User Profiles Based On Soft Usability Problems In Consumer Electronic Products

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Abstract: Consumer electronic industries are increasi ngly confronted with consumer complaints although products function well according to their tec hnical specifications. It is assumed that the gap between actual product usability by users and intended product usability by m anufacturer lead to the problems. This new class of consumer co mplaints in the consumer electronic industry is defined as "soft usability problem s". Product usability is described by attributes that address the physical, cognitive, personal needs of intended user s, and cultural background, w hich refer to user characteristics. T herefore, this paper explores the relationships betw een soft usa bility problem s and user characteristics. W ith the aim, two studi es were conducted in the Netherlands and South Korea. The overall results suggest that soft usab ility problem s vary along specific dim ensions of user characteristics. W ith these findings the study leads to the definition of specific user profiles related to each soft usability problem.

Key words: usability, user characteristics, cross-cultural study, electronic products.

1. Introduction

Thanks to the developm ent of science and technology , consumer complaining seemed to decrease until the m id 90's. However , the average percentage of consumers complaining about new products has started to increase since the late 90's regardless of the advance of technology [1]. Electronic product industries were busy developing new electronic pr oducts without identifying increasing c onsumers' complaints because other attributes such as price and time to market get hi gher priority in the daily practice of m anufacturers. Consequently, they have been increasingly confronting a significant portion of returns for which the technical problem was not found. According to a recent study , it turn ed out that about h alf of reasons of product returns have nothing to do with technical problems [1]. Presumably , this phe nomenon results from an unexpected discrepancy between actual use by consumers and intende d use by designers or manufacturers [2, 3]. These unidentified consum er com plaints in the consum er elect ronic industry is defined as "soft usability problem s" which mean consumer complaints related to non-technical usability issues, as opposed to hard usability problems that have to do w ith technical failures or m alfunctions. An exam ple of such a soft usability problem : a m obile phone works well following its technical spec ification but its user might not find how to send a text message.

Even when she finds it out, the mobile phone might dissatisfy her with keypads that are too tiny to type text easily. There are possible causes of the occurrence of soft problems. First, individual electronic products such as radio, digital camera, and mobile phone have become integrated into one single product. This leads to a complex product or black-box design that confuses consumers in perception, expectation and use [4]. Secondly, manufacturers have kept developing consumer electronics only focusing on new technology. Technical excellence of products only is not enough to consumers as products have been absorbing the technological progresses resulting in larger complexity in terms of its characteristics and functionality [5]. Additionally, manufacturers intend to look at the similarities between people since the era of mass-production. Indeed, they have not taken into account the differences between people based on personal and cultural diversity. Moreover, an electronic product is used by much bigger variety of users than in the past. For instance, computer science engineers were the only users of the computer in the 80's, while nowadays those who use the computer range from children to elderly people. Furthermore, tolerance of consumers and end-users for quality and reliability problems with products is decreasing [6]. Despite the growing number of soft usability problems with consumer electronic products, so far few studies have been done. Recently, Den Ouden et al. [1] assessed over 20 new product development projects to understand the reasons behind the rising number of consumer complaints. Their study analyzed dissatisfaction with new products from various available sources. However, no soft problems were specified in detail in the study. A study conducted by Kim et al. [7] tried to make categorization of soft problems based on consumer survey and established 9 categories of soft problems. The focus of these studies was on exploring the kind of soft problems consumers experienced, not on factors that influence complaining about soft problems. However, in order to develop products that meet consumer's expectations and decrease dissatisfaction the root cause of these soft problems should be found as well. At present there is a lack of information on the causes of such soft problems. Therefore, this paper aims at figuring out what complaints related to soft usability problems consumer have experienced and exploring the relationships between soft usability problems and user characteristics through two studies.

2. STUDY I

The first study as a questionnaire survey analyzed what relationship exists between these complaints and the characteristics of the complainer. These characteristics encompassed demographical, cognitive, socioeconomic, personal, and cultural aspects. On the basis of this study a category system of soft usability problems was developed.

2.1 Method

2.1.1 Samples

Since cultural background was one of the variables taken into account this study has a cross-cultural comparison character. For that reason, the Netherlands and South Korea were selected as a good sample of Western European and Far East Asian countries respectively. Through discussion forums on the Internet and the network of the researchers a random sample of 123 people living in their home country was selected: 64 Dutch and 59 South Korean subjects, 73 male and 50 female. Their ages broadly ranged from late teens to 60. Data was collected from the respondents using questionnaire with regard to demographical dimension, cognitive aspect, physical, and personal characteristics and cultural background, and soft usability problems. On completion of the survey,

109 responses were 'complainers' about soft usability problems while 14 subjects, who had no complaints on their electronic products, were classified as 'non-complainer'.

