감성과학
제18권 4호, 2015
<연구논문>

pISSN 1226-8593
eISSN 2383-613X
Sci. Emot. Sensib.,
Vol.18, No.4, pp.47-58, 2015
http://dx.doi.org/10.14695/KJSOS.2015.18.4.47

The Relationship between User's Emotions and the overall Satisfaction of the Product

Sang-Hoon Jeong*†

*Department of Industrial Design, Mokwon University

Abstract

Due to recent interest in user experience and its significance, much research surrounding this theme is now being conducted. If user experience is defined as the emotions and satisfaction the user feels while using the product, how much of such experience will contribute to the overall satisfaction of using the product? In this research, user experience during usage of a product and the satisfaction acquired by it were investigated. The same experiment was conducted in South Korea and the United States of America in order to get more generalized experimental results. Amongst the six representative user emotions expressed while using a product, ‘Satisfaction in Usability’, ‘Discomfort or Displeasure’, and ‘Excellence’ correlated the most. The above three factors were found to be of the most influence concerning satisfaction of the product. The significance of this finding is that aside from focusing on the attractiveness of the product's exteriors and design, one should be concerned on the ease of usage and effectiveness as well as usability of the product, all of which contribute to how efficiently a consumer will utilize the product.

Key Words: User Experience, Emotion, Satisfaction, Cell Phone, Usability, Product

※ This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2012S1A2A1A01031292).

† Corresponding Author : Sang-Hoon Jeong (Department of Industrial Design, Mokwon University)
E-mail : diasoul@gmail.com
TEL : 042-829-7962
FAX : 042-829-7938

1. Introduction

Parallel to the growing interest in the significance of user experience (UX), much research is currently being conducted in this field. The main principle of UX not only focuses on the compatibility of technologies involved, but also on improving the users' quality of life. As a result, a positive user experience translates into product satisfaction as well as loyalty towards the company. Such a principle has been widely acknowledged by industries involved in customer service, and customer satisfaction has played a pivotal role as a marketing strategy.

Oliver (1980b) ordinarily defined satisfaction as a consumer's general satisfaction with a product or service. Moreover, satisfaction plays a crucial role in marketing activities because it can mediate shift in attitude, tendency to repurchase, positive outlook, brand loyalty, or even complaint following initial purchase. Furthermore, he defined customer satisfaction as the psychological state resulting from when customers experience an anomaly from what they were expecting of the product (Oliver, 1981). Bearden (1983) also considered the emotional state of the consumer when he stated that consumer satisfaction is when he/she subjectively finds joy in owning the product. Meanwhile, Czepiel and Gilmore (1987) stated that satisfaction with a product depends on several factors, including original price, durability, quality, performance, and exterior finesse. In addition to the above studies, much research related to the attributes of the product and customer satisfaction have been conducted in various fields (Chae, 2005; LaTour & Peat, 1979; Wilkie & Pessemier, 1973).

Furthermore, overall consumer satisfaction is strongly correlated to whether or not he/she will reuse the product in the future (Taylor & Baker, 1994). This tendency to repurchase an item is based on not only previous user experience and expectation in the future, but whether they are willing to keep trusting the company's products and services (Czepiel & Gilmore, 1987). A positive experience affects consumer behavior subsequent to the purchase, and as such positively affects their decision to continue using the product (Bearden, 1983; Bitner, 1990; Eggert & Ulaga, 2002; Geva & Goldman, 1990; Kwon et al., 2004; Lee & Kim, 2010; Oliver, 1980a; Oliver & Swan, 1989; Parasuraman et al., 1996; Reichheld, 1996).

If user experience is defined to be the satisfaction or emotions expressed while using the product, what effect will there be on the level of satisfaction following product usage? Although customer satisfaction research is being conducted in a variety of distinctive fields, they are mostly concerned with product characteristics and consumer satisfaction. Thus, aside from simply evaluating inherent properties of a product, it would be meaningful to investigate the relationship between the user's emotions and product satisfaction.

In this paper, the relationship between the emotions portrayed by the user and the overall level of satisfaction was observed. The primary objective was concerned with which particular emotions had a greater impact on the user's satisfaction. To normalize the results of this research, the same experiment in South Korea as well as the United States of America was carried out. Through this, we expect to be able to focus on particular properties that affect user emotions.

