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ABSTRACT

This study reports on an exploratory investigation of quality criteria classification of informational health websites using the Kano model. The results showed that quality features are of three types: (i) *basic* features which are the minimal requirements the consumers expect; (ii) performance features, which are the ones that maximize the consumers satisfaction with the health website; and (iii) the exciting features which are the delighters, the consumers do not consciously expect. The findings indicate that providing accessible website with high quality content that are friendly usable and trustworthy are basic quality features. On the other hand, features of visually appealing website, and human and/or automated feedback mechanisms are performance features that maximize the consumers satisfaction. Developing a health website that incorporates culturally-appropriate materials and employs interactive learning tools such as simulation or puzzles delights consumers and makes the website a leader in it space.

Keywords

 Health website, quality, Kano model, satisfaction, website usability, information quality.

INTRODUCTION

The emergence of the web has enabled health consumers to become more proactive in managing their health by accessing information published in health websites. In the United States, about 61% of adults go to the web for information seeking to assess their health risks, manage chronic conditions and decide treatment regimes (ComScore, 2008; PewResearch, 2009). To cope with this situation, a considerable number of initiatives were established to understand quality criteria of health websites (e.g. Charnock et al., 1999; Griffiths and Christensen, 2005; Hinchliffe and Mummery, 2008; Swaid, 2010) to support developing high quality websites that meet consumers expectations and satisfy their needs. As such, some organizations took active role in these efforts (e.g., Rock Hill Communications, Health On the Net, Consumer Reports Web Watch) (Health Information Institute. 1996; RockHill, 2001). However, no study addressed the classification of the quality features or investigated if health consumers perceive some quality features as more important than the others. Based on Herzberg's theory (Herzberg, 1966) that differentiates between hygiene and motivator features to explain customers satisfaction and dissatisfaction with products, the Kano model (Kano et al., 1984) is developed to categorize features into different levels of quality levels. The objective of this study is to apply the Kano model to classify the quality criteria of informational health websites. The focus is mainly on the quality of informational health websites that are developed for health communication and include "disease prevention, health promotion, health care policy, and the business of health care as well as enhancement of the quality of life and health of individuals within the community" (Healthy People, 2010, p. 11). Health websites that are included in this study provide some degree of interactivity promoting active user control (e.g., navigational tools, internal hyperlinks, interactive quizzes, interactive activities, and responding to consumers questions), in addition to health information content.

LITERATURE REVIEW

Large number of heath websites are existent to disseminate health-related information, services and medical literature to health consumers and professionals. Generally, health websites can be of four types: (i) health portals that are developed as gateways including search engines and lists of links to other health-oriented websites; (ii) informational websites that are

developed to communicate information to health consumers, health professionals, and other specified groups of individuals; (iii) behavior change websites that support health behavior change such as weight loss or quitting smoking; and (iv) transactional websites that communicate information of health products and/or services to support direct and/or indirect sale to consumers and health professionals. Identifying the quality factors of informational health websites that could explain consumers satisfaction and thereby usage, have attracted a number of studies. Some of these studies developed evaluation instruments, while others generated lists of quality criteria that should be used when developing health websites. For example, Charnock and his colleagues (Charnock et al., 1999) developed the DISCERN instrument to judge the quality of written information about treatment choices. Also, another study developed the JAMA Benchmarks to evaluate health information using attributes of authorship, attribution, disclosure and currency (Silberg et al., 1997). Another tool focused on the Suitability Assessment of Materials (SAM) (Meade et al., 1991). The SAM model includes 22-item instrument to test written materials on six measures of content, literacy demand, graphics, presentation, learning simulation/motivation and cultural appropriate. In another attempt to test the usability of health websites, Hinchliffe and Mummery (2008), tested the health website usability. In their study, themes of design, feedback, format, instructions, navigation, terminology and learnability were identified (Hinchliffe and Mummery, 2008). Also, Griffiths and Christensen developed an instrument to measure health website quality using factors of site characteristics, evidence-based guideline of content, DISCERN scores, Google PageRank and user satisfaction (Griffiths and Christensen, 2005). As such, a number of organizations created evaluation tools or compiled a criteria set for health websites. For example, the Rock Hill Communications has issued Web Feet for Health, a list of 24 statements that covers criteria of source, information, timeliness and link (Breckons et al., 2008). Other efforts were guided by the GrwothHouse.org who developed the quality criteria that guarantee a star-seal indicating the website quality (GrowthHouse, n.d.). The criteria identified by GrowthHouse are content, exclusion criteria, geographical scope, commercial content, positive emotional tone, links, technical design, availability and currency. Health on the Net (HON) foundation developed their codes that help health website users in identifying quality sites (Health Information Institute, 2007). The NOH's principles are authoritative, complementarity, privacy, attribution, justifiability, transparency, financial disclosure and advertising policy. The Health Improvement Institute and the Consumer Reports WebWatch generated a list of 115 quality criteria of nine domains of content relevance, content accessibility transparency, links, quality assurance and safeguards (Health Information Institute, 2007). Although these studies provide fruitful insights on quality features that should be present to meet health consumers needs, it does not test whether consumers perceive some design features as more important than others.

