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HeWEK: Measuring the Health Website Quality From the Perception of the African American

Research-in-Progress

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Abstract

Unintentionally, the growth of health websites deepened health disparities between population subgroup as it considers the perception of some sub-populations and ignore the needs of others when designing health websites. This paper presents a study that aims onto considering the perception of the African American in identifying the quality attributes of health websites. Based on focus group research and two-round factor analysis, findings indicate that quality of health websites is a function of dimensions of Aesthetic Design', 'Website Usability', 'Information Quality', 'Information Architecture', 'Responsiveness', 'Trust', 'Identity', 'Appropriateness to Culture', and 'Learnability'. The paper provides useful messages for website designers, website content mangers, usability practitioners, and web-based healthcare program managers. Also, theoretical implications and limitation of the study are presented.

Keywords: Website Quality, E-health, Quantitative Analysis, Scale Construction, Minority

Introduction

As the Internet gains ground as a central resource for health information, an increasing number of health information consumers go online to assess their health risks, manage a chronic condition and decide on treatment regimes. In the US only, about 61% of adults look online for health information and around 60% of women rely on the internet for health information (ComScore, 2008, Pew Research, 2009). In July 2008, 41 million people (13.5 %) in the United States are African American, forming the second largest minority population (Office of Minority health, 2008) in the US and 31% of them go online for health information compared to 34% of the White and 20% of Hispanics. Health-related websites become an important tool that empowers health information consumers and patients (Miller et al., 2007; Street, 2003; Sadan, 2002). Unintentionally, the growth of health-based websites deepened health disparities between population subgroups (Eddens et al., 2009; Gilmour, 2007), as it considered the perception of some sub-populations and ignored the needs of others. Most concerns focused on digital divide and differences in health information access, however, differences may exist in the appropriateness of health website content (Eddens et al., 2009) and website design for diverse populations.

As the dissemination of health information online is growing, there is a need to improve our knowledge on how to design health websites that facilitate and support health consumers, especially for cultural and ethnic minorities. Some health organizations develop and maintain web presence without testing the quality of their websites (White and Raman as cited in Hinchliffe and Mummery, 2008). Thus, health organizations need evaluation instruments that help in testing the quality of their websites. Past research on health websites investigated issues such as health information quality, health information suitability and website usability (e.g., Bernstam et al., 2004; Gagliardi and Jadad, 2002; Purcell et al., 2002; Lewiecki et al., 2006; Nahm et al., 2004; Tjora et al., 2005; Lewiecki et al., 2006; Nahm et al., 2004). As such, the development of instruments to evaluate website quality has received great attention, and some suggest that their use by consumers can educate the users of the characteristics of good quality website (Breckons et al., 2008). Evaluation instruments work on the premise that they can identify “quality” sites on the assumption that sites that conform to indicators of quality are likely to contain accurate information (Breckons et al., 2008). However, studies that test the quality attributes of health websites from the perception of ethnic minority populations are rare (Childs, 2004).

As the number of health websites grows, it is important to ensure that health websites are developed in a way that matches the needs of their potential users. Minority populations such as women, seniors or ethnic and cultural minorities have special characteristics that poses different needs in information seeking online and website usability (e.g., Hope and Li, 2004; Latimer, 2009). Such differences can be explained by the disparities in accessibility to the internet (Porter and Donthu, 2006), website navigation skills (Gilmour, 2007), technology readiness level (Porter and Donthu, 2006) and information seeking behavior (Lorence et al., 2006). In the setting of using the web for health information, factors of internet self-efficacy and internet accessibility (Gilmour, 2007, Lorence et al., 2006) pose more challenges in using the website as a powerful medium for quick and dynamic knowledge distribution.

This paper reports findings from the first phase of developing the Health Website Evaluation Kit (HeWEK) based on eliciting the perspective of the African Americans. The second phase –to be published elsewhere- aims onto testing website quality attributes from the perceptions of the Hispanics. The rest of the paper is structured as follows. First a literature review on health website quality is presented. Second, research method and process of scale construction is discussed. Third, conclusion and implications are provided. The paper ends with discussion of its limitations.

