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Online Consumer Health Information Organization: Users' Perspectives on Faceted Navigation

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Abstract: We investigate facets of online health information that are preferred, easy-to-use and useful in accessing online consumer health information from a user's perspective. In this study, the existing classification structure of 20 top ranked consumer health information websites in South Korea were analyzed, and nine facets that are used in organizing health information in those websites were identified. Based on the identified facets, an online survey, which asked participants' preferences for as well as perceived ease-of-use and usefulness of each facet in accessing online health information, was conducted. The analysis of the survey results showed that among the nine facets, the "diseases & conditions" and "body part" facets were most preferred, and perceived as easy-to-use and useful in accessing online health information. In contrast, "age," "gender," and "alternative medicine" facets were perceived as relatively less preferred, easy-to-use and useful. This research study has direct implications for organization and design of health information websites in that it suggests facets to include and avoid in organizing and providing access points to online health information.

1.0 Introduction

Online consumer health information websites, which specifically provide health information to the general public, have become prevalent in our lives with the growing number of online health information (Robins et al. 2010). A Pew Charitable Trust survey found that approximately 80% of American Internet users, which are about 113 mil-

lion adults, have searched online health information (Fox 2006), indicating that there are many people who use online health information. When people feel curious about certain health problems about themselves or others, they can simply type in their search key words on the Web to get search results from various sources including consumer health websites, or directly visit such websites.

Like any other websites, online consumer health websites are organized in certain ways to facilitate users' finding health information that resides in them. However, the organization of consumer health information websites is not standardized, and they are often designed without understanding the theoretical principles of information organization. Although online health information has a lot of advantages, including fast access and anonymity, the use of information can be hindered because of disorganization of information on the Web (Cline and Haynes 2001). Moreover, consumer health information websites are often organized without an in-depth understanding of a user's preferences, perceived easiness and usefulness in accessing information. In the case of websites that utilize a faceted approach to information organization, facets are often provided without investigating the user's preferences for facets in accessing health information, although there is a possibility that the users might find those facets difficult to use in accessing needed information. Russell-Rose and Tate (2013) argued that when designing a website to support finding information, it is crucial to identify and understand the users so that a website can be designed in a way that meets users' needs. Cline and Haynes (2001, 684) also stated that "the basic premise behind the ease of use is designing a website that builds on the user's perspective," and "navigability is facilitated by organizing and grouping ideas and information by categories that make sense from the consumer's perspective." Thus, it is important to understand which facets users prefer to use, perceive as easy-to-use and useful in accessing health information on websites.

We aim to examine facets that are preferred, easy-to-use and useful in accessing online consumer health information from a user's perspective so that online health information can be organized in a way that facilitates users finding needed information. In this study, we analyzed the organization of current online consumer health information websites in Korea to identify facets that are used in organizing online health information. Then, we conducted an online survey to examine users' preferences, perceived easiness and usefulness of those facets that we identified from the website analysis. The research questions of this study are as follows:

RQ1. What facets are currently used in online consumer health information websites?

RQ2. Which facets do users prefer in accessing online consumer health information?
RQ3. Which facets do users perceive as easy-to-use in accessing online consumer health information?
RQ4. Which access facets do users perceive as useful in accessing online consumer health information?

This paper is organized as follows: In the next section, we provide background information and review the literature and related works on online information organization, online health information, and online health information organization. This is followed by Section 3, which explains our research methodology. In Section 4, we present our results along with supportive data for our findings and include a discussion of these results. Section 5 summarizes our work and presents our conclusions.

2.0 Background and Related Work

2.1 Online information organization

Websites are organized in certain ways in order to facilitate users' access to information on the websites, either by providing general directories or several access points (Zhang et al. 2009). On the one hand, some websites provide subject directories, which allow people to browse information by categories and sub-categories. This interface is developed based on the principle of hierarchical classification structure, which begins with broad, top-level categories that branch into more specific, subordinate-level categories. On the other hand, other websites use interfaces utilizing the principle of faceted classification by providing multiple access points in which each access point works as a facet, "a generic term used to denote any component of a compound subject, also its ranked forms, terms and numbers" (Ranganathan 1967, 88). On websites, facets are sometimes called "categories," and typically they are used as navigation or search tools (La Barre 2006b, 181, 183). When a faceted approach is used, users can navigate information on the website by continuously refining their choices in each facet (Russell-Rose and Tate 2013). Compared to hierarchical classification structure, faceted classification structure is more flexible, and provides a more refined representation of information (Hudon 2010). Particularly, facets allow the expression of various aspects of information resources and provide multiple access points, which make them especially effective in organizing information on the Web. A faceted display of the classification also encourages users to articulate different aspects of their information need (Tang 2007). Because of such benefits, there has been growing interest in using a faceted approach to organize digital information resources (Priss