Kano Model

Based on the Herzberg's motivation-hygiene theory (Herzberg, 1966), Kano, developed his model that is linearly linked to satisfaction (Kano et al., 1984). According to the Kano model, there are three levels of quality expectations for products and services that must be met. The three levels are: (i) Basic; (ii) Performance and (iii) Exciting features. *Basic* quality encompasses attributes that consumers take for granted and they are the minimum acceptable set of features. Their presence is not noticed, but their absence will result in complaints and dissatisfaction. Quality features that are classified as *Performance* quality are the consciously stated needs. The presence of performance criteria is noted, while their absence results in disappointment or disadvantage. On the other hand, the *Attractive* quality criteria are the ones that delight consumers and they are unexpected ones. Their absence will not result in any disadvantage, but their presence will delight consumers and inspire loyalty. The Kano model has the advantages of identifying the quality and an explanation for the transition of features to different quality categories over time. This model recognizes that quality perceptions change over time, which may provide more realistic timing of the assessment of quality (Kano et al., 1984).

THE STUDY

In order to systematically, examine the classification of quality features, the Kano model is applied. The strength of the Kano model is the classification of the features to: (i) basic quality that form the antecedents of consumers satisfaction with the website; (ii) performance features that maximize consumers' satisfaction and (iii) exciting features that delight consumers. The study hypothesizes that quality features of health websites can be categorized into the three quality types suggested by the Kano model : basic, performance and exciting. Basic features are the minimum quality features that are taken for granted and the ones that allow the website to get in the space of health websites, while performance features are the ones that keep the website in the space of health websites and contribute to its quality. Exciting features are the features that make the consumers delighted with the website and make the website the leader among health websites.

Data Collection

Based on a previous study on health website quality (Swaid, 2010), a nine-factor solution including 47 quality features are generated to capture user perception of informational health website quality (see Table 1). A group of 154 students participated in the study during the Summer of 2011 at two universities in the Mid-South. Participants used the web for health information seeking for at least three times in the last six months. Their ages range from 22 to 43 years old with an average web use of around 16.2 hours per week. About 60% of the participants were female and 53% of them were African Americans. The quality features were arranged in a questionnaire following the Kano model recommendation (Kano et al., 1984). The participants were asked to judge the quality type of each of the features as basic, performance, exciting or unclear quality. Two questionnaires were deleted due to missing data, resulting in having 152 complete questionnaires to be included in the study.

RESULTS AND DISCUSSIONS

 Only, a limited number of features had unclear quality for more than 20% of the participants (i.e., F4-6 and F8-3) (see Table 1). Most of the subjects were able to categorize the feature types into basic, performance or exciting. In order to assign a weight score for each of the features, every feature that had basic, performance and exciting, a weight of 1, 2 or 3 was assigned accordingly (Zhang and Dran, 2001). Therefore, the q-score for each feature was calculated as: (B_N_Subject X 1 + P_N_Subject X 2 + E_N_Subjects X 3) ÷N_Subjects.