Background

The very special nature of the web applications and websites pose unique quality evaluation challenges. Webmasters, web applications developers, and website quality assurance managers need tools and methods that can match up to the new needs of health website users. A number of evaluation tools have been developed focusing on health websites. For example, Tomita (1999) developed the Administration, Design, and Quality (ADQ) website evaluation method worksheet. According to the ADQ worksheet (Tomita, 1999), health website’s Administration characteristics of reputable affiliations, author/administrative names, author contact information, URL , website purpose, target population , website goals and website objectives should be up front and obvious to the users. The Design domain refers to elements of website, legend, and webpage, while Quality is a function of authority,

accuracy, currency, objectivity, coverage, presentation and usefulness. The ADQ model offers website designers guidelines on how to self-evaluate health websites. However, it is not clear how the domains and their elements were compiled, which result in questioning the scale's reliability and validity. As such, the GrowthHouse, Inc. developed the quality criteria of content, exclusion criteria, geographical scope, commercial content, positive emotional tone, links, technical design, availability and currency (GrowthHouse, 2010). Based on these criteria, health websites are awarded stars indicating their quality. However, these guidelines are not developed in a form of instrument that can be quantified and used to evaluate quality.

Also, the Rock Hill Communications has issued Web Feet for Health, a list of 24 statements that covers criteria of source, information, timeliness and link. However, the multi-item guide is a time consuming tool (Breckons et al., 2008). Health on the Net foundation (NOH) (Boyer et al., 2007) developed their codes that help health website users in identifying quality sites. The NOH's principles are authoritative, complementarity, privacy, attribution, justifiability, transparency, financial disclosure and advertising policy. The tool offers elements to be scored. It is easy to use and apply. However, the instrument did not consider culture-differences' cognitive ability in web-based health information consumption. Another set of guidelines was suggested by Nicoll's (2001) but, no scoring system was provided and the operational terms are not defined. The Health improvement Institute and the Consumer Reports WebWatch (HICRW) (2003) compiled 115 quality criteria elements of 9 domains of content relevance, content accessibility, content selection, content validity, content interchange and site transparency, links, quality assurance and safeguards. The rating tool is comprehensive but lengthy and average health information consumer will find difficulty in using it. Another instrument, the DISCERN (Charnock et al., 1999), is developed to help health consumers and health providers in judging the quality of written information about treatment choices. Therefore, the DISCERN tool focuses only on health information quality. Also, Griffiths and Christensen (2005) 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. This study is important in shedding insights onto some attributes of website quality. However, aspects of interface design and website structure are not included. Another study by Mummy et al. (2008) tested the health website usability. In their study, themes of design, feedback, format, instructions, navigation, terminology and learnability were identified. The study focus was website usability and did not go beyond the website interaction. Also, Silberg et al. (1997) developed the JAMA Benchmarks to evaluate health information using attributes of authorship, attribution, disclosure and currency. The study tests the quality of health website content. Another tool focused on the Suitability Assessment of Materials (SAM) (Doak et al., 1996). 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. The SAM model focused on the suitability of the content to their intended audience. Other evaluation tools have been developed to measure website quality in contexts of e-retailing, e-government, online education and library-based websites (e.g., Swaid and Wigand, 2009, Zhang and Dran, 2001; Loiacono et al., 2007). These evaluation instruments provided principles sets to be used in evaluation quality of websites. As quality is a function of its context of use (Bevan, 1995, Macload, 1994), the developed instruments may not be helpful to measure health websites quality. Moreover, user's characteristics have been found to affect user needs and preferences when interacting with websites (Hope and Li, 2004). According to Hofstede (1983), culture is: "...collective mental programming: It is that part of our conditioning that we share with other members of our nation, region, or group but not with members of other nations, regions, or groups". (p. 76). Three determining factors of population subgroups that might be expected to have an impact on needs and preferences are national or ethnic cultures, sex, and age (Hofstede, 1983). In a study that examined the effect of culture, sex and age on quality factors of online newspapers importance, significant differences were recognized based on culture (Hope and LI, 2004). Another study that compared between the perceptions of within-country different ethnicities (i.e., blacks and whites) in the United states in regards to quality of House campaign websites (Latimer, 2009), found that different groups have different perceptions and needs in terms of website quality. Such differences can be explained by the disparities in accessibility to the internet (Porter and Donthu, 2006), website navigation skills (Gilmour, 2007), technology readiness level (Porter and Donthu, 2006) and information seeking (Lorence et al., 2006). Moreover, research on online health information found that lack of internet self-efficacy, limited internet accessibility and ethnic-based differences in health information seeking (Gilmour, 2007, Lorence et al., 2006) pose more challenges in using the website as a powerful medium for quick and dynamic knowledge distribution.