and Jacob 1999; Ellis and Vasconcelos 2000; Broughton 2002; Yoo 2004; La Barre 2006a; La Barre 2006b; Tang 2007; Choi 2009). In addition, several researchers developed faceted classification schemes that can be used in classifying information resources on the Web (Van der Walt 2004; Zins and Guttmann 2000; Kwak 2001; Hudon 2010). However, little research has suggested faceted classification for online health information based on the analysis of users' preferences.

2.2 Online health information

Currently, the interests and uses of online health information are increasing. This is not only because the number of people who find health information on the Web is growing (Fox 2006), but also because online health information has various advantages for the users. Online health information is accessible at any time, can be accessed by lay people, and can be acquired anonymously (Fox and Rainie 2000; Thobaben 2002; Eriksson-Backa 2003; Cotton and Gupta 2004). Thus, in recent years, online health information has become one of the serious areas of research studies.

Among studies on online health information, a number of studies examined the quality and credibility of online health information (Berland et al. 2001; Eastin 2001; Eysenbach et al. 2002; Thobaben 2002; Dutta-Bergman 2004; Stvilia et al. 2009; Robins et al. 2010). In these studies, the researchers found that the quality of health information websites vary, and many sites lack quality and credibility so that they often include incomplete, inaccurate, confusing, and conflicting information on a topic (Berland et al. 2001; Eysenbach et al. 2002; Thobaben 2002; Hesse et al. 2005). Some researchers examined the factors that impact the credibility of the consumer health information websites. For instance, Robins et al. (2010) investigated the relationship between visual design and the perception of credibility of consumer health information websites. Robins et al. (2010, 25) asked 34 participants to rate preferences for visual designs of 31 consumer health information websites as well as credibility, and found that the visual designs of the consumer health information websites are related to the perceived credibility of the sites. Eastin (2001) investigated the relationship between source expertise, topic knowledge, and perceived credibility of online health information by asking 125 participants to assess health-related websites with a known topic (HIV) and an unknown topic (syphilis), and health information provided from an expert (doctor) and a non-expert (high school freshman). In this study, the author found that both topic knowledge and source expertise affect the perception of the credibility of health information websites. In a similar vein, Dutta-Bergman (2004) found that the completeness of consumer health information strongly impacts the online consumer

health information's credibility judgments. Eysenbach et al. (2002) reported that accuracy, completeness, readability, design, disclosures, and references are the most frequently cited criteria in assessing the quality of consumer health information on the Web.

There have been also studies that examined online health information searching behaviors of various user groups (Erikson-Backa 2003; Cotton and Gupta 2004; Warner and Procaccino 2004; Crystal and Greenberg 2006; Given et al. 2007; Ybarra and Suman 2008). For instance, Given et al. (2007, 615) examined senior users' online health information seeking behaviors with a special focus on the usability of the health information websites and senior users' searching strategies by interviewing 12 participants. Given et al. reported that senior users regard people (e.g., physicians, pharmacists) and the Internet as good resources for health information. Also, the researchers suggested that online health information websites need to have big and clear images for the senior users and include information about drug interactions as well as side effects. Warner and Procaccino (2004) paid special attention to female users and explored their health information seeking behaviors by conducting a survey with 119 female participants. Warner and Procaccino (2004, 720) found that women are active health information seekers, and they had conflicting opinions about easiness of finding health information, usefulness of the health information they found, and whether their information questions had been answered. Consumer health information in Warner and Procaccino's study (2004) included both physical and online health information, and in terms of online health information, the researchers stated that while female users often use online health information, they were not particularly good at finding qualified resources. Ybarra and Suman (2008, 93) investigated gender and age differences in using online health information. By analyzing national data which surveyed Americans by phone, the researchers found differences between gender as well as age in reasons for finding online health information, evaluating online health information and taking actions after finding online health information. Similarly, to explore whether there are any differences in health information seeking behaviors based on users' gender, age, education, occupation, and health status, Erikson-Backa (2003, 95) interviewed 50 participants who are (1) pregnant women, (2) people who have diabetes, and (3) people who are not pregnant and do not have diabetes. Erikson-Backa (2003, 93) found that both pregnant women and people with diabetes were more active in seeking online health information than people who are not pregnant and do not have diabetes. In terms of gender, men were more active in reading while women were more active in discussions. In the case of age, younger participants were more active than older participants.