2. Methods for Measuring the User's Emotions

A user's emotion, derived from personal experience, can be defined as an intuitive and reflective feeling, about the outside world. It has characteristics that are ambiguous to express since it is complex, comprehensive, personal and dynamic (Lee, 1998). Human emotion is the issue which is subjective, difficult to define and even more difficult to measure because it is personal. Cacioppo and Gardner (1999) concluded

that “the measurement of emotion is a bustling research area”. Generally, the methods for measuring human emotion are divided in two, one is the psychological way based on user's subjective evaluation (Desmet, 2002; Plutchik, 2003; Russell, 1989) and the other is the physiological way based on physiological signals (Cacioppo et al., 1993; Collet et al., 1997; Ekman et al., 1983; Levenson, 1992; Levenson et al., 1990). Since the former has limitation that is it has to be tested after experiencing the emotion (Scherer, 1986), the physiological method, measuring physiological signals to use them as an objective index of human emotion, has been tried to measure the emotion more objectively. However, equipment for measuring physiological signals to grasp the emotion is usually expensive and burdensome. Moreover, it is not easy to approach the area from the design field because of difficulties with analyzing data output from tests.

If taking into consideration that the stimulus is not big, and the user has to keep moving while using the product, to measure the user’s emotions, the psychological measuring method can be seen as more effective than the physiological measuring method. Because it is very difficult to overcome the limitations of the physiological measuring method listed above and to detect accurate physiological signals in these situations. The most common method in the psychological measuring method is to indirectly measure the user’s emotion by using adjectives, hence to measure the user’s emotion by drawing out a set of emotional words.

2.1. Extraction of Emotional Words and Representative Emotions

In the field of emotional engineering, a measurement method that indirectly measures the user's emotions through adjectives, called emotional words, is used. However, most of the studies on emotional words are related to expressions of emotions felt from a product's appearance or studies on words that emotionally express a product's appearance itself. In relation, we have extracted some emotional words that can come up while people use a product and reveal emotional changes not words that were derived simply from the product's appearance.

Firstly we assembled a set of emotions that were sufficiently extensive to represent a general overview of the full repertoire of Korean emotions from various literature studies (Han et al., 1998; Jang & Jang, 1994; Kim et al., 1993; Kim, 2003; Kim et al., 1998; Park et al., 1998). Secondly, we found emotional words from the afternotes written by website. Lastly, emotional words were collected from verbal protocols in which the user says out loud what he/she is feeling while he/she is carrying out a task (Think Aloud Method) (see Figure 1). After the collected words were deleted or integrated according to standards, they were applied on appropriateness evaluation surveys for identification of emotional expressions while using a product.

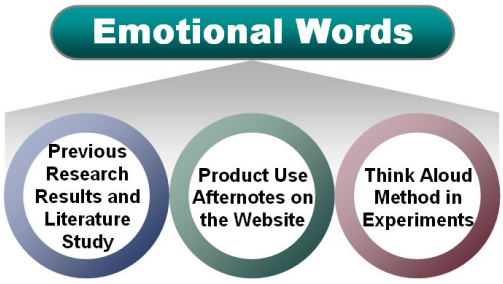

Figure 1. Methods for Extraction of Emotional Words

Using factor analysis, we categorized the emotional words to form the following 6 representative emotions;

- ‘Aesthetics’ is the emotions aroused by the product's appearance and by visual information pertaining to the product. Related emotional words are: pretty, refined, elegant, clean, lovable, cute, charming, and well-matched.
- ‘Satisfaction in Usability’ is the emotions aroused by satisfaction with or the practicality of the

product. Related emotional words are: satisfactory, sensitive, natural, reliable, efficient, and useful.

- 'Novelty' is the emotions expressed by something that is novel that has never been experienced. Related emotional words are: unusual, original, ingenious, unique, and marvelous.
- 'Discomfort or Displeasure' is uncomfortable or unpleasant emotions expressed while using a product. Related emotional words are: discomfort, frustrated, difficult, annoying, confused, and disappointed.
- 'Pleasure' is pleasant emotions expressed while using a product. Related emotional words are: pleased, glad, enjoyment, and pleasure.
- 'Excellence' is the emotions evoked by something notably excellent. Related emotional words are: excellent, the best, and look better.

It is expected that emotional words and user's representative emotions extracted in this study will be used as subjective evaluation data that is required to measure user's emotional changes while using a product (Jeong & Lee, 2005).

