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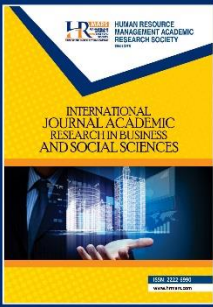
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Examining User Perceived Information Quality of Health-Related Websites

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Abstract

A remarkable advancement of technology has encouraged people to take in-charge of personal health management through getting more information about diseases, illness and health via health-related websites. As websites and design features are aplenty, this research explores the acceptance of their technological compelling web design features. However, the evaluation of the quality of health-related websites still needs more investigation. The purpose of this study is to examine the information quality dimensions of technological features in the health websites by using explanatory factor analysis (EFA). A survey instrument was designed, validated and distributed to health-related websites users. In total, 482 data were used for the exploratory and internal consistency tests. From the Exploratory Factor Analysis (EFA), the findings have revealed successfully identified five factors with 74.88% of total variance explained. The study findings are significant as it helps in providing essential directions for the critical technological factors influencing the success of a health-related website for improving e-health literacy and positively affects the user-health behaviour, which would potentially yield refinements in existing website.

Keywords: Online Health Websites, Information System Success Model, E-Health Literacy, Service Quality.

Introduction

The Internet today is a common source of obtaining health information. This exponential growth of seeking health information behaviour using the Internet brings with it innovative ways of transacting, communicating, learning, socializing, and transforming just about every aspect of daily life. This environment encourages users taking an active role in managing their health. There is a large volume of published studies indicate that quality of health websites is significantly essential to user engagement and should not be ignored (Beaunoyer et al., 2017; Eysenbach et al., 2002; Stoyanov et al., 2015). According to Sligo and colleagues (2017), there were various online health information websites deliver inconsistent quality and evidence for their usage is limited.

Information quality is essential components in effective web design. Studies found that the common elements between the different information quality frameworks; including accuracy, consistency, timeliness, completeness, accessibility, objectivity and relevancy (W. H. DeLone & McLean, 2003; Katerattanakul & Siau, 1999; Knight & Burn, 2005; Tao et al., 2017). Previous studies revealed that web design features of health-related websites need the essential elements of information quality including dimensions of system quality, information quality and service quality (DeLone & McLean, 2003; Hassan et al., 2013; Maon & Seman, 2015; Tao et al., 2017). Schaupp and colleagues (2006) emphasized that information quality is a well-known and essential success factor when assessing the overall success factor in the context of a web-based system. However, not all online health websites provide the same quality of information or experience. While there are design guidelines for general purpose websites, there are no similar guidelines for online health websites, and it is unclear what are the most useful or appropriate design features.

Moreover, reliable quality criteria for health-related websites is the utmost essential concerning the rising number of Internet users, both health professionals and laypeople, searching for health information (Gattoni & Sicola, 2005). Commonly, the quality of a website is usually associated with its content and usability. A systematic review study reported that 74 initial different criteria and attributes could be used to assess web sites quality (Rekik et al., 2018).

Getting the design right is crucial to achieving the potential benefits that an online health website can offer (Hassan et al., 2013; Win et al., 2015). Hence, the main objective this paper is to examine the identification of a set of health-related websites design features that focus primarily on information quality features of information presenting the health-related websites. In particular, this paper is; (1) to describe the information quality design features and (2) to justify the information quality design features for online health websites.

Methods

Data Collection and Participants

A convenience sampling technique was employed in this present research. Data has been obtained through a self-administrated structured survey question. The researchers extracted all the potential technological design features from the literature based on technological features from other studies done in online health information websites (Kandari, 2010; Tao et al., 2017). The initial list of technological features was assessed by experts on the subject, resulting in several changes in wording, and the deletion of unnecessary items. An established questionnaire was adapted from several studies were used in this study. At this stage, there were 22 items under information quality features to be examined. A questionnaire was produced, asking respondents to rate the importance of each information quality feature on a 5-point scale with anchors of "Strongly disagree" to "Strongly agree". Data was then collected, and a total of 510 responses were managed to be obtained. However, only 482 were valid for data analysis purposes.

Data Analysis

Descriptive statistic was used to study the obtained data using IBM SPSS version 24. Frequencies, mean and standard deviation were used to describe the demographic background of respondents. In order to ensure goodness of measures, factor analysis, convergent validity and reliability for the instrument were applied. In this study, exploratory Factor Analysis (EFA) was conducted to identify the underlying relationships between measured variables (Hair et al., 2010).

Moreover, EFA is primarily an exploratory technique because it limits control over variables loading on the latent factor (Armenski et al., 2018). Before the EFA, some descriptive statistics are determined. In the process, the reliability of the measures is tested using both the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) and Bartlett's test of sphericity. Furthermore, to test the reliability and internal consistency of the importance scores, the reliability of data checked using Cronbach's alpha value. Parallel analysis is also performed in addition to the factor analysis in order to retain an exact number of factors for successful completion of EFA.