Table 1. List of variables measured in Study I

User characteristics	Measured variables
Demographics	Age, Gender, Educational level, Marriage, Having a child
Cognition	Technical skill, Spatial reasoning, Literacy, Memory, Adaptability, Use fixation, Brand fixation, Prerequisite content knowledge, Reading manuals
Socioeconomics	Social participation, Income, Grown-up environments, Living environments, Buying decision
Personality	Patience, Flexibility, Self-efficacy, Religion, Locus of control, Sensitivity to advertising, Sensitivity to stereotyping, Attitude to life, Perfectionism, Exposure to advertising
Cultural background	National culture, Power distance (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty avoidance (UAI), Long-term orientation (LTO)

2.1.2 Instruments

A questionnaire consisting of two parts was developed. The first part was formulated to discover what kind of soft usability problems people have experienced with their electronic products. The other part consisted of questions related to demographical, cognitive, socio economic dimension, personality and cultural background (Table 1). The variables used in the questionnaire were found in the literature in the field of consumer complaining behavior and consumer (dis)satisfaction [8-14]. For cultural characteristics, Hofstede's cultural dimensions were used to measure cultural backgrounds since culture plays a role in the field of product design as well as management in business [15-18]. Most of the questions were answered on five-points scales while some were dichotomous (yes or no) and multiple choices. In order to increase the reliability of the scores on some variables questions were asked twice, with the same content but with different formulation. The subjects participated in the survey by filling in either a web-based questionnaire or a questionnaire on paper. The answers given by them in the web-based questionnaire were automatically saved into a database on the Internet. The second way to recruit participants was through the researchers' network of people who live either in South Korea or in the Netherlands. All the answers from both the web-based and the paper questionnaire were input into a SPSS data sheet and then were statistically analyzed.

2.2 Results

Seven soft problems of nine soft problem categories [7] are closely related to usability of household electronic products: understanding, performance, sensation, health, structure, maintenance, and constraint. The 7 categories are defined as 'soft usability problems' in this study (Table 2). In order to test the significance of the relationships between soft usability problems and the variables in user characteristics, a correlation analysis and a non-parametric chi-square were used, which is to determine the correlations between soft usability problems and dichotomous variables such as cultural background, reading manuals, buying decision, and gender. Specific soft usability problems are correlated with specific complainers' characteristics (Table 3). Complaining about understanding of their electronic products is significantly correlated with high technical skill, low literacy, poor memory, strong external locus of control, being pessimistic in life, being a lot exposed to advertising, earning high annual income, belonging to an older generation, low score on power distance, high score on individualism and uncertainty avoidance regarding Hofstede's cultural dimensions, being used to reading a manual that comes with a new product ($\chi 2=14.92$, $p < .01$) having children ($\chi 2=6.08$, $p < .01$) and being male ($\chi 2 = 4.34$, $p < .01$).

The performance complaints seem to be related to age: there are more younger people who have this kind of complaint. And they are also connected to low technical skill, high literacy , low self-efficacy, not seeking for perfectionism, scoring low on Hofstede's uncertainty avoidance, reading no manuals ($\chi 2=5.94$, $p < .01$) and having no religion ($\chi 2=4.57$, $p < .01$). Low spatial reasoning, high ability to adapt to new products, low use fixation, high flexibility , low sensitivity to stereotyping, seeking for being perfectionist, and taking buying decision together with family members ($\chi 2= 5.70$, $p < .01$) are linked to the sensation complainers. Interestingly, most of complainers on sensation problems are South Korean people ($\chi 2=9.87$, $p < .01$). Complaining about health does not relate to any variables. The respondents who complained about structure of their electronic products are likely to be older, have low use fixation and strong internal locus of control, to be impatient, and to see their life optimistic. People who have dissatisfaction on maintenance of their electronics are described by having high self-efficacy, strong internal locus of control, getting used to reading manuals ($\chi 2=4.55$, $p < .01$) and having religion ($\chi 2=8.10$, $p < .01$). People who complain on constraint are characterized by having low prerequisite content knowledge, low flexibility, strong external locus of control, not seeking for perfectionism , being hardly exposed to advertising, growing up at countryside and having short-term aims. Based on these statistical interpretations between soft usability problems and user characteristics, user profiles are made as shown in Table 4.