2.2. Development a Self-report Questionnaire-type Scale

Adjective checklists, self-report questionnaire-type scales have been extensively used to assess user's emotions. From previous studies, a self-report questionnaire-type scale using the representative emotions and a set of emotional words was suggested (see Appendix). Also the reliability of the suggested self-report questionnaire-type scale was confirmed through the analysis of Cronbach's coefficient alpha. Therefore, the self-report questionnaire-type scale extracted through this research can be used in various ways to measure a user's emotions naturally expressed while using a product (Jeong, 2007).

3. Experiment

3.1. Experiment Overview

In this research, the relationship between the users' emotions and their satisfaction was observed. The product of interest was a cellular phone, which is commonly owned, especially by college students who served as the primary subjects. First Korean, then American college students were subjected to the same experiment. The objective was not comparing the results from the two countries, but rather normalizing the results obtained in Korea.

3.2. Experiment Methods

First, the subjects were introduced to the overall context of the experiment. Specifically, the six questions pertaining to user emotions were explained to them to facilitate experimentation. First, subjects were asked how they felt about using their current cell phones. The self-report questionnaire-type scale for measuring user's emotions while using a product developed by Jeong (2007) was used, in which user emotions were self-evaluated. Reliability analysis of the scale developed in previous studies yielded reliable results for pursuing the experiment (Jeong, 2007). The subjects were asked to evaluate their emotions when using their cell phone into six levels (1. not true, 2. slightly true, 3. somewhat true, 4. true, 5. very true, 6. extremely true). Next, they were asked to show their level of satisfaction with their cell phone in 5 levels (1. very unsatisfied, 2. unsatisfied, 3. neutral, 4. satisfied, 5.very satisfied).

In order to investigate the relationship between user emotions whilst using the cell phone and the level of satisfaction, six emotional levels evaluated by the self-report questionnaire-type scale as independent variables and five satisfaction levels as the dependent variables. These were then run through SPSS 18.0 for

Windows, and multiple regression analysis was performed.

3.3. Experiment 1: Korea.

3.3.1. Experiment 1 (Korea) Participants

Korean college students were chosen to represent subjects of experiment. All currently enrolled in Mokwon University, 157 total students (38 males and 119 females, Mean = 21.15, S.D. =1.61).

3.3.2. Experiment 1 (Korea) Results

Emotion and satisfaction evaluation were set as the independent and dependent variable, respectively. Each independent variable (Representative Emotion) correlated to its dependent variable (Product Satisfaction) (p<0.05).Ofthesixrepresentativeemotions,'Satisfaction in Usability' (0.486) showed the highest correlation, followed by 'Excellence' (0.371), 'Aesthetics' (0.361), 'Novelty' (0.351), then 'Pleasure' (0.317); 'Discomfort or Displeasure' (-0.211) notably showed a negative correlation.

According to regression analysis, the regression value was shown to be effective in explaining the dependent variable (F=12.332, p=0.000) (see Table 1).

Evaluating the significance of each independent variable, 'Satisfaction in Usability' (p=0.000) and 'Discomfort or Displeasure' (p=0.001) were found to be significant when other variables entered the regression equation. In this case, a positive(+) value of 'Satisfaction in Usability' would reflect a satisfactory user experience, whereas a negative(-) value of 'Discomfort or Displeasure' would reflect a discomforting user experience. Besides the two, 'Aesthetics' (p=0.201), 'Novelty' (p=0.240), 'Pleasure' (p=0.580), and 'Excellence' (p=0.375) were not found to be significant when other variables entered the equation. Calculation of the absolute value of standardized coefficient (beta) showed that of the independent variables representing six emotions, 'Satisfaction in Usability' showed the greatest impact (0.315), followed by 'Discomfort or Displeasure' (-0.233), 'Novelty' (0.111), 'Aesthetics' (0.102), 'Excellence' (0.096), then 'Pleasure' (0.054) (see Table 2).

Consequently in Korea, 'Satisfaction in Usability' and 'Excellence' showed high correlation, and 'Satisfaction in Usability' and 'Discomfort or Displeasure' most significantly affected product satisfaction.