Findings and Discussion

Demographic Profile

A total of 482 responses was valid for data analysis. Data findings showed that the age range of the 482 respondents was between 18 and 58 years. Data findings show that 62.7% were female (n=302), while male respondents were 37% (n=180).

The findings of this study show that the mean age of the respondents was 26.84 years (SD=6.68). Sixty-eight per cent of the respondents were between 21 and 29 years (n=329). Less than 7% were above 40 years (6.2%, n=30) and below 20 years (6%, n=29). More than half of the respondents have perceived their health at very good and good states (31.7%, n=153; 29.5%, n=142, respectively).

In terms of Internet usage pattern, it was reported that nearly 40% of the respondents used the Internet at more than six hours per day (39.2%, n=189) and more than 70% have been used the Internet since last ten years in range (74.2%, n=358). Most of the respondents believed that the Internet assists them in making decisions relating to their health (86.6%, n=417) and it is considered essential to respondents to be able to access health resources on the Internet (83.8%, n=404). The study results demonstrate that online health information seeking among people is now a prevalent behaviour. Consistent with much previous studies, the majority of online health information seeker were female and the average age of the people who are seeking health information through online was from age range 18 to 29 years old (Saad et al., 2013; Weaver et al., 2009).

Exploratory Factor Analysis (EFA) for Validity

A total of 22 items was factor analysed based on the constructs grouping to examine the construct dimensionality using IBM SPSS version 23. Exploratory factor analysis (EFA) is a widely-used statistical technique in social sciences (Hair et al., 2010). A Principal Component Analysis (PCA) with an Orthogonal Rotation (Varimax) using IBM SPSS was performed on the survey data. The goal of the rotation is to simplify and clarify the data structure (Hair et al., 2010)

In this present study, there are four commonly used assumptions followed to assess EFA namely; (i) sampling adequacy (Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) and Bartlett's test of sphericity) measure greater than 0.6 (Kaiser, 1974). For a satisfactory factor analysis to proceed and if any pair of variables has a value less than this, one of them should consider dropping from the analysis (Sultana et al., 2015).; (ii) the minimum eigenvalue for each factor; (iii) considering the sample size, factor loading of 0.50 for each item considered as the threshold for retaining items to ensure greater confidence; and (iv) orthogonal rotation was used since it is an excellent general approach that simplifies the interpretations of the factors.

The present study findings indicate that KMO score was 0.922, which shows an excellent score of sampling adequacy. Bartlett's test is another indication of the strength of the relationship among variables. The Bartlett's test of sphericity is reported statistically significant levels, i.e., its associated probability is less than 0.05, which indicates that a PCA (principal component analysis) can be performed efficiently with the dataset. Hence, KMO and Bartlett's Test confirms that dataset is perfect for factor analysis (Hair et al., 2010).

Data findings of the EFA and the internal consistency score for all constructs are shown in Table 1 and Table 2. The findings of the EFA of information quality has yielded five factors explaining 74.881% of the total variance. A loading was considered significant if it had an absolute value higher than 0.50 (Hair et al., 2010). Therefore, based on eigenvalue higher than one and factor loading, these 22 items were selected into five different factors, namely i) completeness ii) consistency iii) understandability iv) accuracy and v) relevancy. The selection of the five factors is also supported by parallel analysis. The findings showed that the factor loadings of the variables were between 0.525 and 0.853.

TABLE 1.

FACTOR ANALYSIS RESULTS

Variables	1	2	3	4	5	Communalities
CI30	0.805	0.111	0.254	0.222	0.156	0.590
CI31	0.792	0.143	0.178	0.219	0.139	0.641
CI29	0.769	0.152	0.232	0.252	0.187	0.672
CJ33	0.717	0.382	0.066	0.174	0.227	0.625
CJ32	0.672	0.445	0.119	0.154	0.199	0.766
CJ34	0.650	0.451	0.116	0.101	0.221	0.799
CM44	0.192	0.785	0.051	0.169	0.121	0.746
CM43	0.098	0.780	0.125	0.251	0.19	0.727
CM42	0.130	0.742	0.179	0.242	0.192	0.746
CH27	0.37	0.646	0.309	0.038	0.145	0.698
CH28	0.316	0.622	0.312	0.054	0.196	0.849
CH26	0.384	0.578	0.378	0.067	0.115	0.848
CH25	0.412	0.525	0.346	0.092	0.126	0.713
CU70	0.187	0.214	0.840	0.143	0.219	0.862
CU69	0.159	0.229	0.805	0.161	0.229	0.863
CU71	0.259	0.233	0.752	0.212	0.146	0.791
CA2	0.248	0.132	0.181	0.853	0.103	0.804
CA3	0.27	0.136	0.186	0.843	0.107	0.854
CA4	0.169	0.336	0.096	0.726	0.185	0.753
CQ57	0.232	0.18	0.234	0.185	0.829	0.695
CQ56	0.311	0.194	0.205	0.132	0.817	0.733
CQ58	0.207	0.429	0.234	0.125	0.702	0.698
Total	10.937	1.623	1.445	1.360	1.109	
% of Variance	49.714	7.376	6.567	6.181	5.043	

TABLE 2.