Table 2. Categorization of Soft Usability Problems (Kim et al., 2007)

Category	Subcategory	Description
Understanding	Awareness	Users know that a function exists and have no difficulty in finding it, but they do not understand how to use it.
	Navigation	Users have difficulty in finding a specific function.
	Lack of need	Users don't use and need some functions. Sometimes these functions just confuse them.
Performance	Compatibility	Product is impossible or difficult to use with other software or hardware.
	Time	Product is annoying because it is too slow or too fast.
	Battery	Battery life is not enough and seems to become less and less.
	Efficiency	Product is less efficient with regard to technical performance.
	Error	Sometimes an error occurs that cannot be solved through a helpdesk.
Sensation	Sound	Product is not loud enough to listen to or is too noisy.
	Tactility	Users feel unpleasant touching or using product.
	Weight	Product is heavy to carry or use.
	Heat	Users feel unpleasant because of heat emitted by product.
	No sense	User cannot feel any differences between options or levels.
Health	Fatigue	Users feel tired or fatigued in a part of their body while using product.
	Safety	Users are worried about harming their health.
Structure	Cable	Product is annoying because of its cable.
	Configuration	Users feel uncomfortable because of product's mechanical structure.
	Shape	Product is too small or big to comfortably use or press. Problems occur because of its exterior form.
	Connection	Ejecting or connecting is irritating.
Maintenance	Service	It is difficult to get help or support. Software support is seldom updated.
	Cleaning	It is annoying to clean product.
	Care	Product requires more care.
	Durability	Product is not strong or durable enough.
	By-product	Product produces by-products that need to be managed
Constraint	Lack of function	Users feel a need for a specific feature or function, with which the product would be more convenient to use
	Lack of improvement	Product is not improved compared with its previous version
	Insufficient information	There is no feedback or feedforward in use

Table 3. Pearson Correlations between Variables and Soft usability problems in Study I

Variables Understand		Performance	Sensation Structure		Maintenance	Constraint
Demographics						
Annual income	-.225**					
Age -.203**		.215**		-.180*		
Cognition						
Prerequisite knowledge						.277**
Technical skill	-.174*	.167*				
Spatial reasoning			.218**			
Literacy .240**		-.175*				
Memory	.162*					
Adaptability			-.175*			
Use fixation		.196*		.185*		
Socioeconomics						
Grown-up environ.						.182*
Personality						
Patience				.183*		
Flexibility			-.253**			.207**
Self-efficacy		.203**			-.224**	
Locus of control	.217**			-.181*	-.214**	-.186*
Sensitivity to stereotyping			.182*			
Attitude to Life	.155*			-.342**	-.175*	
Perfectionism		.204**	-.312**			.231**
Exposure to ads	-.181*				.156*	.250**

**Coefficients are significant at p < .05.*
*** Coefficients are significant at p < .01.*

Table 4. User profiles summary based on Study I

Complaints	User Profiles				
	Demographics	Cognition	Socioeconomics	Personality	Culture
Understand	• High annual income • Old generation • Male	• High technical skill • Low literacy • Low memory	-	• Strong external locus of control • Pessimistic in life • A lot exposed to ads • Reading manuals	• High IDV • High UAI
Performance	• Young generation	• Low technical skill • High literacy	-	• Low self-efficacy • Not perfectionist • Reading no manuals	• Low UAI
Sensation -		• Low spatial reasoning ability • High adaptability • Low use fixation	-	• High flexibility • Low sensitivity to stereotype • Perfectionist • Buying decision together	• Korean people
Structure	• Old generation	• Low use fixation	-	• Low patience • Strong internal locus of control • Optimistic in life	-
Maintenance -		-	-	• High self-efficacy • Strong internal locus of control • Optimistic in life • Rarely exposed to ads • Reading manuals	• Low IDV
Constraint -		• Low prerequisite content knowledge	• Grown-up at countryside	• Low flexibility • Strong external locus of control • No perfectionist • Hardly exposed to ads	• Low LTO

3. STUDY II

In the second study only two consumer electronic products were focused upon, a vacuum cleaner and a mobile phone which were most complained by the participants of the first study. For these products the relationship was studied again between soft usability problems experienced and user characteristics. This also aims to see the influence of product type on the occurrence of soft usability problems. People who were not involved in the previous study participated in the questionnaire survey.