Table 1. Result of regression analysis[b] (Representative Emotions-Satisfaction, Korea, N=157)

Model		SS	*d.f.*	MS	F	*p*-value
1	SSR	37.435	6	6.239	12.332	.000[a]
	SSE	75.890	150	.506		
	Total SS	113.325	156			

[a] Predictive value: (Constant), Excellence, Discomfort or Displeasure, Aesthetics, Satisfaction in Usability, Novelty, Pleasure
[b] Dependent variable: Product Satisfaction

Table 2. Calculation of the absolute value of standardized coefficient[a] (Representative Emotions-Satisfaction, Korea, N=157)

Model		Non standardized		Standardized	t	*p*-value	Collinearity	
		B	Standard error	β			Tolerance	VIF
1	(Constant)	2.349	.231		10.157	.000		
	Aesthetics	.061	.048	.102	1.283	.201	.707	1.415
	Satisfaction in Usability	.212	.056	.315	3.804	.000	.652	1.534
	Novelty	.061	.052	.111	1.181	.240	.509	1.965
	Discomfort or Displeasure	-.152	.045	-.233	-3.368	.001	.935	1.070
	Pleasure	.035	.063	.054	.554	.580	.472	2.118
	Excellence	.055	.062	.096	.889	.375	.386	2.592

[a] Dependent variable: Product Satisfaction

3.4 Experiment 2: United States of America

3.4.1. Experiment 2 (U.S.A.) Participants

Experiment 2 was carried out with the same format of experiment 1 in English, with American college students as subjects. The participants were students currently enrolled in the University of Cincinnati (mean age 20.31, SD 2.30), with a total of 113 (male 70, female 43) students.

3.4.2. Experiment 2 (U.S.A.) Results

Each independent variable (Representative Emotion) showed a significant correlation with the dependent variable (Product Satisfaction) (p<0.05). Of the six representative emotions, 'Satisfaction in Usability' (0.423) showed the highest correlation, followed by 'Excellence' (0.411), 'Novelty' (0.296), 'Pleasure' (0.278), then 'Aesthetics' (0.165); 'Discomfort or Displeasure' (-0.388) notably showed a negative correlation.

According to regression analysis, the regression value was shown to be effective in explaining the dependent variable (F=9.183, p=0.000) (see Table 3).

Evaluating the significance of each independent variable, 'Satisfaction in Usability' (p=0.012), 'Dis-comfort or Displeasure' (p=0.001), and 'Excellence' (p=0.010) were found to be significant when other variables entered the regression equation. In this case, a positive(+) value of 'Satisfaction in Usability' and 'Excellence' would reflect a satisfactory user experience, where as a negative(-) value of 'Discomfort or Displeasure' would reflect a discomforting user experience. Besides the three, 'Aesthetics' (p=0.482), 'Novelty' (p=0.219), and 'Pleasure' (p=0.838) were not found to be significant when other variables entered the equation. Calculation of the absolute value of standardized coefficient (beta) showed that of the independent variables representing six emotions, 'Discomfort or Displeasure'(-0.290) showed the greatest impact, followed by 'Excellence' (0.262), 'Satisfaction in Usability' (0.246), 'Novelty' (0.119), 'Aesthetics' (-0.067), then 'Pleasure' (-0.022) (see Table 4).

Consequently in the United States, 'Satisfaction in Usability' and 'Excellence' showed high correlation and 'Discomfort or Displeasure' notably showed a negative correlation, and 'Discomfort or Displeasure', 'Excellence', and 'Satisfaction in Usability' significantly affected product satisfaction.

Table 3. Result of regression analysis[b] (Representative Emotions-Satisfaction, U.S.A., N=113)

Model		SS	*d.f.*	MS	F	*p*-value
1	SSR	40.347	6	6.724	9.183	.000[a]
	SSE	77.618	106	.732		
	Total SS	117.965	112			

[a] Predictive value: (Constant), Excellence, Discomfort or Displeasure, Aesthetics, Satisfaction in Usability, Novelty, Pleasure
[b] Dependent variable: Product Satisfaction

Table 4. Calculation of the absolute value of standardized coefficient[a] (Representative Emotions-Satisfaction, U.S.A., N=113)