As shown above, there have been a number of studies on online health information that investigated the quality and credibility of online health information and explored information seeking behaviors of various user groups. However, fewer studies focused on the organization of online health information so that little is known about the classification structure of health information on the websites as well as users' preferences for the organization of online health information. Tang's (2007) study is one of the few studies that is related to organization of health information. In this study, the researcher examined whether an interface utilizing the principle of faceted classification is useful in browsing and searching information in PubMed. In this study, Tang (2007) found that participants preferred to use query submission methods together with the faceted classification display than only using query submission methods, indicating that faceted classification supports users' information access. Zhang et al. (2009) is another study that focused on the organization of online health information organization. In this study, Zhang's team analyzed health subject clusters based on the users' transaction log data on the health subject directory of health information websites. However, which facets facilitate accessing online health information for the users are not fully investigated yet. When designing a website using a faceted approach, it is critical to focus on user need, and user research is key in achieving this (La Barre 2006b, 155). Investigating which facets are preferred, easy-to-use and useful in accessing online health information is important to make online health information more accessible so that users can take full advantage of health information on the Web.

3.0 Methodology

To answer to the identified research questions, this study employed two-fold methodological approaches: analysis of classification structures of existing health information websites, and an online user survey.

3.1 Classification structure analysis

To analyze the classification structures that are currently used in organizing consumer health information on websites, the authors selected 20 websites that are the most frequently used consumer health information sites in South Korea. Top 20 sites were identified based on the usage statistics from rankey.com, which offers site usage statistics for websites in various fields in South Korea. The sample health information websites were visited in October 2011. The ranking numbers, the name of the websites, and their URLs are provided in Table 1.

Ranking	Website Name	URL
1	Health Chosun	health.chosun.com
2	Kormedi Dot Com	www.kormedi.com
3	Hidoc	www.hidoc.co.kr
4	Gungang IN	hi.nhic.or.kr
5	MK Health	www.mkhealth.co.kr
6	Joins MSN	healthcare.joinsmsn.com
7	Vitamin MD	www.vitaminmd.co.kr
8	eHospital	www.clinic.co.kr
9	Medcity	www.medcity.com
10	Doctor Korea	duser.doctorkorea.com
11	Think Medi	www.thinkmedi.com/
12	365 Homecare	www.365homecare.com/main.html
13	Health Korea	health.korea.com/
14	Cy Medi	www.cymedi.com/
15	Wise Women	www.wisewoman.co.kr/
16	Health MBC	www.healthmbc.com/
17	Korean Medi	www.koreanmedi.com/html/
18	My Doctor	www.mydr.or.kr/
19	Doctor	www.doctor.co.kr/
20	Health Hankyung	health.hankyung.com/

Table 1. Sample websites

As consumer health information websites often include information and materials other than health information, such as advertisements, in each site, web pages that specifically contain health information were analyzed for this study. Often, these were under the name of "health/medical information," "health/medical information center" or "health/medical encyclopedia." To identify facets that are used in organizing online health information, the researchers developed an initial coding scheme that includes definitions of possible facets and examples of each facet. Then, this coding scheme was further developed by carefully going through the sample websites. In particular, since each website used different terminologies to represent each facet, it was necessary for the authors to develop categories which could group similar facets, and select a terminology for each category in a way that best represented facets in each category. To develop these facet categories, the authors started with few examples of facets that are used in selected websites, and then continued to review more facets that are used in sample websites. In this process, some categories were eliminated, new categories emerged and some categories were combined or split. Then, the authors gave definitions to each facet category so that facets can be easily categorized for analysis. In addition, examples for each category were included. This became a final coding scheme for facet analysis in current health information websites for this study. The final version of the coding scheme is presented in Table 2.