3.1 Method

3.1.1 Samples

For the same reason as in the first study, people from the Netherlands and South Korea were selected as target group. A total of 127 people (62 Dutch and 65 South Korean) took part in the questionnaire survey. They had not participated in the previous study. Dutch respondents were recruited from those who were commuters by train in the Netherlands while South Korean people were recruited through the network of the researchers in South Korea. Their ages broadly ranged from late teens till 70, and 50 male and 78 female. It turned out that nine respondents from the total group had no vacuum cleaner. 23 people were classified as non-complainers on their vacuum cleaners while 95 people were complainers. Regarding the mobile phone, five respondents were not users of a mobile phone. 79 people were non-complainers while 43 people had complaints. In the data analysis, 118 respondents for the vacuum cleaner and 122 respondents for the mobile phone were taken into account.

Table 5. List of variables measured in Study II

User characteristics	Measured variables
Demographics	Age, Gender
Cognition	Technical skills, Computer literacy, Expectation gap
Socioeconomics	Sense of belonging, Relationships toward people, Shared use
Personality	Assertiveness, Spender, Extrovert/Introvert, Self-respect, Laziness, Sense of accomplishment, Attitude towards complaining, Buying confidence, Tolerance for error, Satisfaction, Use period, Level of complaint, Flexibility, Frequency of use, Use of functions (mobile phone only), Carrying frequency (mobile phone only), Busyness, Brand preference
Cultural background	National culture

3.1.2 Instruments

A paper-based questionnaire focusing on both vacuum cleaner and mobile phone was used. Open-ended questions were formulated to discover what soft usability problem they experienced in using their household electronic products, followed by questions that measure demographics, cognition, socioeconomic dimension, personality and cultural background. Their descriptions to the open-ended questions were classified into one of seven soft usability problem categories. The variables used in the questionnaire were partly selected from the ones in the previous questionnaire based on the extent to which they correlate to soft usability problems: the variables showing no significant correlations such as spatial reasoning, adaptability, use fixation, prerequisite content knowledge, reading manuals, social participation, brand fixation, religion, and attitude to life were excluded in this questionnaire. New variables were added. See Table 5 for an overview. Most of the variables were measured on a five-points scale. Like the previous study, to increase the reliability of the answers questions gauging consumer-related variables were asked twice and their mean values were used for statistical analysis. All the answers were input into a SPSS data sheet and statistically analyzed.

3.2 Results

The results of the questionnaire were statistically analyzed by correlation analysis and non-parametric chi-square. The results show how variables in user characteristics interact with regard to soft usability problems, relying on a specific type of product.

Table 6. Pearson correlations between Variables and Soft usability problems in Study II (vacuum cleaner)

Variables Understand	Performance	Sensation	Health Structure	Maintenance	Constraint
Personality					
Level of complaint			.205*		
Spender	.231*				
Laziness	.221*				
Shyness	-.187*				
Self-respect	-.211*				
Accomplishment	-.185*				
Buying confidence					.216*
Flexibility			.226*		
Frequency of use	-.188*			.185*	
Busyness				.205*	

**Coefficients are significant at p < .05.*

Table 7. User profiles summary based on Study II (vacuum cleaner)

Complaints	User Profiles			
	Demographics Cognition	Socioeconomics	Personality	Culture
Understand -	-	-	-	-
Performance -	-	-	• Spender • Lazy people • Low shyness • Low self-respect • Low sense of accomplishment • Infrequent users	-
Sensation -	-	-	-	-
Health -	-	-	• High level of complaint	-
Structure -	-	-	• High flexibility	• Korean people
Maintenance -	-	-	• Frequent users • Busy people	-
Constraint -	-	-	• High buying confidence	-

Vacuum cleaner

Table 6 shows what factors in user characteristics are related to specific soft usability problem in using vacuum cleaner (Table 6). The respondents, who complained about *performance* of their vacuum cleaners, are likely to be relatively lazy and big spenders, and to have less shyness, self-respect, sense of accomplishment than others, and infrequent users of vacuum cleaner. Complaining about *health* of their vacuum cleaners is significantly correlated with aggressive complaining behavior (level of complaint). People who complained about *structure* of their vacuum cleaners are characterized by having high flexibility in using their electronics. The *constraint* complaints seem to be related to high self-confidence in buying products. Complainers on *maintenance* are more frequent users of their vacuum cleaners and those who live a busy life (α=.205, p <.05). However, there are no significant relationships between soft usability problems such as understanding and sensation and user characteristics in using vacuum cleaners. Meanwhile, Dutch people are less likely to be complainers on structure of their vacuum cleaners, compared with South Korean (α=.005, p < .05). On the basis of the relationships between soft usability problems and user characteristics, user profiles are created as shown in Table 7.