Model		Non standardized		Standardized	t	*p*-value	Collinearity	
		B	Standard error	β			Tolerance	VIF
1	(Constant)	3.151	.342		9.211	.000		
	Aesthetics	-.046	.065	-.067	-.706	.482	.693	1.443
	Satisfaction in Usability	.187	.073	.246	2.562	.012	.673	1.486
	Novelty	.092	.074	.119	1.237	.219	.676	1.479
	Discomfort or Displeasure	-.228	.064	-.290	-3.538	.001	.924	1.082
	Pleasure	-.015	.075	-.022	-.206	.838	.536	1.865
	Excellence	.170	.065	.262	2.609	.010	.616	1.623

[a] Dependent variable: Product Satisfaction

3.5 Experiment Results: Total

In the case of total participants, each independent variable (Representative Emotion) correlated to its dependent variable (Product Satisfaction) (p=0.000). Of the six representative emotions, 'Satisfaction in Usability' (0.502) showed the highest correlation, followed by 'Excellence' (0.385), 'Pleasure' (0.332), 'Novelty' (0.221), then 'Aesthetics' (0.208); 'Discomfort or Displeasure' (-0.375) notably showed a negative correlation. According to regression analysis, the regression value was shown to be effective in explaining the dependent variable (F=26.450, p=0.000) (see Table 5).

Table 5. Result of regression analysis[b] (Representative Emotions-Satisfaction, Total, N=270)

Model		SS	*d.f.*	MS	F	*p*-value
1	SSR	99.576	6	16.596	26.450	.000[a]
	SSE	165.020	263	.627		
	Total SS	264.596	269			

[a] Predictive value: (Constant), Excellence, Discomfort or Displeasure, Aesthetics, Satisfaction in Usability, Novelty, Pleasure
[b] Dependent variable: Product Satisfaction

Evaluating the significance of each independent variable, 'Satisfaction in Usability' (p=0.000), 'Discomfort or Displeasure' (p=0.000), and 'Excellence' (p=0.007) were found to be significant when other variables entered the regression equation. In this case, a positive(+) value of 'Satisfaction in Usability' and 'Excellence' would reflect a satisfactory user experience, whereas a negative(-) value of 'Discomfort or Displeasure' would reflect a discomforting user experience. Besides the three, 'Aesthetics' (p=0.817), 'Novelty' (p=0.538), and 'Pleasure' (p=0.539) were not found to be significant when other variables entered the equation. Calculation of the absolute value of standardized coefficient (beta) showed that of the independent variables representing six emotions, 'Satisfaction in Usability' showed the greatest impact (0.336), followed by 'Discomfort or Displeasure' (-0.310), 'Excellence' (0.187), 'Pleasure' (0.041), 'Novelty' (0.039), then 'Aesthetics' (-0.013) (see Table 6).

Consequently in the case of total participants, 'Satisfaction in Usability' and 'Excellence' showed high correlation and 'Discomfort or Displeasure' notably showed a negative correlation, and 'Satisfaction in Usability' and 'Discomfort or Displeasure' most significantly affected product satisfaction, and 'Excellence' was also an influential factor.

4. Discussion and Conclusion

In this research, we conducted experiments to evaluate the relationship between the emotions expressed by users during product use. From previous studies, a set of emotional words that can show changes in emotions of users while using a product were extracted and

Table 6. Calculation of the absolute value of standardized coefficient[a] (Representative Emotions-Satisfaction, Total, N=270)

Model		Non standardized		Standardized	t	*p*-value	Collinearity	
		B	Standard error	β			Tolerance	VIF
1	(Constant)	2.746	.198		13.884	.000		
	Aesthetics	-.009	.039	-.013	-.232	.817	.732	1.366
	Satisfaction in Usability	.247	.044	.336	5.675	.000	.678	1.476
	Novelty	.026	.042	.039	.616	.538	.606	1.650
	Discomfort or Displeasure	-.222	.037	-.310	-6.055	.000	.905	1.105
	Pleasure	.029	.048	.041	.615	.539	.522	1.915
	Excellence	.122	.045	.187	2.704	.007	.494	2.026

[a] Dependent variable: Product Satisfaction

were divided into six representative emotions according to factor analysis. In this paper, we observed the relationship between the emotions portrayed by the user and the overall level of satisfaction. To normalize the results of this research, we carried out the same experiment in South Korea as well as the United States of America.

The main findings of the current research are;

First, in the case of Korea, 'Satisfaction in Usability' and 'Excellence' showed high correlation, and 'Satisfaction in Usability' and 'Discomfort or Displeasure' most significantly affected product satisfaction.