Facet Category	Definition	Examples
Diseases & Conditions	Name of a disease, or a medical condition associated with a specific symptom.	Breast cancer, Depression, HIV/AIDS, High blood pressure
Medical Specialty	The branch of medicine.	Otolaryngology, Dentistry, Pediatrics
Body Part	Part or organ of a body.	Head, Feet, Eyes
Diagnostics	Name of test or process which attempts to identify a possible disease or disorder.	Allergy tests, MRI, Pregnancy test
Treatments & Procedures	Name of remediation of a disease or disorder.	Aortic valve surgery, Joint replacement, Radiation therapy
Nutrition	Name of nutrients.	Vitamins, Magnesium
Age	Specific age group.	Children's health, Teens' health, Seniors' health
Gender	Specific gender.	Men's health, Women's health
Complementary & Alternative Medicine	Name of healing practice that does not fall within the realm of conventional medicine.	Oriental medicine, Osteoarthritis Alternatives

Table 2. Coding scheme for website analysis

Based on this coding scheme, facets in sample websites were analyzed. In particular, for each site, the researchers analyzed:

1. Facet categories used in each site
2. The number of facet categories
3. The number of sub-facets in each facet.
4. The minimum, maximum, and average number of facets
5. The minimum, maximum, and average number of sub-facets
6. The depth of classification structures

Here, "sub-facet" refers to sub-categories under each facet category. For example, in the case of "Gender" facet category, most websites included "women" and "men" as sub-facet categories. In addition, the depth of classification structure refers to the level of hierarchy within each facet category. For instance, if a facet included a sub-facet, and sub-sub facet, the depth of the classification structure was marked as "3" as there were three levels of hierarchy in this facet.

3.2 Online survey

An online user survey was conducted using a questionnaire sent to 96 participants representing the general public in South Korea. Convenience sampling was employed, and we sent requests through email. We considered balancing gender and age as much as possible to better represent the general public. Twelve responses that were incomplete were excluded from the analysis. In total, 84 valid responses were collected. Among those 84 participants, 37 (44%) were male and 47 (56%) were female. As for age groups, participants who were in their 20s were 21 (25%), 30s were 22 (26%), 40s were 14 (17%), 50s were 14 (17%), and 60s were 13 (15%).

The questionnaire was designed to investigate users' preferences for and perceptions of ease-of-use and usefulness of the identified facets that are currently used in consumer health information sites in Korea. In the questionnaire, participants were asked to rate their preferences, perceptions of ease-of-use and usefulness of the selected facets using a five-point scale ranging from 1 to 5. The data were analyzed with descriptive statistics, including means and standard deviations, to identify which facets are preferred, easy-to-use and useful. In addition, a Kendall's tau-b correlation test was conducted to examine correlations among the three perceptions of facets – perceived preference, easiness, and usefulness.

4.0 Results

4.1 Facets used in current consumer health information sites

By analyzing the organization of 20 consumer health information sites, the following nine facet categories were identified: 1) diseases & conditions (e.g., breast cancer, depression); 2) medical specialty (e.g., otolaryngology, dentistry); 3) body part (e.g., head, feet); 4) diagnostics (e.g., allergy tests); 5) treatments & procedures (e.g., adrenal surgery, aortic valve surgery); 6) nutrition (e.g. vitamins, magnesium); 7) age (e.g., children's health, seniors' health); 8) gender (e.g., men's health, women's health); and, 9) complementary & alternative medicine (e.g., oriental medicine). Table 3 shows identified facet categories and an indication of which website included which facet category. In this table, websites are displayed in their ranking numbers. Facets that are categorized as "Others" are unique facets that were used only in one website. Those facets included emergency, drug, topic, and special users.

Among nine facet categories, "diseases & conditions" was the most frequently used to provide an access point to online health information. Among 20 health information websites, 10 of the websites (50%) used facets that can be categorized into "diseases & conditions." In addi-

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Diseases & Conditions	o	o	o				o		o				o	o	o	o				o
Medical Specialty	o	o			o						o						o	o		
Body Part		o	o			o				o										
Diagnostics		o					o						o							
Treatments & Procedures		o					o	o												
Nutrition		o					o			o										
Age									o	o		o								
Gender									o	o		o								
Complementary & Alternative Medicine														o		o				
Others	o			o			o			o			o	o					o	o

Table 3. Facets used in 20 top-ranked consumer health information websites.

tion, "medical specialty" (30%) and "body part" (20%) also frequently were used.