Based on this review, there is a mere need for an evaluation instrument to be used to measure health website quality considering the perception of the African American. This study incorporates theories of Technology Acceptance

Model (TAM) (Davis, 1986), the Unified Model of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), the flow theory (Koufaris, 2002) and the SERVQUAL model (Parasuraman et al., 1988) in proposing the dimensions of health website quality.

Method

Evaluation of websites quality generally can be made using heuristic evaluations and/or empirical studies. In the case of applying heuristic method, a group of expert evaluators apply their expertise to conduct evaluations (e.g., Sutcliffe, 2001). Such approach may not permit to find problems related to typical users. In the second case where empirical method is used, a group of users with different backgrounds and skill sets are called to browse and evaluate the website (e.g., Swaid and Wigand, 2009). Empirical evaluation was found to be effective and necessary in evaluating website quality (Signore, 2005). Regardless of the method used, website quality measurement has been found neither simple nor straightforward (Aladwani and Plavia, 2001). Existent research on website quality pays less attention to construct quantifying through identification, measurement and validation. In this study, a two-round of data collection and analytical work is used to ensure developing a validated scale. Participants in each phase were asked to evaluate a health website that was sponsored by a governmental group who focuses on minorities' health issues.

Scale Construction

A number of frameworks have been suggested in constructing scales (e.g., Churchill, 1979; Segars; 1993; Anderson and Gerbing, 1988). Generally, there are four steps to develop a scale: (i) conceptualization; (ii) operationalization, (iii) design and (iv) normalization. The phase of conceptualization refers to defining the scope of construct and its related dimensions. This step is important to identify at early phase of scale development the scope of the study and its related literature. This helps in identifying related constructs. The second step is to operationalize the identified dimensions. This is conducted by generating a list of items that best represent the dimensions. Third step is the scale design. Usually this is done by data purification and analytical work. Usually, reliability analysis and factor analysis are applied to refine the sample of items and define the underlying constructs. Finally, the identified dimensions are tested in terms of their relationships with other stable and defined outcome variable. This step is called normalization. Also, at this phase, psychometric properties of scale in terms of its reliability and validity are tested. Next sub-sections describe the construction of the Health Website Evaluation Kit (HeWEK).

Conceptualization

The current study defines health web quality as the extent the website enables its users an effective health information consumption, comprehension and education. Delimiting the domain of the construct is important as it will guide to relative literature. Based on literature review of evaluation instruments, a number of dimensions were defined. To validate our work, additional focus group research was applied with a number of African American web users. Three focus groups were used with total of 24 African American users who used the web for health information search, consumption and education at least three times for the last six months. Participants' ages ranged from 21 to 27 years and more than 75% of the participants were females. Each focus group lasted for around 180 minutes and resulted in identifying eight dimensions: 'Information Quality', 'Aesthetic Design', 'Website Usability', 'Identity', 'Trust', 'Responsiveness', 'Appropriateness to Culture' and 'Learnability' (see Table 1).

Operationalization

It is essential to operationalize each dimension with a set of elements that best represent the dimension. Where possible, validated items from prior research were used to operationalize the dimensions. Non-existent measures were compiled using the focus group research and a sorting task practice following the recommendations of Nielson (2004). This step resulted in developing the initial set of items related to quality criteria. A total of 64 items

were arranged in a survey instrument. The initial instrument was pre-tested using a pilot study. Several items were modified and deleted to ensure content, clarity and meaningfulness resulting in having 58 items.

Table 1. Constructs Definitions	
Construct	Definition
Aesthetic Design	Consumer perception of the degree the website interface is visually appealing and well designed
Information quality	Consumer perception of usefulness and quality of website content
Website usability	Consumer perception of degree website ease of use and navigation
Responsiveness	Consumer perception of getting the help and answers when needed by automated or human factors
Trust	Consumers perception of the confidence and trust toward the website
Identity	Consumer perception of clarity of ownership and authorship of health website and its content
Appropriateness to Culture	Consumer perception of the culture match of website content to its audience
Learnability	Consumer perception of usefulness of active and passive learning mechanisms