The variable B_N_Subjects is the number of subjects who classified the feature as basic, while the variable P_N_Subjects is the number of subjects who classified the feature as performance , and E_N_Subjcets is the number of subjects who classified the feature as exciting. The variable N_Subjects is the total number of participants. Figure 1 shows the averaged scores plotted by order of the q-score.
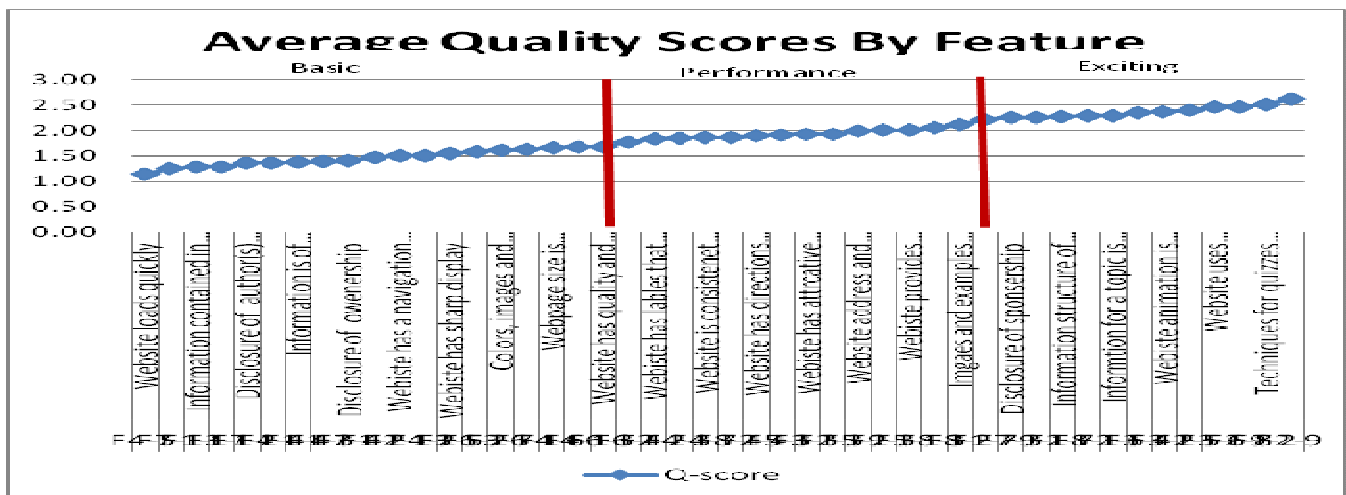

Figure 1. Average quality scores for health websites quality features

The procedure applied in similar studies (e.g., Zhang and Dran, 2001) was followed in this study to divide the features into the different three quality types. The features were divided to three groups based on the significant jump and the semantic meaning of the features around the division points. As shown in Figure 1, the division between basic and performance types were between F6-4 and F2-2. The division between performance and exciting was between feature F1-7 and F7-3. The divisions indicate that there are different types of quality features. The basic quality features that form the minimum quality requirement for health websites. The performance quality features are the ones that give the website advantage, and the exciting features are the delighters that consumers did not expect and did not consciously know. Based on Kano model application, the minimal quality for a health website is to be accessible all times, have accurate and updated information, accreditation labels, reputable organizations behind the website, with the author information disclosed and a powerful navigation support system.

Feature ID	Feature
F4-5	Website loads quickly
F7-1	Disclosure of authorship
F1-1	Information contained in the website is current and timely
F3-1	Website interface is visually appealing
F7-2	Disclosure of author(s) qualification and affiliation
F4-4	Website is accessible all times
F1-4	Information is of appropriate level of readability and easy to understand
F1-3	Information contained in the website is at the right level of detail
F7-4	Disclosure of ownership
F1-2	Information contained in the website is accurate and relevant
F2-1	Website has a navigation system that support browsing
F4-2	Standard navigation bar, home button and back/forward buttons on every page
F3-5	Website has sharp display
F6-2	Website has good reputation
F3-7	Colors, images and pictures are consistent, relevant and clear
F6-1	I feel this website is trust worthy
F4-6	Webpage size is reasonable
F4-1	Scrolling through pages is kept to minimum
F6-3	Website has quality and accreditation labels awarded by third parties
F6-4	Organization behind the website is reputable
F2-2	Website has labels that help me locate information
F4-3	Website supports different platforms and browsers
F4-7	Website is consistent across the webpages (buttons, images, multimedia.. Etc)
F8-4	There is a clear culture match
F2-4	Website has directions for navigation
F5-3	Website provide FAQ
F3-3	Website has attractive backgrounds and patterns
F2-3	Website has a query/search system that is very helpful
F5-2	Website address and contact information are included on all webpages
F9-3	Website is fun to use
F5-1	Website provides mechanisms for email and human responses
F8-3	Unbiased information
F8-2	Images and examples present culture is a positive ways
F1-7	Novel(new) information
F7-3	Disclosure of sponsorship
F9-1	Interactive learning or simulation is provided
F2-7	Information structure of website is logical
F8-1	Central concepts of materials appear culturally appropriate
F2-6	Information for a topic is compiled on one unified location
F3-4	Website has attractive images and titles
F3-2	Website animation is meaningful
F2-5	Website has website map
F3-6	Website uses appropriate multimedia
F2-8	Advertisement-related information is located consistently in one location across the webpgaes
F9-2	Techniques for quizzes and games are provided to improve learning health materials
F2-9	Information has consistent format (consistent headings, subheadings and summary regardless of the topical area)

Table 1. Quality features of informational health websites

On the other hand, features such as visual layout, and mechanisms for human and email contact are performance features, that maximize consumers satisfaction. The exciting features are the quality attributes that make the website a leader in its space, such as providing interactive learning tools, meaningful animation and multimedia, and matching the intended culture. Consumers do not expect informational health websites to provide interactive games and puzzles as a way to health education or culture-based content. Therefore, providing such quality features is a plus.