Number of facet categories, sub-facets, and the depth of the classification structure for each website along with their average, median and range are presented in Table 4. In this table, websites are displayed in their ranking numbers.

As shown in Table 4, the number of facets used in each site ranged from 1 to 5, and the mean number of facets was 2.2 while the median number was 2. Thus, it seemed that quite a few were being used to provide access to health information on the websites. In the case of sub-facets, they ranged from 0 to 51, which showed that the number of sub-facets for each facet varies. However, the average number, which was 9, and the median number, which was 5, indicated that few sites with many sub-facets impacted the range. In fact, among 45 facets, only 16 facets (36%) had more than 10 sub-facets, which mean that 29 facets (64%) included less than 10 sub-facets. As shown in the table, there was one website which did not use any sub-facets. In this case, if a user clicks one of the facets, such as "Diseases & Conditions," the user encounters a list of thousands of health information topics that are not organized by any sub-facets. In the case of the facet that had 51 sub-facets, the website organized the "Nutrition" facet by using 51 sub-facets, where each of the sub-facets was a nutrient such as "vitamin B1," "vitamin C," and "vitamin K." The depth of the classification structure ranged from 1 to 5, the mean number of the depth was 2.4 and the median was 2, which indicates that most sites have multiple levels of hierarchy for each facet. However, there was only one facet category in which the depth was 5, and most facet categories did not have a deep classification structure. In addition, it seemed that there were no differences in the depth of classification structure among the facet categories.

4.2 Users' perception of preference, ease-of-use and usefulness

First, user preference was investigated using a five-point scale. Table 5 presents users' ratings of preference about which facets they like to use to access health information in a consumer health information site. The results indicate that users preferred "diseases & conditions" (4.11), "body part" (3.76), and "nutrition" (3.33) the most, ranked 1st, 2nd, and 3rd respectively. On the contrary, "alternative medicine" (2.62) and "gender" (2.67) turned out to be least preferred facets to users. The results reveal that the most widely used facets were also preferably selected, such as "diseases & conditions" and "body part." However, users' demographic characteristics, such as "age" and "gender," were relatively less preferred. Interestingly, "alternative medicine" was selected as the least preferable facet even though oriental medicine is widely available in Korea.

Secondly, the survey participants were asked to rate perceived ease-of-use. Similar to the previous result, "diseases & conditions" (4.11), "body part" (3.81), and "nutrition" (3.21) were ranked 1st, 2nd, and 3rd respectively. "Medical specialty" (3.18) and "diagnostics" (3.18) were tied at the 4th rank in terms of ease-of-use. Then, "gender" (3.08) and "age" (3.05) followed, ranking 6th and 7th respectively. However, users thought that "treatments & procedures" (2.83) and "alternative medicine" (2.64) would be less easy-

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Sample Website	Facet Categories	Number of Facet Categories	Number of Sub- facets	Depth of classification structure
1	Diseases & Conditions	3	20	2
	Medical Specialty		23	2
	Diseases & Conditions		2	2
2	Diseases & Conditions	3	20	2
	Medical Specialty		22	2
	Body Part		11	3
3	Diseases & Conditions	4	0	1
	Diagnostics		0	1
	Treatments & Procedures		0	1
	Nutrition		0	1
4	Others (Korean alphabets)	1	14	2
5	Medical Specialty	1	10	2
6	Body Part	1	7	3
7	Diseases & Conditions	5	14	1
	Diagnostics		14	1
	Treatments & Procedures		2	2
	Nutrition		51	1
	Others (drug)		2	2
8	Treatments & Procedures	1	5	1
9	Diseases & Conditions	3	5	2
	Age		2	2
	Gender		2	2
10	Body Part	5	12	3
	Nutrition		3	2
	Age		2	3
	Others (topic)		19	2
	Others(health functional food)		1	2
11	Medical Specialty	1	25	2
12	Age	2	1	2
	Gender		2	2
13	Diseases & Conditions	4	3	4
	Diagnostics		3	4
	Others (subject)		3	4
	Others (theme)		8	3
14	Diseases & Conditions	3	1	4
	Complementary & Alternative Medicine		1	4
	Others (medicine)		3	5
15	Diseases & Conditions	1	9	4
16	Medical Specialty	2	17	3
	Complementary & Alternative Medicine		7	3
17	Medical Specialty	1	14	2
18	Medical Specialty	1	23	3
19	Others (professional clinic)	1	8	3
20	Diseases & Conditions	2	8	3
	Others (medical information)		5	2
Mean		2.2	9.0	2.4
Median		2	5	2
Range		4	51	4