Design

Design phase is important in ensuring the scale reliability and validity. The 58 items were arranged in a questionnaire in preparation for data collection. The items were measured using a Likert scale on seven-point ranging from (1) extremely not important to (7) extremely important. The instrument was administered to students at one of the Historically Black Colleges and Universities (HBCUs)¹ who used health websites for information seeking and communication. A total of 152 complete questionnaires were collected that are sufficient to conduct reliability and factor analysis (Hair et al., 1998). The reliability of measures was assessed using Cronbach's alpha that ranged from 0.691 to 0.840, exceeding the value of 0.70 (Nunnally and Bernstein, 1994) - except of learnability dimension that has reliability alpha value of 0.691-. Next, exploratory factor analysis (EFA) was applied to examine the dimensionality of health website quality. The EFA was applied using Principal Axis Factoring as an extraction method and Varimax rotation. The Bartlett test of sphericity and the Measure of Sampling Adequacy (MSA) were used for testing the correlation matrix. The significance of the Bartlett test was .000 and the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.895, both indicating the adequacy of conducting the EFA. Conducting factor analysis resulted in dropping 24 items that either correlated low (i.e., less than 0.40) with other items of the same trait or caused low reliability alpha for the dimension (Hair et al., 1998). The factor analysis resulted in defining health website quality as a function of 'Aesthetic Design (the extent to which the website is attractive and appealing), 'Content Quality '(the extent to which the website offers current, relevant and useful content), 'Information Architecture' (the extent the information is labeled, organized and structured), 'Website Usability' (the extent of the ease of using the web and navigation) 'Trust' (the extent to which the website conveys trust ,

¹ HBCUs are institutions of higher education in the United States that were established before 1964 with the intention of serving the black community (US Department of Education, 2008)

credibility and confidence), 'Identity' (the extent the website discloses the ownership and authorship), 'Responsiveness' (the extent the website provides contact information, email and mechanism to ask questions and receive feedback), 'Appropriateness to Culture' (the extent the website is appropriate for its targeted culture), and 'Learnability' (the extent the website provides passive and interactive health education) (see Table 2) with eigenvalues greater than the value of one for the identified dimensions. The obtained 34-item solution explains 80.1% of the variance in the correlation matrix.

Contrary to focus group research output, it turned out that the dimension of 'Information Quality' is two-dimension construct that is composed of 'Content Quality' and 'Information Architecture'. Also, the dimension of learnability needs further investigation due to low number of measures.

Normalization

The resulted 34-item scale was used to collect another set of data to be used for assessing the psychometric properties of the scale. A sample of 109 African American web users, were asked to participate in evaluating a health website that was designed by local minority health care organization. The health website was designed to promote health care and public health issues for minority populations of African Americans and Hispanics. The subjects were directed to the website and given three questions to answer: (i) find food guide pyramid; (ii) what is magnesium and what food provides magnesium; and (iii) how to choose a successful and safe weight-loss program. At the end of the activity, the instrument was administered to the subjects. Total of 103 complete questionnaires were collected. Reliability analysis for the identified dimensions were above the cut-off value of 0.70, except of Learnability dimension that has alpha value of 0.693 due to having two elements (Nunnally and Bernstein, 1994). Next, the scale was assessed in terms of its convergent and discriminant validity. Bagozzi and Yi (1988) defined factor loading exceeding 0.70 as evidence of convergent validity. The exploratory factor loadings for all constructs exceed the recommended level of 0.70, indicating acceptable item convergence on the intended constructs. The discriminant validity, which is the "degree to which two conceptually similar constructs are distinct" (Hair et al., 1998, p. 118) was examined by counting the number of times an item correlate higher with items of other constructs. Correlation analysis revealed that all items of constructs correlate less than the criterion of 50% (Campbell and Fiske, 1959). Furthermore, the instrument was tested in terms of its relationship with an outcome variable of "overall website quality" that is adopted from Aladwani and Palvia (2002). The participants were asked to rate the website overall-quality on a scale that ranges from 1 to 7. The nine dimensions of health website quality correlated significantly with the website overall-quality. The highest correlation was between 'Content Quality', 'Information Architecture' and 'Appropriateness to Culture' (Pearson's $r = 0.45$; $r = 0.43$ and $r = 0.42$ respectively), whereas the association between 'Responsiveness' and website overall-quality was the lowest (Pearson's $r = 0.31$) (see Table 3).