Second, in the case of the United States of America, 'Satisfaction in Usability' and 'Excellence' showed high correlation and 'Discomfort or Displeasure' notably showed a negative correlation, and 'Discomfort or Displeasure', 'Excellence', and 'Satisfaction in Usability' significantly affected product satisfaction. Whereas 'Aesthetics' and 'Pleasure' failed to yield statistically significant results; it even showed a negative correlation when other factors entered the regression equation. Thus, we may assume that in the case of American users who think logic is more important than experience, 'Aesthetics' and 'Pleasure' do not play a significant role in product satisfaction. Conversely, 'Excellence' of a product reflecting a property that stands out among the rest was found to be of great influence.

Thirdly, in the case of total participants, of the six representative emotions, 'Satisfaction in Usability' and 'Excellence' showed high correlation and 'Discomfort or Displeasure' notably showed a negative correlation, and 'Satisfaction in Usability' and 'Discomfort or Displeasure' most significantly had the greatest impact on product satisfaction, and 'Excellence' was also an influential factor.

Thus, the emotions aroused by satisfaction with or the practicality of the product (Satisfaction in Usability), the emotions evoked by something notably excellent (Excellence), and uncomfortable or unpleasant emotions expressed while using a product (Discomfort or Displeasure) are greatly correlated with the level of product satisfaction. Moreover, the emotions aroused by satisfaction with or the practicality of the product (Satisfaction in Usability), uncomfortable or unpleasant emotions expressed while using a product (Discomfort or Displeasure), and the emotions evoked by something notably excellent (Excellence) were found to greatly influence overall product satisfaction. This conforms to the behavior level of the three levels of design set forth by Norman(2004), where use of the product can convey joy and utility while using it. Thus, not only should focus be placed on the visceral level of a product during product design, but ease of use and effectiveness should also be amongst the top priorities of usability (Shackel, 1991). In other words, how effectively a user can navigate the functions of a product should be critically considered (Nielsen, 1993).

Consequently the usefulness of a product was also found to be a significant factor for evaluating the overall utility of the product. Specifically, the significance of user experience, and therefore a positive user experience contributes to the satisfaction of the users' needs as well as to brand loyalty.

However, the participants of this research was restricted to college students in their twenties, and the product of interest was also limited to a cell phone, and therefore the results of this experiment cannot easily be generalized to a theory. Thus, we cannot safely conclude the relationship between user emotions while using the product and the overall level of satisfaction. Further studies would need to consider age of participants, occupation, and gender ratio to reduce statistical population variance, and also apply various other products of interest in order to provide a clearer conclusion. Moreover, this research focused on which emotional factors had the greatest influence in product satisfaction. The results of this research can be extended to further studies to validate which aspects of a product carry influence pertaining to each of the six representative emotions. Through this, we hope to

set forth a design guideline to maximize user experience and emotional quality of a product.

REFERENCES

Bearden, W. O. (1983). Selected determinants of customer satisfaction and complaint reports. *Journal of Marketing Research, 20(1)*, 21-29.

Bitner, M. J. (1990). Evaluating service encounters: the effects of physical surrounding and employee response. *Journal of Marketing, 54(4)*, 69-82.

Cacioppo, J. T., & Gardner, W. L. (1999). Emotion. *Annual Review of Psychology, 50(1)*, 191-214.

Cacioppo, J. T., Klein, D. J., Berntson, G. G., & Hatfield, E. (1993). The psycho-physiology of emotion. In: M. Lewis, & J. M. Haviland (Eds.), *Handbook of Emotions*. NewYork: TheGuilfordPress. 119-142.

Chae, H. J. (2005). *An Investigation into the Relationships of Customer Satisfaction Among Product Attributes, Price, after Service, Advertising and Repurchase Intentions*. Doctoral Thesis, KeimyungUniversity.

Collet, C., Vernet-Maury, E., Delhomme, G., & Dittmar, A. (1997). Autonomic nervous system response patterns specificity to basic emotions. *Journal of the Autonomic Nervous system, 62(1/2)*, 45-57.

Czepiel, J. A., & Gilmore, R. (1987). *The Service Challenge; Integrating for Competitive Advantage*. Chicago: American Marketing Association.

Desmet, P. M. A. (2002). *Designing Emotions*. Delft: Delft University of Technology.

