three points that show improvement from other studies were fulfilled.

This study did experiment about blending standardized cultural dimensions and design elements. The direction of next research may be to eliminate sampling errors and investigate cultures for deeper combination.

Reference

Book
- Bernd Lobach (2000). 『인더스트리얼 디자인』. 조형교육.
- Eskild Tjalve (1989). 『프로덕트 디자인』. 미진사.
- Wucius Wong (1993). 『Principles of Form and design』. John Wiley & Sons.
- 이재국 (1992). 『디자인 가치론』. 청주대학교 출판부.
- 임연웅 (1992). 『디자인 방법론 연구』. 미진사.
- 우흥룡 (1996). 『디자인 사고와 방법』. 창미.

Theses
- Dianne Cyr, Head, Larios (2010). Colour appeal in website design within and across cultures-A multi-method evaluation, *International Journal of Human-Computer Studies, 68*, 1-21
- Elisa M, Jakob Nielson Ed, (1996). International User Interfaces, Wiley computer Publishing, 46.
- Fang Liu, Jamie Murphy, Jianyao Li, Xiangping Liu, (2007). English and Chinese? The Role of Consumer Ethnocentrism and Country of Origin in Chinese Attitudes towards Store Signs, *Australasian Marketing Journal, 14(2)*
- Geert Hofstede 외 3명. (1990). Measuring Organizational Cultures; A Ouanlitative and Quantitative study Across Twenty Cases, Admimistrative Science Quarterly, 35(2).
- Jean-Charles Chebat, Morrin. (2007). Cololrs and cultures: Exploring the effects of mall decor and consumer perceptions, *Jounal of Business Research 60*, 189-196.

- Mario Gagliardi, (2001). Transcribing codes: Models for cultural fit in branding, Design Management Review, Bostion, 4.
- Mohammad Razzaghi, Mariano Ramirez Jr, and Robert Zehner,(2009) "Culture patterns in product design ideas: comparisons between Australian and Iranian student concepts", Design studies vol 30, 4.
- Olivier Furrer, Ben Shaw-Ching Liu and D. Sudharshan (2000). The Relationships vetween Culture and Service Quality Perceptions: Basis for Cross-Cultural Market Segmentation and Resource Allocation, *Journal of Service Research*, 2(4).
- Richie Moalosi,Vesna,Popovie, Anne Hickling-Hudson (2010). Culture-orientated product design, Techno Des Educ 20:175-190
- S. Duygu Bedir Eristi (2009). CULTURAL FACTORS in WEB DESIGN, Anadolu University Department of Educational Technology and Computing.
- 김정하 (2002). 「문화적 차이에 따른 웹사이트 구조 디자인의 변화에 대한 연구-한국과 미국의 국가별 E-Commerce 사이트 비교 관찰을 통한 문화와의 관계를 중심으로」, 석사학위 논문, 한국과학기술원.
- 박선영 (2007). 「문화적 차이에 의한 모바일 폰 디자인 선호도의 기호학적 분석-한국, 중국,일본의 20대 사용자를 중심으로」, 석사학위 논문, 이화여자대학교 디자인 대학원.
- 임경화 (2010). 「한국·중국 문화적 차이에 따른 디자인 선호도 차이에 관한 연구-주방용품 밀폐용기를 중심으로」, 석사학위 논문, 홍익대학교 산업미술대학원.
- 정현원 (2008). 「감성의 개념 및 어휘 체계 정립을 통한 공감각 디자인 평가 방법에 관한 연구」, 홍익대학교.

Internet site
- Amazon, http://www.amazon.kr
- Ebay, http://www.ebay.kr
- Wikipedia, http://ko.wikipedia.org