Conclusion

Growing number of health care organizations invest considerable resources in developing websites for health promotion and disease management. The web is a powerful tool for health information seekers. Analysts predict that in the future, "virtual healthcare systems" will be one of the main systems that provide information on healthy lifestyles and offer disease management services (COR Healthcare Resources, 2001). Concerns over how health information is presented on the internet has prompted researchers and health organizations to establish information quality criteria, however, the studies that consider the ethnicity variables in website quality are scarce (Childs, 2004). This paper presents the first phase of a study that examines quality attributes considering the perception of different minority sub-groups. The developed instrument helps website designers, website content managers and web-based healthcare program managers to assess and identify the strength and weakness elements of their websites, especially the ones that are intended for African Americans. This study provides useful messages for several groups.

For those who develop and design health websites, it is important to engineer carefully the website architecture to help information seekers to complete their tasks. For example, website designers should include a task modeling task to ensure that website architecture fits the tasks users want to carry out. Some items need to be presented using checklists, while it may be more appropriate to use drop-down menus for other items.

Table 2. Factor Solution of Health Website Quality

Construct	Mean	Std	Factor Loading^a	Reliability Alpha
<i>Content Quality</i>				0.840
CQ1:Information contained on the website is current and timely	4.34	1.61	0.749	
CQ2:Information contained on the website is accurate and relevant	4.31	1.71	0.756	
CQ3:Information contained on the website is at the right level of detail	4.40	1.56	0.786	
CQ4: Information contained on the website is pretty much what I need to carry out my tasks	4.42	1.70	0.767	
CQ5: Information contained on the website is in appropriate format	4.33	1.59	0.777	
CQ6: Information contained on the website is readable easy to understand	4.32	1.60	0.745	
<i>Information Architecture</i>				0.789
IA1:It is easy to find information I need	4.60	1.56	0.818	
IA2:Labels help me locate information I need	4.63	1.65	0.779	
IA3:Website is featured with navigation system to support browsing and searching	4.59	1.43	0.813	
IA4:The query system on the website is very helpful	4.66	1.41	0.823	
IA5: Information on the website is organized and classified	4.55	1.44	0.847	
<i>Aesthetic Design</i>				0.820
AD1:The website has visual design	4.12	1.49	0.809	
AD2:The website includes appropriate multimedia	4.22	1.50	0.791	
AD3:The Website animation is meaningful	4.29	1.57	0.786	
AD4: Colors, pictures and images are consistent, relevant and clear	4.19	1.48	0.799	
<i>Website Usability</i>				0.810
WU1:Website interface is visually appealing	4.90	1.56	0.819	
WU2: Scrolling through pages is kept to a minimum	5.01	1.60	0.810	
WU3: Standard navigation bar, home button and back/forward buttons on every page	4.90	1.59	0.820	
<i>Responsiveness</i>				0.709
RES1: Human e-mail responses provide answers to my questions	5.51	1.61	0.722	
RES2: Website addresses are included in all existing documentation, publicity and advertising channels	5.32	1.58	0.723	
RES3: Questions and answers format is used to discuss problems and solutions	5.39	1.69	0.731	
<i>Trust</i>				0.828
TR1: The website has adequate security features	4.23	1.41	0.757	
TR2: The website has a good reputation	4.44	1.41	0.761	
TR3: The website contain trust and assurance seals	4.20	1.36	0.723	
TR4: The organization behind the site is reputable	4.23	1.36	0.790	
<i>Identity</i>				0.756
ID1:The website discloses who is the author of the content	4.33	1.45	0.723	
ID2: The website includes the author's qualification	4.12	1.44	0.727	
ID3: It is clear what organization or individual owns the website	4.25	1.45	0.754	
ID4:The website have full information of the authors of the web content	4.05	1.32	0.780	
<i>Appropriateness To Culture</i>				0.788
AC1: Central concepts of the materials appear to be culturally appropriate	4.41	1.42	0.756	
AC2:Images and examples present culture in a positive ways	4.20	1.46	0.745	
AC3:There is a clear culture mismatch	4.32	1.43	0.765	
<i>Learnability</i>				0.691
LN1:Interactive learning or simulation is provided	4.87	1.89	0.687	
LN2: Techniques of quizzes and games enhance learning health materials	4.78	1.78	0.676	

^a Extraction method: Principal Axis Factoring. Rotation method: Varimax with Kaiser Normalization; Rotation converged in 6 iterations.