SUMMARY EXPLORATORY FACTOR ANALYSIS (EFA) RESULTS

FACTORS	LOADINGS	ITEMS
Factor 1: COMPLETENESS Percentage of Variance Explained = 49.71% Eigen Value = 10.937	.805	CI30 website provides full information without directing you to other sources
	.792	CI31 website does not share information in bits and pieces
	.769	CI29 information on the website is complete
	.717	CJ33 information on the website is exhaustive and complete yet compact
	.672	CJ32 information on the website is to the point
	.650	C34 information on the website is not repetitive
	Factor 2: CONSISTENCY Percentage of Variance Explained = 7.376% Eigen Value = 1.623	.785
.780		CM43 information on the website uses international and local units for straightforward interpretation
.742		CM42 information on the website uses correct yet identifiable symbols/abbreviations
.646		CH27 information is always presented in the same format on the website
.622		CH28 information uses consistent language, symbols, units and format across all webpages
.578		CH26 web pages are compatible with regards to fonts, layouts and presentation etc.
.525		CH25 information on the website has consistent presentation across various web pages and links
Factor 3: UNDERSTANDABILITY Percentage of Variance Explained = 6.567% Eigen Value = 1.445	.840	CU70 information on the website is clear and unambiguous
	.805	CU69 information provided on the website is easily understood
	.752	CU71 website uses easy to understand language for better comprehension and understanding

Factor 4: ACCURACY	.853	CA2 information on the website is
Percentage of Variance Explained =	.843	accurate
6.181%	.726	CA3 information provided on the website
Eigen Value = 1.360		is credible for the accuracy of the content
		CA4 information on the website is free of
		grammatical, spelling and typographical
		errors
Factor 5: RELEVANCY	.829	CQ57 the website only provides related
Percentage of Variance Explained =	.817	information helpful to solve the task at
5.043%	.702	hand
Eigen Value = 1.109		CQ56 website only provides information
		relevant to the task at hand
		CQ58 the information on the website does
		not lead to different directions than
		needed for the task

Reliability Analysis

Descriptive statistics were used to evaluate the appropriateness of the 24 items measurement by calculating the means of all responses and standard deviations (SD) per item and data distribution. For instance, if a mean of an item is close either to 1 or 5, this item may decrease the correlations among the rest of the items. Moreover, the internal consistency reliability was tested by using Cronbach's Alpha for each competency. The internal consistency is excellent when the alpha value is higher than 0.9, and the internal consistency will be acceptable if the alpha value is at least higher than 0.7 (Blunch, 2012).

Table 4 describes the descriptive statistics and reliability coefficient range of Cronbach's alpha. Findings indicate that variables are internally consistent and a good correlation between retained factors and variables. Since Cronbach's α value for each factor is above 0.50; all four factors are accepted as being reliable for the research. Data distribution of variables was also conducted. The value of Skewness and Kurtosis statistics that lies between -4 and +4 is considered to be acceptable (Tabachnick & Fidell, 2014). Referring to the findings in Table 4, it showed that all data met the acceptable range indicating the normal distribution of data. All factors have a mean value between these 3.983 and 3.841 on a scale of 5.

Table 4.

Descriptive statistics and reliability test (n=482)

Factors	Mean	SD	Skewness	Kurtosis	α	No of item
Factor 1: Completeness	3.880	.719	-0.078	-0.902	0.924	6
Factor 2: Consistency	3.841	.663	-0.411	0.211	0.903	7
Factor 3: Understandability	3.983	.720	-0.213	-0.590	0.896	3
Factor 4: Accuracy	3.977	.746	-0.273	-0.278	0.907	3
Factor 5: Relevancy	3.876	.733	-0.090	-0.636	0.872	3

Conclusion

This study was conducted to identify the factors concerning the perceived service quality of users in the information used in health-related websites. These study findings have confirmed five dimensions that measure users' perceived information quality presenting on websites. The five dimensions perceived information quality, including the constructs of completeness, consistency, understandability, accuracy and relevancy of information presented on health-related websites in Malaysia. Each of these five identified and verified factors had revealed a significant impact on overall service quality. Therefore, this study will contribute to the development of better online health-related websites in Malaysia that will be beneficial to society generally. Through understanding the information quality dimensions for health-related websites, an organization will have a much better chance of gaining more business and serving its stakeholders. These finding also contributed to the body of knowledge in terms of verifying the dimensions of perceived information quality from information system success model and in partial to perceived usefulness in the Technology Acceptance Model is relevant in designing health related websites (Davis, 1993; DeLone & McLean, 1992; Tao et al., 2017). These findings will help others researchers in design an effective health related website for general users. Finally, future researchers are suggested to expand this study by looking at the associations between websites design features and benefits of online health-seeking behaviour and may affect user-health behaviour.

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