To understand the consumer perspective of the quality types based on quality dimensions rather than quality features, average q-score for the domains was calculated. Figure 2 shows the plotting the q-scores for the factors. According to Figure 2, factors of Information-Quality, Information-Organizations, Website-Usability, Trust and Identity are basic categories. The factors of Aesthetic -Design and Responsiveness are performance categories, and factors of Appropriate-to-Culture, and Learn-ability are exciting factors.
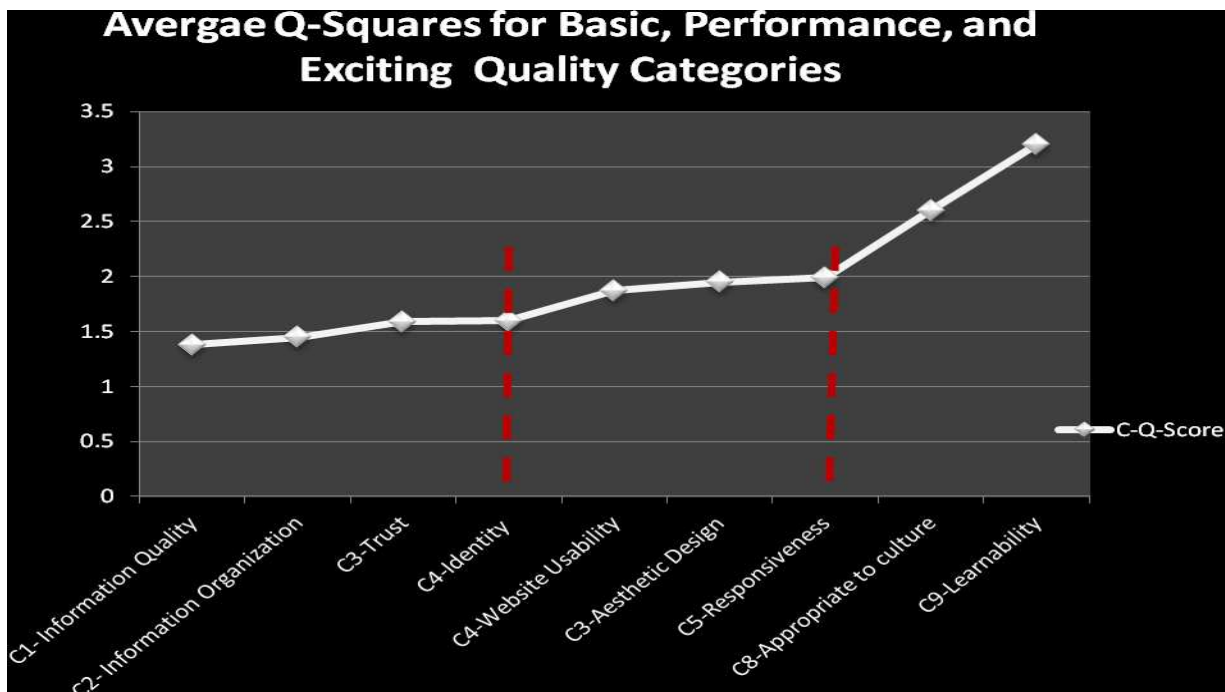

Figure 2. Average quality scores based on quality dimensions

CONCLUSION

One aspect of eHealth is consumers' use of new technologies to become better informed about their health and health care options. In response, a proliferation of health-related websites has emerged. Due to the impact of their quality on users, quality criteria of health websites should be identified and prioritized based on users' perception. This study is designed to understand quality criteria and its ranking from the perspective of its users. Results suggest that quality factors are not equally important. Quality dimensions and features are of different levels of priority. The findings should help website designers, content managers, and health professional working on developing web-based health interventions.

LIMITATIONS AND FUTURE RESEARCH

There are some limitations that should be highlighted. First, in this study the focus is on informational health websites that include health information and some degree of interactivity. However, quality of other health websites (e.g., behavior change websites) may suggest additional set of quality features that make such websites successful in promoting health behavior change. Also, in this study, quality items were identified and ranked based on the perception of the health information consumer. As quality is contextualized and should be evaluated based on the perception of the end-user, this study did not

consider the perception of health professionals and other user groups. Also, this study invited college students to participate in the study. Although young active web users form about 72% of web-based health information consumers (PewResearch, 2009), which matches the profile of students population, it would be interesting to replicate the study inviting other consumers with different demographic variables (e.g., race, age, and education). Understanding the role of these variables on quality evaluation warrants future research.

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