Table 3: Correlations among constructs of health website quality and overall quality rating

	CQ¹	IA	AD	WU	RE	TR	ID	ATC	LN
IA	0.23**								
AD	0.20**	0.24**							
WU	0.21**	0.41**	0.41**						
RE	0.34**	0.21**	0.22**	0.24**					
TR	0.22**	0.20**	0.22**	0.31**	0.36**				
ID	0.31**	0.20**	0.21**	0.20**	0.18**	0.41**			
ATC	0.36**	0.19**	0.22**	0.19**	0.17**	0.48**	0.21**		
LN	0.27**	0.23**	0.37**	0.35**	0.18**	0.23**	0.22**	0.38**	
Overall Quality	0.45**	0.43**	0.42**	0.41**	0.31**	0.39**	0.35**	0.42**	0.39**

Notes: ** $p < 0.01$

¹CQ: Content Quality

IA: Information Architecture

AD: Aesthetic Design

WU: Website Usability

RE: Responsiveness

TR: Trust

ID: Identity

ATC: Appropriateness To Culture

LN: Learnability

Website designer should make the home page friendly, easy to use, attractive and appealing. Webpages should be consistent from one page to the other. Website accessibility should be maintained by using metadata that will enable the website to work in a variety of web browsers and devices. Each webpage should be associated with a title tag – a text that displays in the title bar of the browser window- that matches the content title of the webpage. Website designers are encouraged to use relevant keywords to the header of webpages to improve search engine visibility. For the health practitioners who manage the content of the website, website content should be delivered using understandable and clear language. Also, including short video clips would be ideal media. However, consideration should be given to ensuring that the content is accessible to all users. The website should disclose clearly who developed the website and for what objectives. Including trust seals is also recommended to increase user's confidence. Also website should include indicators that web content has been checked by experts and updated regularly. Website content managers should examine carefully the appropriateness to culture of their websites by including pictures, stories and drawings that matches cultural preferences. Engaging website users by learnability mechanisms (e.g., stories, puzzles, online games and teasers) may help in creating training simulation that increase self-care and reduced their emergency clinical utilization (Lieberman, 2001). Although it is unlikely for professional health websites to provide feedback facility within their websites, interaction and feedback should be integrated into sites. Website content managers need to check regularly the links and URLs included in their websites to regularly maintain the reliability of their sites. More importantly, they should take the responsibility for their websites links and ensure that it is accessible, valuable and validated. The scale presented in this paper could be used to assess the website quality using the 34 items. Also, the instrument can be used to evaluate a specific quality dimension of the health website by using the sub-scale of one of the nine identified dimensions.

Developing a scale to assess the quality of health websites designed to be used by the African American populations was the aim of this study. However, the findings of the focus groups have highlighted a number of additional issues that needs addressing and are beyond the scope of this study. First, the scale was designed focusing on one type governmental website with URL suffix of .gov. Re-testing the scale in evaluating other types of health websites is encouraged. For example, voluntary organization's websites include other categories of information such as factual information, directory information on sources to help, contact information with other people, psychological and emotional support, events meetings, fundraising and lobbying for improvements in services (Childs, 2004). It would be interesting to understand quality attributes of such health websites. Second, websites that include health services such as making appointments and obtaining drug prescriptions via the web were not included in the scope of this study. Research on e-service quality for health websites is needed. Thirdly, some health websites include "suppogroups", where patients can contact and communicate with other individuals with the same circumstances. Such support group aim onto providing psychological and emotional support including descriptions of individual's experiences and challenges to the existing methods of treatment and care (Childs, 2004). These services that promote networking were also not included in this research and needs further investigations. Finally, researchers are encouraged to include the quality attributes and examine their relationships with the outcome of health behavior change. It would be interesting to understand what quality attributes influence the health behavior change.

As noted by Torgerson (1958, p. 1)

The principal objective of a science, other than the description of empirical phenomena, is to establish, through laws and theories, general principles by means of which the empirical phenomena can be explained, accounted for, and predicted. In carrying out this objective, sciences concern themselves with gathering and comparing data in order to establish the correlations, mathematical equations and theories that are the goal of inquiry. As we shall see, measurement is one of the things that enable these processes to be carried out.

I agree.

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