Table 4. Facet categories, sub-facets, and the depth of classification structure

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Facet	Mean	Rank	Standard deviation
Diseases & Conditions	4.11	1	0.92
Medical Specialty	3.02	6	1.09
Body Part	3.76	2	0.90
Diagnostics	3.19	4	1.12
Treatments & Procedures	3.08	5	1.12
Nutrition	3.33	3	1.13
Age	3.00	7	1.11
Gender	2.67	8	1.13
Alternative Medicine	2.62	9	1.12

Table 5. Users' perception of preference of facets

Facet	Mean	Rank	Standard deviation
Diseases & Conditions	4.11	1	0.81
Medical Specialty	3.18	4	0.89
Body Part	3.81	2	0.90
Diagnostics	3.18	4	1.05
Treatments & Procedures	2.83	8	1.14
Nutrition	3.21	3	1.12
Age	3.05	7	0.99
Gender	3.08	6	1.01
Alternative Medicine	2.64	9	0.93

Table 6. Users' perceived ease-of-use of facets

to-use. One thing notable is that "alternative medicine" was also ranked at the lowest in the case of easy-to-use facet. Users regarded the facet of "alternative medicine" as the least preferable and least easy-to-use facet when they access health information on the Web. Table 6 displays users' ratings of perceived ease-of-use of the selected facets.

Facet	Mean	Rank	Standard deviation
Diseases & Conditions	4.27	1	0.72
Medical Specialty	3.40	4	0.84
Body Part	3.60	2	0.84
Diagnostics	3.48	3	0.96
Treatments & Procedures	3.35	5	1.05
Nutrition	3.33	6	1.09
Age	2.98	7	0.92
Gender	2.83	8	1.00
Alternative Medicine	2.76	9	1.03

Table 7. Users' perceived usefulness of facets

Third, we investigated which facets users would consider useful when accessing health information online. Table 7 presents users' ratings of perceived usefulness of the selected facets. The top two most useful facets turned out to be "diseases & conditions" (4.27) and "body part" (3.60). These two facets were also chosen as the most preferred and ease-to-use by the participants. Also, the values of standard deviations for these two facets were relatively low ("diseases & conditions" s.d. = 0.72; "body part" s.d. = 0.84). This result reveals that the participants' responses were more consistent in rating these facets as useful access points. "diagnostics" (3.48; 3rd) and "medical specialty" (3.40; 4th) were also perceived as highly useful facets in using consumer-level health information. "Nutrition" (3.33), which was placed as the 3rd in preference and ease-of-use, was ranked 5th in terms of usefulness. Users preferred to use "nutrition" information and thought it as an easy-to-use facet, but it was regarded as less useful comparatively. Both "age" (2.98) and "gender" (2.83) were relatively rated low in their usefulness as a

Facet	Preference		Ease-of-use		Usefulness	
	Mean	Rank	Mean	Rank	Mean	Rank
Diseases & Conditions	4.11	1	4.11	1	4.27	1
Medical Specialty	3.02	6	3.18	4	3.40	4
Body Part	3.76	2	3.81	2	3.60	2
Diagnostics	3.19	4	3.18	4	3.48	3
Treatments & Procedures	3.08	5	2.83	8	3.35	5
Nutrition	3.33	3	3.21	3	3.33	6
Age	3.00	7	3.05	7	2.98	7
Gender	2.67	8	3.08	6	2.83	8
Alternative Medicine	2.62	9	2.64	9	2.76	9

Table 8. Users' perceived preference, ease-of-use, and usefulness of facets

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facet. Once again, "alternative medicine" (2.76) was perceived least useful when using consumer health information.