Eggert, A., & Ulaga, W. (2002). Customer perceived value: a substitute for satisfaction in business market? *Journal of Business and Industrial Marketing, 17(2/3),* 107-118.

Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic nervous system activity distinguishes among emotions. *Science, 221(4616),* 1208-1210.

Geva, A., & Goldman, A. (1990). Satisfaction measurement in guided tours. *Annals of Tourism Research, 18(2),* 177-185.

Han, S. H., Yoon, M. H., Kim, K. J., Jo, S. J., Kwak, J. Y., & Hong, S. W. (1998). *Development of a Usability Evaluation Method*. Pohang University of Science and Technology (POSTECH) & Ministry of Science and Technology.

Jang, S. K., & Jang, K. H. (1994). A study on Korean idioms - with emphasis on emotion expressions. *Journal of Koreanology, 25*, 295-318.

Jeong, S. H. (2007). Development a self-report questionnaire-type scale for measuring user emotions while using a product. *Korean Journal of the Science of Emotion & Sensibility, 10(3),* 403-410.

Jeong, S. H., & Lee, K. P. (2005). Extraction of user's representative emotions expressed while using a product. *Journal of Korean Society of Design Science, 18(1),* 69-80.

Kim, C. J., Lee, N. S., Park, S. J., Park, J. H., Park, S. C., & Lee, S. Y. (1993). *Development of Human Sensibility Measurement Technology*. Seoul: Korea Research Institute of Standards and Science (KRISS) & Ministry of Science and Technology.

Kim, H. S. (2003). *A study on Korean Emotional Idioms*. Seoul: Hankook-munhwasa.

Kim, Y. A., Kim, J. K., Park, S. K., Oh, K. J., & Chung, C. S. (1998). Dimension of the emotion structure through the analyses of emotion related terms in Korean language. *Korean Journal of the Science of Emotion & Sensibility, 1(1),* 145-152.

Kwon, K. D., Lee, S. W., & Huh, W. H. (2004). Importance-performance analysis as a strategic tool for car manufacturers, an empirical study on factors affecting satisfaction of car owners' repurchase and recommend intention. *Daehan Journal of Business, 45(4),* 1795-1821.

LaTour, S. A., & Peat, N. A. (1979). Conceptual and methodological issues in consumer satisfaction research. *Advances in Consumer Research, 6(1),* 431-437.

Lee, J. R., & Kim, M. O. (2010). An empirical study of the influence of automobile attributes on overall satisfactions, repurchase intentions, recommendation intentions: focusing on Chinese consumers. *International Business Review, 14(1),* 19-54.

Lee, K. H. (1998). Human sensibility and emotion in

sensibility ergonomics. *Korean Journal of the Science of Emotion & Sensibility, 1(1),* 113-122.

Levenson, R. W. (1992). Autonomic nervous system differences among emotions. *Psychological Science, 3(1),* 23-27.

Levenson, R. W., Ekman, P., & Friesen, W. V. (1990). Voluntary facial action generates emotion-specific autonomic nervous system activity. *Psychophysiology, 27(4),* 363-384.

Nielsen, J. (1993). *Usability engineering*. San Diego: Academic Press, Inc.

Norman, D. A. (2004). *Emotional design-why we love (or hate) everyday things*. NewYork: Basic Books.

Oliver, R. L. (1980a). A cognitive model of the antecedents and consequences of satisfaction decision, involvement and product performance. *Behavioral Science, 40(April),* 104-132.

Oliver, R. L. (1980b). A cognitive model of the antecedents and consequences of satisfaction response. *Journal of Consumer Research, 17 (September),* 460-469.

Oliver, R. L. (1981). Measurement and evaluation of satisfaction process in retail setting. *Journal of Retailing, 57(3),* 25-48.

Oliver, R. L., & Swan, J. E. (1989). Consumer perceptions of interpersonal equity and satisfaction in transaction: a field survey approach. *Journal of Marketing, 53(April),* 21-35.

Parasuraman, A., Zeithaml, V. A., & Berry, L. (1996). The behavioral consequences of service quality. *Journal of Marketing, (April),* 31-46.

Park, M. C., Shin, S. G., Han, K. H., & Whang, S. M. (1998). Measuring meaning of Korean adjectives and colors. *Korean Journal of the Science of Emotion & Sensibility, 1(2),* 1-11.