Table 8. Pearson correlations between Variables and Soft usability problems in Study II (mobile phone)

Variables Understand	Performance	Sensation	Health Structure	Maintenance	Constraint
Personality					
Level of complaint	.241**			.344**	
Buying confidence					.184*
Carry frequency				.180*	
Use of Functions	.222*				

Table 9. User profiles summary based on Study II (mobile phone)

Complaints	User Profiles			
	Demographics Cognition	Socioeconomics	Personality	Culture
Understand	- -	- - -		
Performance	- -	-	• High level of complaint • Many functions users	-
Sensation	- -	- - -		
Health	- -	- - -		
Structure	- -	- - -		
Maintenance	- -	-	• High level of complaint • Frequently carrying users	-
Constraint	- -	-	• High buying confidence	-

Mobile Phone

Complainers on *performance* and *maintenance* delivered by their mobile phones are likely to be very aggressive in level of complaint. The performance complainers s eem to use more functions of their mobile phones. The respondents, who complained about maintenance, are used to almost always carrying their mobile phones with them. People who complained about *constraint* are likely to have high buying-confidence when they choose a mobile phone (Table 8). There w ere shown no significant correlations betw een soft usability problem s such as understanding, sensation, health, and structure and specific variables of user characteristics. Table 9 presents user profiles based on the relationships found in the study on mobile phone.

4. Discussion

The contribution of the present study lies foremost in the emphasis on the importance of considering user diversity related to the occurrence of soft problems. As an explorative study the aim was to find any relationship between soft usability problem s and the personal background of the participants. The results indicate that (1) complaints in using electronic products have a relationship with their user characteristics, and (2) it is possible to distinguish dif ferent user profiles w ith dif ferent type s of soft usability problem s. W e w ill discuss below the different findings of this study . There are some correla tions resulting from interven ing variables that show unclear relationships though they were statistically significant. But they we re included in the study because this research is not intended to provide the definitive re lationships betw een soft usability problem s and user characteristics. T he outstanding fin ding is that personality and cultural characteristics have a significant relationship with (the occurrence of) soft usability problem s. This im plies that consum er electronic products are experienced in dif ferent ways between individuals a nd between dif ferent cultural backgrounds. Overall, the number of subjects and the sample bias give a limitation to this study. C ompared w ith the num ber of variables measured, it is relatively not enough to draw a conclusi on on the relationships between user characteristics and

soft usability problems. In addition, some variables do not seem to be relevant to the context of product usability. This made it difficult to use them for finding relationships with soft usability problems. They could be relevant to explain consumers' complaining behaviour instead of complaints in product use. For the study on mobile phone, there were no complaints on understanding, which had been the most reported problem with regard to mobile phone in Study I. It seems to be caused by a different questionnaire format from the one in Study I. In spite of these pitfalls, this study is meaningful in the sense that it gives an overview of how user characteristics interact with usability in consumer electronic products. Companies can also gain brief insight into their consumers through this explorative study since customers are an invaluable source of information for the firms. It would be worthwhile for future study to select variables that are significant in user and usability interaction and test in more reliable number of subjects including more diverse cultures. In that study a representative sample will be selected so that results can be generalised to the population.

5. Conclusions

Improving usability should be a major objective in designing consumer electronic products. However, companies have so far invested technical aspects of product usability. Companies can come up with better products and increase consumer satisfaction through feedbacks from actual users of products, which are related to non-technical problems. This study demonstrates how new consumer complaints, defined as soft usability problems, relate to user characteristics with products in use. The overall results indicate that each soft usability problem is closely linked to specific user characteristics. In Study I, variables associated to Demographic, cognitive dimension and personality show strong correlations with soft usability problems. Whereas, it was found out that factors related to personality only have to do with the occurrence of specific soft usability problem in the study II. The influence of cultural background with regard to soft usability problems was shown in the Study I only. Cultural background relates to complaints about sensation in Study I but problems on structure with the vacuum cleaner in Study II. Most of variables used in the two studies are not similar. Only the following variables in the first study were adopted for the second study: age, gender, technical skills, flexibility, and cultural background. There exist some differences and similarities in the results of those variables between the two studies. According to Study I, age and gender are factors that influence specific soft usability problems. These aspects, however, show no relationships with soft usability problems in Study II. While in Study II the vacuum cleaner and mobile phone were tested, some differences and similarities were discovered between the two products. Level of complaint is related to health problems with vacuum cleaners while for the mobile phone it has to do with performance and maintenance. On the other hand, buying confidence shows a significant relationship with the problem of constraint in both vacuum cleaner and mobile phone. Frequency of use and busyness turn out to significantly correlate with specific soft usability problems in the study of vacuum cleaner. However, this relationship does not appear in the survey on mobile phone. These findings vary also according to type of product: in Study II it turns out that soft usability problems vary between vacuum cleaner and mobile phone. Though these studies do not completely address the relationships between the occurrence of soft usability problems and user characteristics, the findings have to be confirmed in a representative survey as explorative studies. This leaves the necessity of further studies on how product characteristics affect the relationships. This future research can contribute to a better understanding of usability that would be mutually beneficial to both customers and manufacturers.

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References

[1] den Ouden, E., Yuan, L., Sonnemans, P. J. M. and Brombacher, A. C. (2006) Quality and reliability problems from a consumer's perspective: an increasing problem overlooked by businesses?, *Quality and Reliability Engineering International*, vol. 22, no. 7, pp 821-838.

[2] Estelami, H. (2003) Sources, characteristics, and dynamics of postpurchase price complaints, *Journal of Business Research*, vol. 56, no**.** 5, pp 411-419.

[3] Goodman, J. A., Ward, D. and Broetzmann, S. (2002) It might not be your product, *Quality Progress*, vol. 35, no. 4, pp 73-78.

[4] Broadbridge, A. and Marshall, J. (1995) Consumer complaint behaviour: the case of electrical goods, *International Journal of Retail & Distribution Management*, vol. 23, pp 8-18.

[5] De Melo, A. F. and L.A. Gontijo, L. A. (2000) Evaluation of Usability in Home Appliances. In *Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and 44th Annual Meeting of the Human Factors and Ergonomics Association, 'Ergonomics for the New Millennium'*.

[6] Brombacher, A. C. (2005) Reliability in strongly innovative products; a threat or a challenge?, *Reliability Engineering and System Safety*, vol. 88, pp 125.

[7] Kim, C. J., Chrisitaans, H. H. C. M. and van Eijk, D. J. (2007) Soft Problems in Using Consumer Electronic Products. In *IASDR conference*, Hong Kong.

[8] Khalid, H. M. (2006) Embracing diversity in user needs for affective design, *Applied Ergonomics*, vol. 37, no. 4, pp 409-418.

[9] Aykin, N. M. and Aykin, T. (1991) Individual Differences in Human-Computer Interaction, *Computers & Industrial Engineering*, vol. 20, no. 3, pp 373-379.

[10] Chen-Yu, J. and Hong, K. H. (2002) Antecedents and consequences of consumer satisfaction/dissatisfaction with the performance of apparel products at purchase and after consumption: a comparison of male and female South Korean consumers, *International Journal of Consumer Studies*, vol. 26, no. 2, pp 117-127.

[11] Keng, K. A. and Liu, S. (1997) Personal values and complaint behaviour : The case of Singapore consumers, *Journal of Retailing and Consumer Services*, vol. 4, no. 2, pp 89-97.

[12] Leventhal, L., Teasley, B., Blumenthal, B., Instone, K. Stone, D. and Donskoy, M. V. (1996) Assessing user interfaces for diverse user groups: Evaluation strategies and defining characteristics. *Behaviour and Information Technology*, vol. 15, no. 3, pp 127-137.

[13] Mooradian, T. A. and Olver, J. M. (1997) "I can't get no satisfaction:" The impact of personality and emotion on postpurchase processes, *Psychology & Marketing*, vol. 14, no. 4, pp 379-393.

[14] Stephens, N. and Gwinner, K. P. (1998) Why don't some people complain? A cognitive-emotive process model of consumer complaint behavior, *Journal of the Academy of Marketing Science*, vol. 26, no. 3, pp 172-189.

[15] Ndubisi, N. O. and Ling, T. Y. (2006) Complaint behavior of Malaysian consumers. *Management Research News*, vol. 29, no. 1/2, pp 65-76.

[16] Hofstede, G. (2003) *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. 2 Ed., London: Sage Publications, Inc.

[17] Kim, C.J., Chrisitaans, H. H. C. M. and Diehl, J. C. (2006) Exploring the influence of culture in consumer electronic products. In *16th World Congress on Ergonomics IEA 2006*. Maastricht, the Netherlands: International Ergonomics Association.

[18] Ono, M. (2006) Design and Culture: essentially interlinked, plural, variable, and beyond the predictable. *Journal of Design Research*, vol. 5, no. 1, pp 3-15.