This study also compared users' ratings of the three difference perceptions—preference, ease-of-use, and usefulness. As shown in Table 8, in all the three cases, "diseases & conditions" was selected as the top, with the rating scores higher than 4 point out of 5. That is, "diseases & conditions" is considered to be the most preferred, easy-to-use, and useful facet in organizing information in consumer health information sites. Also, "body part" was selected as the second ranked in all three different types of perceptions investigated in this study. In particular, the score of ease-of-use (3.81) was relatively high compared to preference (3.76) and usefulness (3.60). The facet of "diagnostics" was also ranked relatively high in all three perceptions. In the case of "nutrition," users thought it preferable and easy-to-use when using consumer health information. However, it was perceived less useful by being ranked 6th. On the other hand, the "treatments & procedures" facet was ranked 5th in both preference and usefulness respectively, but participants thought it less easy-to-use when accessing health information. The facets of "age" and "gender" were relatively less preferred and considered less useful. The "alternative medicine" facet was the least preferred, easy-to-use, and useful amongst the facets suggested in this study.

A Kendall's tau-b correlation analysis result implies that all three perceptions, ease-of-use, preference, and usefulness, would be closely related to each other (p<0.05). Correlation coefficients turned out to be high in all three pairs observed by showing over 0.6. In particular, the correlative relationship between preference and usefulness was the highest (τ_b= .761, p<0.01), which implies useful facets would be preferred by users. On the contrary, the correlation coefficient between ease-of-use and usefulness was relatively low (τ_b= .648, p<0.05). The correlation table is displayed in Table 9.

	Preference	Ease-of-use
Ease-of-use	.761**	
Usefulness	.778**	.648*

Table 9. Kendall''s tau-b correlation among three perceptions of facets (* p<0.05; ** p<0.01)

5.0 Discussion and Conclusions

We investigated the organization of online health information by analyzing facets that are currently used in organizing 20 top-ranked consumer health information websites in South Korea. Each site offered different types and number of facets to provide access points to online health information, and often used varying terminologies for similar facets. In this study, by grouping similar facets into categories, nine facets were identified. Among nine facets, the "diseases & conditions" and "medical specialty" facets were the most widely used facets among the websites. On average 2.2 facets were provided, which means that only a small number of facets are implemented as access points to online health information in the sites. A further analysis of the facets showed that the numbers of sub-facets varied greatly by websites. In the case of the depth of organizational structure, the average number was 2.4, which mean that the level of hierarchy for each facet is not very deep. Overall, the analysis revealed that there is little consistency in organizational structure across the selected online health information sites, which can make finding health information difficult for the users.

Based on the identification of facets, this study surveyed users' perceptions of those facets with regards to preference, ease-of-use, and usefulness. The survey results explicitly uncovered that "diseases & conditions" was the most preferred, easy-to-use, and useful when accessing health information in the perspective of users. The "body part" facet, such as names of organs or body parts, was also preferred and perceived as easy-to-use and useful. Users showed their preference for the "nutrition" facet, and they also thought it would be easier to use as well. However, they did perceive it less useful. Considering the fact that the most widely used facets in health information websites were "diseases & conditions" and "medical specialty," current health information websites seemed to reflect users' preferences to some extent; however, more thorough and deeper understanding is necessary. On the other hand, two key demographic facets, "age" and "gender," were relatively less preferred, easy-to-use, and useful by the subjects. Even though these two facets serve as the basic access points, users were less likely to prefer these facets in using health information. Finally, "alternative medicine" turned out to be least preferred, easy-to-use, and useful according to users' perceptions. Even though Korean health information sites include a fair amount of oriental and alternative medicine information, users were less likely to prefer this facet when accessing online health information.

These findings could yield direct implications in organizing health information. For example, when designing a consumer health information site, "diseases & conditions" and "body part" should be given priority among other facets. In designing a health information site, these two facets should be the basic access points to help users reach complex health information. Also, "diagnostics" and "nutrition" should be emphasized in guiding users to access the appropriate information they want. The "treatments & procedures" facet was also widely used, and us-

ers would benefit from facet categories related to the "treatments & procedures." However, users felt that the "treatments & procedures" facet would be relatively difficult to use. Therefore, it is required to help users to use this type of facet more easily by providing more user-oriented terms in describing treatment and procedures in the medical area. La Barre (2006b, 187) also emphasized the importance of selecting terminologies that are familiar to the user. Although significant correlations were observed, there were gaps amongst preference, ease-of-use, and usefulness. This implies that we should consider different aspects of user perceptions in designing a faceted structure of a health information site at the consumer level. When consumer health information websites are organized and designed based on a thorough understanding of a user's perspective, it will not only make health information on websites more accessible, but also will likely provide more consistency across health information websites, which will further support accessing and utilizing health information on the Web.

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