Plutchik, R. (2003). *Emotions and life: perspectives from psychology, biology and evolution*. Washington: American Psychological Association, 181-222.

Reichheld, F. F. (1996). Learning from customer defection. *Harvard Business Review, 74(2),* 56-69.

Russell, J. A. (1989). Measures of emotion. In: R. Plutchik, & H. Kellerman (Eds.), *The Measurement of Emotions*. New York: Academic Press. 83-112.

Scherer, K. R. (1986). Studying emotion empirically: issues and a paradigm for research. In: K. R. Scherer, H. G. Wallbott, & A. B. Summerfield (Eds.), *Experiencing emotion: a cross-cultural study*. Cambridge: Cambridge University Press. 3-27.

Shackel, B. (1991). Usability-context, framework, design, and evaluation. In: B. Shackel, & S. Richardson (Eds.), *Human Factors for Informatics Usability*. Cambridge: Cambridge University Press. 21-37.

Taylor, S., & Baker, T. (1994). An assessment of the relationship between service quality and customer satisfaction in the formation of consumers' perceptions of quality. *Journal of Retailing, 70(2),* 163-178.

Wilkie, W. L., & Pessemier, E. A. (1973). Issues in marketing's use of multi-attribute attitude models. *Journal of Marketing Research, 10(November),* 428-441.

Received : October 01, 2015
Revised : October 27, 2015
Accepted : October 27, 2015

Appendix

[Self-report Questionnaire-type Scale]

"***Aesthetics***", "***Satisfaction in Usability***", "***Novelty***", "***Discomfort or Displeasure***", "***Pleasure***", and "***Excellence***" are the representative emotions expressed while using products. Based on your current cell phone usage experience, please check one of the following (1. not true, 2. slightly true, 3. somewhat true, 4. true, 5. very true, 6. extremely true) based on your emotional response (emotions, affects, psychological state, feelings).

1. I have feelings of "**Aesthetics**" while using my cell phone. ("***Aesthetics***" *is the emotions aroused by the product's appearance and by visual information pertaining to the product. Related emotional words are: pretty, refined, elegant, clean, lovable, cute, charming, and well-matched.*)
   ( ) not true ( ) slightly true ( ) somewhat true ( ) true
   ( ) very true ( ) extremely true

2. I have feelings of "**Satisfaction in Usability**" while using my cell phone. ("***Satisfaction in Usability***" *is the emotions aroused by satisfaction with or the practicality of the product. Related emotional words are: satisfactory, sensitive, natural, reliable, efficient, and useful.*)
   ( ) not true ( ) slightly true ( ) somewhat true ( ) true
   ( ) very true ( ) extremely true

3. I have feelings of "**Novelty**" while using my cell phone. ("***Novelty***" *is the emotions expressed by something that is novel that has never been experienced. Related emotional words are: unusual, original, ingenious, unique, and marvelous.*)
   ( ) not true ( ) slightly true ( ) somewhat true ( ) true
   ( ) very true ( ) extremely true

4. I have feelings of "**Discomfort or Displeasure**" while using my cell phone. ("***Discomfort or Displeasure***" *is uncomfortable or unpleasant emotions expressed while using a product. Related emotional words are: discomfort, frustrated, difficult, annoying, confused, and disappointed.*)
   ( ) not true ( ) slightly true ( ) somewhat true ( ) true
   ( ) very true ( ) extremely true

5. I have feelings of "**Pleasure**" while using my cell phone. ("***Pleasure***" *is pleasant emotions expressed while using a product. Related emotional words are: pleased, glad, enjoyment, and pleasure.*)
   ( ) not true ( ) slightly true ( ) somewhat true ( ) true
   ( ) very true ( ) extremely true

6. I have feelings of "**Excellence**" while using my cell phone. ("***Excellence***" *is the* e*motions evoked by something notably excellent. Related emotional words are: excellent, the best, and look better.*)
   ( ) not true ( ) slightly true ( ) somewhat true ( ) true
   ( ) very true ( ) extremely true

[Questions pertaining to your current cell phone]

1. Manufacturer: 2. Model name:

3. Date of purchase (month/year):

4. How satisfied are you with your current cell phone?
   ( ) very unsatisfied ( ) unsatisfied ( ) neutral ( ) satisfied
   ( ) very satisfied

[Personal information]

1. Sex: ( )Male ( )Female 2. Age: 3. Nationality: