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A STUDENT PERSPECTIVE INTO INFORMATION QUALITY OF WEB SITES

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A Student Perspective Into Information Quality of Web Sites

Research Paper

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Abstract

As organizations have become aware of the strategic importance of websites, the trend to use websites for various purposes has increased in domains such as education, health, government and business. However, organizations seeking to obtain benefits from their websites need to create and maintain websites that are supporting the interaction and communication of the organization with their users. The purpose of the study was to investigate the information quality of a website. A set of information quality indicators including accuracy, timelines, easy understanding, organization, consistent representation and easy navigation, were divided into four categories and evaluated in this study. For this purpose, an extensive study of the literature on existing quality evaluation models, essential website' success factors and criteria was conducted to identify necessary quality factors, sub- factors and criteria. An evaluation framework consisting of five factors (content, usability, reliability, efficiency and functionality) hierarch ally arranged into sub- quality factors and criteria was developed. The framework was applied on websites to assess its effectiveness and at the same time to evaluate the quality of the web site. The results of evaluating a website showed that in general, participants l consider individual websites to be of good quality, reliable and efficient, while having moderate quality in its content, usability and functionality features.

Keywords

Website quality evaluation, website evaluation, website quality framework, quality information

OVERVIEW OF THE STUDY

In today's era, the Internet has developed into a primary platform for Information Technology (IT) and businesses (Desanctis & Dickson, 2000). Many organizations have their own website to publish information on the Internet. For instance, businesses can promote their products and services to consumers through websites; libraries are able to provide digital resources and online services to users on their websites. Universities also publish research findings, curriculum information and other resources on their websites. The Internet offers users unique communication powers, and websites become a medium for the researcher to provide information. It is essential for a website to provide quality information.

BACKGROUND AND CONTEXT

In the last decade, the Internet has been developed at exponential speed and countless websites have been created. Almost anyone can publish information on the Internet, and disseminate information to global audiences faster than ever before (Yuan et al., 2005).

STATEMENT OF THE PROBLEM

Information quality can be defined as effective information that can be used to enhance an individual's decision making process and improving management process (Mosele, 2011). Evaluating the quality of a website helps to assess whether or not the web site is meeting its intended purpose of information for the intended users (Mebrate, 2010). The results of the evaluation can help to understand the parts of the website that need modification to bring an improvement to it. Most individual websites are affected by the following problems:

- the information is not reliable (for example Wikipedia, etc.). Wikipedia allows anyone to edit the information published on its pages. This makes it difficult to determine if the information is of good quality or not. Currently Wikipedia allows its articles to be freely edited by any individual who so wishes (Mebrate, 2010). This allows for an amount of collaboration between users but also allows for inaccuracies and blatant lies.
- On other sites, it is difficult to determine the quality of the data.

Users of individual websites expect specific type of information in the website and a short period of time to access the information they want. Users are usually concerned with two basic questions which are: if the user can find the information they are looking for on the web site and can the user find the information in a timely manner.

OVERVIEW OF THE LITERATURE

Quality

Quality is an intangible concept. The terms good quality and poor quality are used in everyday life to tell how good or bad a product functions. Most people can recognize quality easily but they find it difficult to give a clear description of the term. Sometimes quality indicates luxury, taste, and expensive products (Brajnik, 2001). A product that is expensive is perceived to have good quality, while a more affordable product is considered to have poor quality. This outlook shows that people consider quality as something that can be felt, understood and judged but cannot be measured and hence cannot be controlled. Regardless of this observation, in order to improve the acceptance and use of a product, its quality should be defined, measured and controlled (Mebrate, 2010).

Quality can be seen as the abstract relationship between attributes of an entity. These attributes of entity of interest include the viewpoint on that entity and the quality

characteristics of the entity. While the term is ambiguous and misunderstood, there are many perspectives and approaches to define and measure quality (Mebrate, 2010).

Quality management

The types of information which may be used for quality indicates are different (Bizer & Cyganiak, 2009). Information sharing is important and the significance of its impact on organizations performance depends largely on the quality of the shared information where quality refers to the shared information's usefulness, accuracy and accessibility. Quality management has been defined as an approach to management made up of "a set of mutually reinforcing principles, where flow is supported by a set of practises and performance (Bizer & Cyganiak, 2009). Information proposed by Information Systems (IS) is classified into non-managerial and managerial information. The IS used in processing the non-managerial information belongs to operational level systems. IS used in the processing managerial information belongs to managerial and strategic level.

Research develops solution for secure information access, as certain systems contain private information about individuals. Access to such information needs to be managed to ensure only that authorized users view such information and only authorized purposes (Michnick & Lo, 2009).

Different perspective of Quality

Based on diverse perspectives on quality, different definitions are given to quality. Five fundamental perspectives of quality as introduced by Garvin define quality in different ways (Gavin, 1984). These five perspectives and the definitions are described below:

Transcendental. This view associates quality with the "innate excellence" of a product. It emphasises the idea that quality is universally recognized and measureable, which indicates high achievements and inflexible standards. This strived for ideal "best" characteristic of a product is the transcendental viewpoint of quality.

User based. This perspective of quality focuses on users' satisfaction. A product is said to have a good quality when users are satisfied in using it. Thus, if the product meets the purpose for which it was designed and developed in the first place and users are satisfied in using it, then it has a good quality (Kitchnham & Lawrence, 1996).

Conformance to requirements (Manufacturing based). This is another perspective that defines quality as the "conformance to requirements". A product should conform to specific set of design requirements established at the beginning of the production. Any deviation indicates low product quality (Gavin 1984).

Product based. In this approach, quality of a product is determined based on its internal characteristics and the weights assigned to them according to their level of importance. In addition, since the selection of the attributes and assigning values might be susceptible to subjectivity, it may be difficult to arrive at an agreed upon definition of quality, which is acceptable by all types of users (Kitchnham & Lawrence, 1996).

Value based. In this approach, quality is defined in terms of the relations between the value and cost of a product. A product with good quality provides performance at an acceptable price and conformance at an acceptable cost. Existing quality definitions fall into one of the 5 basic perspectives though the views of users and product manufacturers would be different. The implication of different perspectives of quality indicates the different viewpoints of users and developers (Gavin, 1984).

Information Sharing

Information sharing refers to the extent to which critical and propriety information is communicated to the organization. Information quality includes such aspects as the accuracy, timeliness, adequacy and credibility of the information exchanged. While information sharing is important, the significance of its impact on the organization depends on what information is shared, when it is shared, how it is shared and with whom it is shared. Sharing information in the organization can create flexibility but it requires accurate and timely information (Li & Lin, 2006). Ensuring information privacy can help to create a trusted network for information sharing and knowledge transfer between individuals (Razavi & Iverson, 2006).

Interpersonal relationships occur within many contexts: neighbors, classmates, friends and lectures. Information-sharing research at the interpersonal level focuses on individual behaviors such as motivations, approaches, and channels for an individual to share information with others (Yang & Maxwell, 2011). Within organizations, there is a trend to encourage groups to share information and knowledge (Yang & Maxwell, 2011). The relationships between factors are complex as is the influence they have on each other.

Website Quality

In the last decade, the Internet has been developed at exponential speed and countless websites have been created. Almost anyone can publish information on the Internet, and disseminate information to global audiences faster than ever before (Gasser & Stvilia, 2001). Compared to traditional media, the Web has its uniqueness, which poses some challenges and sometimes twists to maintaining and improving the information quality of websites. Essentially, the Web is a hybrid medium that is able to integrate different components together, that is combines visual content with text, and use audio and video clips (Alexander & Tate, 1999).

This merging of text, image, sound, and animation constitutes a powerful new medium for conveying messages, but also brings a lot of diversity and complexity to the Web. The use of hypertext links is one of the Web's features. It gives the users flexibility to browse in various paths. However, it can cause problems when there are inactive links, such as links that are broken or don't respond to user's action. An inactive link means a dead end to users, and too many of those links on a web site can make people frustrated even though the web site contains information of quality.

Another challenge is the fact that visitors may enter the site at any point. Almost every website has a homepage containing background information and serving as an initial page viewed by users. However, sometimes users first enter the site at another page, for example, when they retrieve a page by using a search engine. Under those circumstances, they may not be able to figure out who is responsible for the site if such background information is not provided on that page. When users think the information is provided anonymously, the credibility of the information is usually discounted (Gasser & Stvilia, 2001).

Website quality models

Quality evaluation of websites and web applications did not enjoy the higher degree of emphasis that was placed on software quality evaluation. Recently however, there has been developments in Web Engineering. This shifted the focus of quality evaluation from the offline world to the online world (Micali & Cimino, 2008).

A number of models are available to test quality of websites. The selection basis for the models in this study was based on the unique benefits each of the selected models had presented which in turn could be linked to the quality framework. Web QEM had in essence, the practical ISO orientation (accuracy) whereas the 7-Loci model is conceptual in its approach (relevance). The MiLE model has a balance between being application dependant and independent (interpretability), whereas the MINERVA model presents the user with a wide application base, ease of access and usability (access and security). The sum of the selection then also covers the theoretical orientation as well as the practical approach and an allowable ease of access.

Web - QEM (Web Quality Evaluation Model)

This model was a product of quality assessment made on museum websites. Subsequently, it was applied to academic websites and other domains. The quality characteristics in this model are based on the ISO 9126-1 model and therefore it includes usability, reliability, efficiency and functionality (Mendes, 2006). The evaluation process in the model involves the following basic steps:

- selecting a web site or sets of web sites to compare or evaluate
- specifying evaluation goals and intended user’s view point
- defining quality characteristics and sub-characteristic attributes requirement tree
- defining criterion function for each attribute, and applying attribute measurement
- aggregating elementary preference to yield the global web site quality preference
- analyzing, assessing, and comparing partial and global outcomes

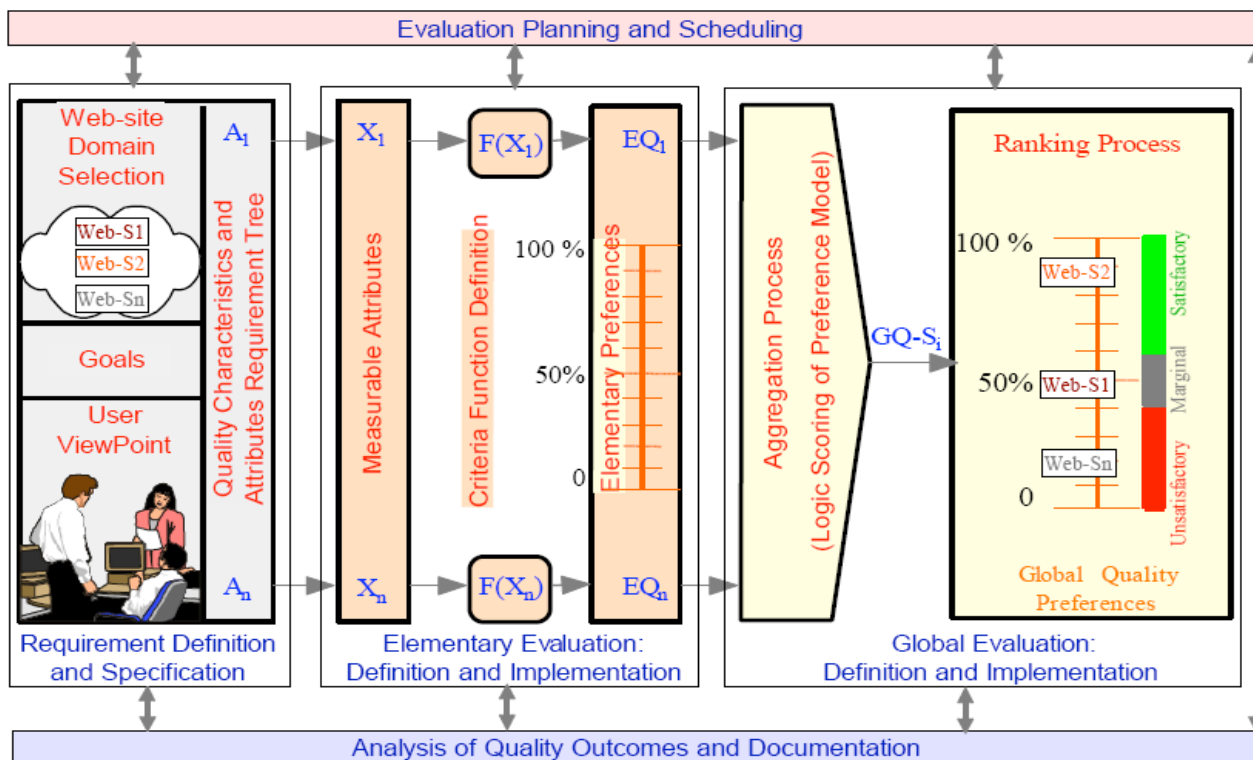


Figure 1 W-QEM Model Source Mebrate (2010)

What makes this model unique is that it gives a specific approach and a step-by-step procedure to achieve the evaluation of the website. Further, the model provides the method that should be used in each of the steps, as shown above. It uses the Logic Scoring Preference (LSP) approach of evaluation. LSP is a method used to quantitatively measure attributes of a product through logic scoring. Although end-users participate at the earlier stages of the assessment to help the identification and specification of user requirements, the rest of the evaluation process engages only experts. Thus, the evaluation process may result in a pile of subjective opinion of the experts that do not represent the usability experience and satisfaction of the end users of the website (Mebrate, 2010).

2QCV3Q-model (7 Loci)

This is a conceptual model consisting of 7 dimensions to evaluate quality of a website: who, what, why, when, where, how and feasibility (with what means and devices). The model takes its name from the rhetorical principles of Cicerone loci, which begin with Auxiliis (feasibility), Quis (identity), Quid (content), Ubi (individuation), Quando (management) and Quomodo (usability) (Signore, 2005) The quality characteristics and attributes of this model are shown in the figure 2 below.

MiLE (Milano-Lugano)

This model shows a distinction between application dependent and application independent evaluations. It proposes technical inspection for evaluating application independent aspects. It suggests the use user-experience and scenario based testing for the application dependent aspects of a web site (Micali & Cimino, 2008). This model is a usability focused evaluation method based on the combination of inspection from evaluators and user's empirical testing. It bases its evaluation on two heuristics: abstract and concrete evaluation heuristics (Signore, 2005). It categorizes different levels of analysis: content, services, navigation, cognitive features of the interface, aesthetic/graphic level and technology level (Triacca, 2005). Content means the quality of the information the website contain and its communication level. Services mean all the functionalities the website offer to its users. Navigation means two things: the first is the different ways users react to a piece of information and the second is the logical structure of information passing from one piece of information to another.

Cognitive features of the interface indicate how users understand, perceive and remember the web site structure. This is related to usability characteristics mentioned in other models. Aesthetic/graphic level indicates the graphic design and layout of the website interface, the type of font, colour, size, image and the distribution of the graphic elements in the pages. Technology level indicates the compatibility of the website to perform well in different types of browsers, the security level of the server hosting the web site and the interaction between the web site and the remote database.

CICERONIAN LOCI	ATTRIBUTES AND SUBATTRIBUTES
<p>QVIS (<i>Persona: Who?</i>) IDENTITY</p>	<p><i>Identification</i> – Brand or Charisma, Image – Target users’ profiles <i>Characterisation</i> – Design – Personalization</p>
<p>QVID (<i>Factum: What?</i>) CONTENT</p>	<p><i>Coverage</i> – Domain referred to owner’s and users’ goals – Value of information and links <i>Accuracy</i> – Quality of information – Source(s), author(s)</p>
<p>CVR (<i>Causa: Why?</i>) SERVICES</p>	<p><i>Functionalities</i> – Functions needed by owner and users – Adequacy to owner’s and users’ goals <i>Control</i> – Correctness – Security, ethics and privacy</p>
<p>VBI (<i>Locus: Where?</i>) LOCATION</p>	<p><i>Reachability</i> – Intuitive URL – Retrieval <i>Interactivity</i> – Contact information – Community building</p>
<p>QVANDO (<i>Quando: When?</i>) MAINTENANCE</p>	<p><i>Corrective maintenance</i> – Check-up, links, dates – User assistance <i>Adaptive Maintenance</i> – Enhancement – Reengineering</p>
<p>QVOMODO (<i>Modus: How?</i>) USABILITY</p>	<p><i>Accessibility</i> – Hardware and Software requirements – People with disabilities <i>Navigability</i> – Structure, Orientation – Download times <i>Understandability</i> – Languages – Level of terminology</p>
<p>QVIBUS AVXILIIS (<i>Facultas: With what means and devices?</i>) FEASIBILITY</p>	<p><i>Resources</i> – Financial and Human Resources – Time <i>Information and Communication Technology</i> – Hardware (computer, networks) – Software (implementation, integration)</p>

Figure 2 2QCV3Q Model Adapted from Mich et al. (2003)

MINERVA (Ministerial Network for Valorising Activities in Digitization)

MINERVA is a network of European states’ ministries for cultural heritage. This model is proposed for evaluating quality of cultural websites (museum, archives, libraries, and other cultural institutions) (Minervagroup, 2005). In this model, quality is defined in terms of accessibility and usability.

The purpose of the quality criteria in this model is two-fold. The first is they are used to represent the quality characteristics for evaluating quality of cultural websites, and the second one is that they support the design and evolution of cultural websites (Signore, 2005). The model supports the use of 10 quality principles: transparent, effective, maintained, accessible, user-centred, responsive, multi-lingual, and interoperable, managed and preserved (Micali & Cimino, 2008).

Transparent means the website must clearly indicate its purpose, mission and its identity to not confuse users. A website must offer a valid and relevant content that provides appropriate supporting information. Maintained indicates content and technical maintenance of the website. It specifically focuses on the currency of content and improving technical functionalities of a website (Mebrate, 2010). Accessible indicates a characteristic of a website to help all the users community access the website without any difficulties. Thus, a website must consider users that are blind or with partial sight-seeing problems and hearing disabilities. The website should also not rely on one technology to present its information to its users (Minervagroup, 2005). It should support different type's browsers, operating systems and devices.

User-centered means the web site must satisfy user's needs and users must find the web site useful, easy to use and attractive. Responsive indicates the capability of the website and the its owners to respond to questions users forward. It also means users can participate in producing content and participating to answer questions in a forum discussion. Multi-lingual means a website should offer multiple languages for its users (Mebrate, 2010).

Problems with the generic software and website quality models the quality models discussed in the previous sections share common drawbacks that using these models for quality evaluation of websites does not seem to be reasonable. The problems can be summarized as follows (Mebrate, 2010):

- the models present general characteristics lacking justification that describe which factors to determine for evaluating a particular software product or a web site in a specific domain.
- lack of underlying principle for deciding which specific quality characteristic relate to which high level quality criteria
- no clear way that shows how the sub- characteristics are composed for the overall assessment of the website and the method that should be used to measure the general quality assessment

Effective Web Design

Sevloid (1997) put forth a list of items essential to a webpage. He argued that every webpage should contain items as author, contact person, date of creation or update, various links and copyright message. He went on to stress that one must design the first pages with special care, offer only relevant information on the web site, and match the site's style with the target audience. Effective web sites must be clear, informative, concise and graphically appealing.

Nathan (1998) suggested that a personal website should have personality and reflect a personal vision. A website's personality will reflect one's own personality and it does this through every aspect of the presentation: words, images, layout, tone or thoughts (Ndaba, 2004).

Nathan (1998) pointed out that when the web pages are meant to teach or provide information, the task of effective webpage design can be considered from an instructional point of view. Welsh also argued that a web page is a communication device and should be analyzed within communication theory.

The perspective of an information provider on the quality of the information system and the information it provides may be different from that of the information consumer. However, ultimately it is the information consumers who will judge whether or not the information is fit for their uses. Therefore, quality of the information cannot be assessed independently of the consumers who use the information (Strong et al., 1997). From the information, conceptualizing the underlying aspects of information quality that are important to inform consumers is developed. This framework allows information systems managers to better understand and meet their information consumers' information quality needs.

Information Quality (IQ) Category	Information Quality (IQ) Dimension
Intrinsic IQ	Accuracy, Objectivity, Believability, Reputation
Contextual IQ	Relevancy, Value-Added, Timeliness, Completeness, Amount of information
Representational IQ	Interpretability, Ease of understanding, Concise representation, Consistent representation
Accessibility IQ	Accessibility, Access security

Table 1 Framework of measuring IQ of Web site

Intrinsic information quality denotes that information has quality in its own right (Huang & Wang, 1999). Literature reviews in this area suggest that the main dimension of intrinsic information quality is the accuracy of the information (for example Wang & Strong, 1996; Huang & Wang, 1999). This accuracy of information leads to consumer's concerns about the credibility or reliability of the information source. If inaccurate information becomes common knowledge for a particular information source, this source is viewed as having little added value and will result in reduced use/visits.

Contextual IQ highlights the requirement that "IQ must be considered within the context of the task at hand" (Huang & Wang, 1999). Information must be relevant, timely, complete, and appropriate in terms of amount so as to add value. In order to add value to the task or purposes for which the information is provided, the information must be measuring information quality of websites relevant and complete (Huang & Wang, 1999). Too large a volume of information may make it difficult for consumers to access, interpret and understand the meaning within a reasonable time; therefore, it also has little or no added value.

Representational Information Quality

Representational IQ denotes the aspects of format and presentation of the information (Huang & Wang, 1999). It requires that information systems present information concisely and consistently, and in a way that is interpretable and easy to understand by information consumers (Huang & Wang, 1999; Katerattanakul & Siau, 1999). This category of quality requires that information systems need to present their information in a way that is interpretable, easy to understand, and concisely and consistently represented (Huang & Wang, 1999).

Accessibility IQ requires that the information system must be accessible but secure (Huang & Wang, 1999). This framework broadens conventional IQ conceptualization and treats information as a multi-dimensional product. It emphasizes that IQ is not merely an intrinsic concept, and it should be measured in the context in which information is produced and used. Moreover, the information quality cannot be assessed independent of the people who use information – information consumers (Strong et al., 1997). As consumers now have more choices and control over their computing environment, information consumers' assessments of IQ are increasingly important (Strong et al., 1997).

Criteria and Framework of Evaluating Information Quality of Web site

Alexander and Tate (1999) discussed five traditional evaluation criteria – accuracy, authority, objectivity, currency, and coverage – in their book “Web wisdom: how to evaluate and create information quality on the Web.” They applied these criteria to Web resources with consideration of the unique nature of the Web. They work out a basic checklist that can be used as keys to evaluate and create information quality on the Web site. In addition, they classified seven types of Web pages and discussed differences among them (Zhang et al., 2002).

Zhang et al. (2000) described their study of evaluating information quality of Web home pages for approximately 200 selected Fortune 500 companies across 10 industries. They developed an evaluation instrument, and performed an explorative analysis between types of Web home pages and user perceptions. The findings of this study reveal that differences exist among certain types of Web home pages with respect to user's perceptions of presentation of information, navigation, and quality (Zhang et al., 2000). The instrument developed by Zhang and Keeling et al. consists of three constructs that respectively measure user's perceptions of presentation, navigation, and quality of Web home pages (Zhang et al., 2000).

This study considers users' perception of navigation and presentation of information as part of the evaluation criteria. Although it evaluates only the home page of the Fortune 500 corporations, some general principles and approaches are still applicable to other types of websites. Another evaluation framework was proposed by Katerattanakul and Siau (1999) in their study of “measuring information quality of websites: development of an instrument.” The framework for this study was developed on the basis of the Information Quality Framework. The study used other types as basis and furthermore, did not apply the same framework/data collection mode. The detail was edited to comply with the publication requirements.

RESEARCH QUESTIONS

Although the literature attempted to solve all the problems as described certain issues still need attention. These are:

- what are the individuals and influences of information quality on organizations?
- do Information Quality (IQ) dimensions behave differently across individual web domains of the WWW?

RESEARCH METHODOLOGY

Quantitative research is a predetermined or predefined scenario which is standardized (Durrheim & Blanche, 1999). Quantitative data are numeric in nature based on numbers and evidence. It is suitable in experiments, surveys and in questionnaires, which are used in

positivist research and can also be used in interpretive and critical research (Oates, 2008). Quantitative research works in descriptive studies. This study deployed quantitative research methodology because the study was focused to understand the information quality on an individual website.

The questionnaire

The questionnaire has in total 23 questions and was divided into three parts: part one requests permission to use the responses for academic research. Part two focuses on biographic data such as, general personal particulars like your age, gender and study level. Part three asks about the information quality of individual websites. The questionnaire used in this study was developed based on the proposed research framework. The concept in each question is related to design and evaluates criteria of individual websites. Each question or concept is based on the proposed measures for each category of the research framework. Therefore, the 23 questions can be classified into four categories of information quality: intrinsic, contextual, representational, and accessibility information quality. A pre-test of the questionnaire was administered to a senior lecturer that has extensive experience in IT. Based on his feedback, changes in the wording of some questions were made.

Population and Sampling

The study focuses on the NWU Mafikeng Campus students, applying the probability sampling technique. The population was 300 students. The sample size of the study was one hundred (100). One hundred (100) questionnaires were distributed to the Northwest University Information Systems' students. These students were used due to the contribution they would make to the field of the study as they have studied or are studying Information Technology with modules pertaining to the Internet and web sites. In all cases they have created a web site of their own as a project. The questionnaires were distributed over a three month period.

Data Analysis

Data handling is the procedure of ensuring that research data is stored, archived or disposed of in a protected and safe manner throughout and after the conclusion of a research. This includes the expansion of policies and procedures to supervise data handled non-electronically (Taskakkori & Teddlie, 2003). Data handling is important in ensuring the reliability of research data since it addresses concerns related to confidentiality, security and protection of research data.

Factor analysis was performed to test for consistency with the dimensions found by Wang and Strong (1996). After completion of this processes, all questionnaires were analyzed using SPSS and graph plotters to derive possible conclusions from the answers given by the users. Graphs and charts were used for the purpose of presenting the finding in a user friendly and understandable format. The relationships between the different variables measured will be determined by computing correlations based on the Stockburger (1996) model.

This information and all the data gathered from other sources such as professional articles will lead to the finalisation of the research results. The literature review also formed part of the data analysis process.

ANALYSIS

Respondents Information

This section outlines information as obtained from the questionnaires. A total of 100 questionnaires were distributed to the Northwest University Mafikeng campus. The target population for the questionnaire was students who are studying Information Systems or Computer science. Of the total questionnaires, 90 questionnaires were returned and 10 were never returned to the researcher. Of the 90 questionnaires returned, none were rejected making them all valid. The analysis is based on the 90 responses that the researcher received back. The findings may be applied to students in a similar environment in developing countries. The study was limited as the student had both financial and time constraints.

The results the respondents that participated in the study as Information Systems students at Northwest University Mafikeng Campus, South Africa. The findings of this research show that 33% of the students are female. This indicates that there are more males in pursuit of an IS qualification. The participants in this study are tertiary students with a different perception on information accessed on the web. Eighty percent of the IS students who participated in the study are between 15-25 and the rest are between 25-35.

Information from websites sources is accurate

Figure 3 below reflects the number of participants that responded to whether the information from website sources was accurate or not. This reflects that more students believe that information found on websites is accurate. They responses are based judging from their previous encounters with information quality they found on the web.

The participants appear to frequently compare information found on the Web with information they already know. Discrepancies between what has been read elsewhere or what is known and found on a website is a common factor associated with the detection of problems with information accuracy. These results reflect that information is correct, precise, true, relevant, workable, and up-to-date. The graph clearly reflects that the information found on web site agrees with an identified source to a desired precision. This is supported by Yang, and Maxwell (2011).

Accurate	Numbers
I strongly agree	16
I agree	46
I disagree	14
I strongly disagree	6
I don't want to answer this question	8

Figure 3 Information Accuracy

Access to information must be restricted, and hence kept secure

Figure 4 indicates that 85% agree and strongly agree that access to information must be restricted, and kept secure. These results mean that the users feel that accessibility of information must be guaranteed. There has to be some control order to prevent possible misuse of information, there must therefore be secure information. This is in agreement with Katerattanakul and Sian (1999) when they argue that accessibility information quality emphasizes that the information must be accessible but secure.

Access	Numbers	Percentage
I strongly agree	21	23
I agree	56	62

I disagree	6	7
I strongly disagree	0	0
I don't want to answer this question	7	8

Figure 4 Information Access

Information must be available or easily and quickly retrievable

The results reflect that the information must be available and that the available information gives the consumer the ease of use, the ease of understanding and the ease to read. There's appropriate explanatory text, certain explanatory text to enhance user's ability to comprehend meaning of written or printed words or symbols. Yang and Maxwell (2011) argue that the site response system feedback is accessible to the websites, interoperable across computers.

Information must be correct, reliable and certified error free.

Figure 5 below shows if information is correct and reliable. The majority (80%) believe that the information is correct and valuable to information consumers. This finding further reflects that information on the web sites must be correct and reliable. This is in agreement with Mendes (2006) when he states that there must be an instrument reliable enough that gives confidence in the relation between variables.

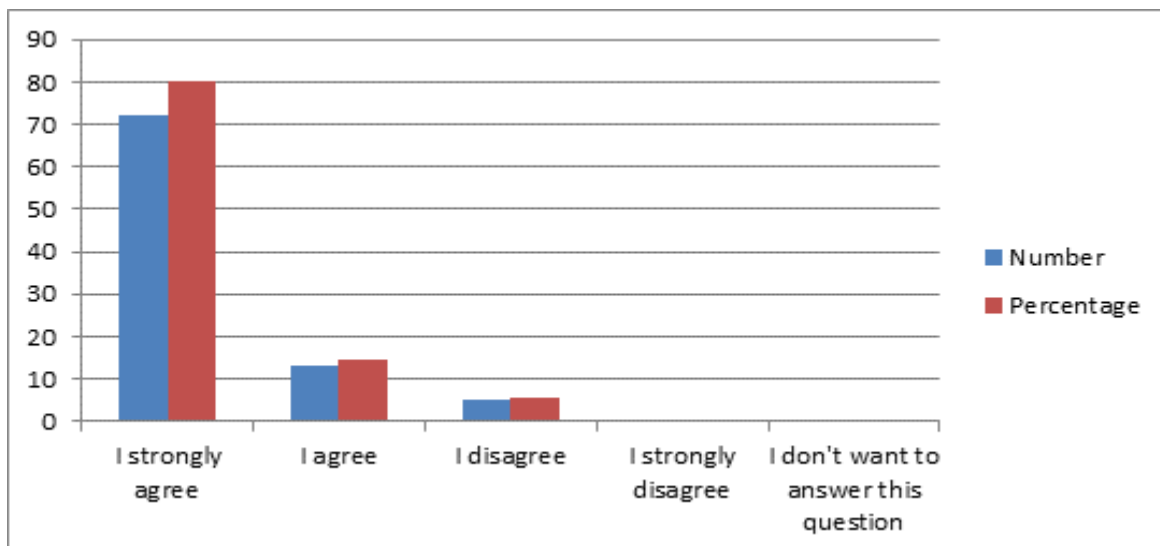


Figure 5 Correct Information

The quality or volume of available information must be appropriate

The results reflect that 96% of the responses agree that the quality or volume of available information must be appropriate. This is an indication that respondents feel that information quality must be relevant, not too broad and in abundance, and must serve the purpose of the web site. They strongly agree that it must be appropriate. Web pages have no value unless the readers understand and can act on the information they contain. The contents of the website must be organized for information consumers to understand and digest information.

Information must be acceptable or regarded as true, real and credible.

Figure 6 displays that 94% agree. This gives indication that websites must be credible and reputable, containing additional information pertaining to the identification of the site owner

thus building the reputation of the site owner. There must be referenced information and external recognition of the site for the information to be regarded as true, and credible. This allows the readers to know more about the author and to provide the communication channel for the readers to contact the author. This notion is supported by Yang and Maxwell (2011).

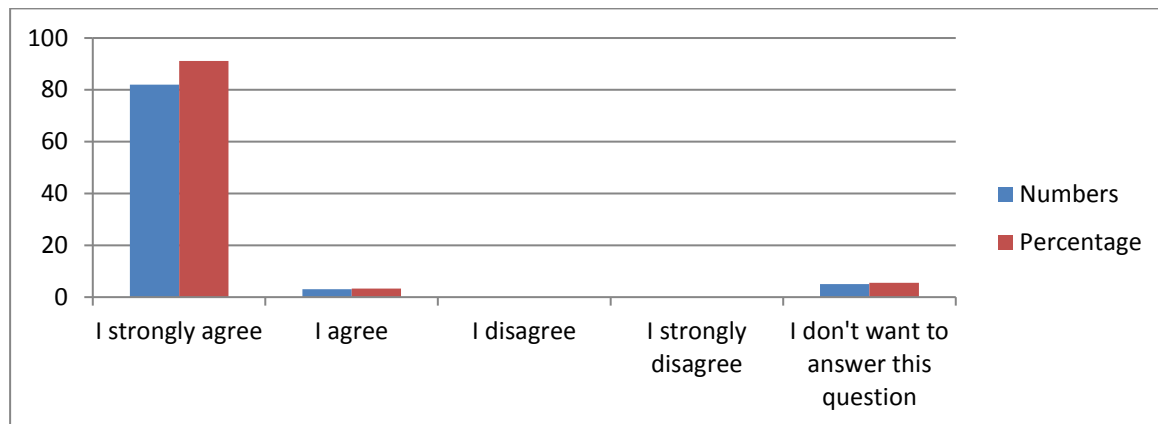


Figure 6 Information Acceptance

Information must be of sufficient breadth, depth and scope for the task at hand.

The results also show that 46% agree that the information must be sufficient (enough for the task). This could be interpreted that once information consumers visit a site they should find the information useful and fit for purpose (applicable). Contextual information quality highlights the requirement that information quality must be considered within the context of the task at hand. In order to add value to the tasks or purposes for which the information is provided, the information must be relevant and complete (Huang & Wang, 1999).

Information must be compactly represented without being overwhelming.

According to Huang and Wang (1999), for information to be considered of good representational quality, it must be interpretable, easy to understand, and concisely represented. When looking at the results of Figure 10, more than 70% agree that the representation of information must be compact without being overwhelming. The respondents thus concur with the notion that information must be represented concisely and that information on web sites should be believable (the extent to which information can be considered to be correct), be representational, be organised, have acceptable visual settings, have typographical features, is consistent and has vividness and attractiveness as basis on the web site.

Huang & Wang (1999) define representational information quality for individual websites as the concerns about visual settings or typographical features such as background, colour, text, font, and image of the web pages and about the combination or layout of these various components on the Web pages. Dividing web page into appropriate sizes would also increase the readability of the pages. Other dimensions of the individual website's representational information quality, which designers/users include in this category, are the vividness or attractiveness of the individual website and the use of multi-media (sound and animation) in the individual website.

Information must be in appropriate language and the data definitions must be clear.

The results show that all of the respondents agree. This is a reflection that the respondents believe that information must be in an appropriate language and with clear definitions. The characteristics of information content must be up-to-date information, language with familiar terminology, relevant information and complete coverage.

Information must be applicable and helpful for the task at hand

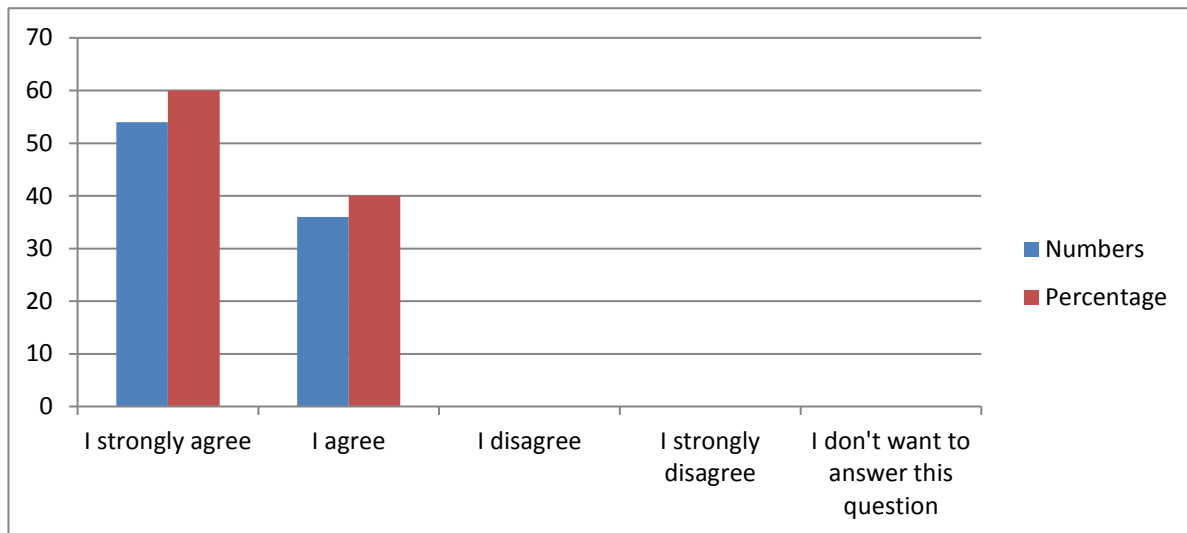


Figure 7 Applicability of Information

The results in Figure 7 show all agree that information found in websites must meet the task at hand (fit-to-task/purpose), adequately meeting needs by being effective and relevant. This is supported by Strong and Wang (1997) when they argue that information consumers occasionally complain that the available information does not support their tasks. Contextual information quality highlights the requirement that quality must be considered within the context of the task at hand. In order to add value to the tasks or purposes for which the information is provided, the information must be measuring information quality of web sites. This relevant information must be provided in time and in an appropriate amount (Lee and Wang, 1999).

Information must be trusted or highly regarded in terms of their source or content.

Figure 8 below shows that 92% that the information must be trusted or regarded in terms of their source content. These results can be interpreted to mean more of the information consumers believe that information content must be reliable, up-to-date, and accurate and be reliable. This is supported by Hlynka and Welsh (1996) where they stated that a website needs clear identification of the author.

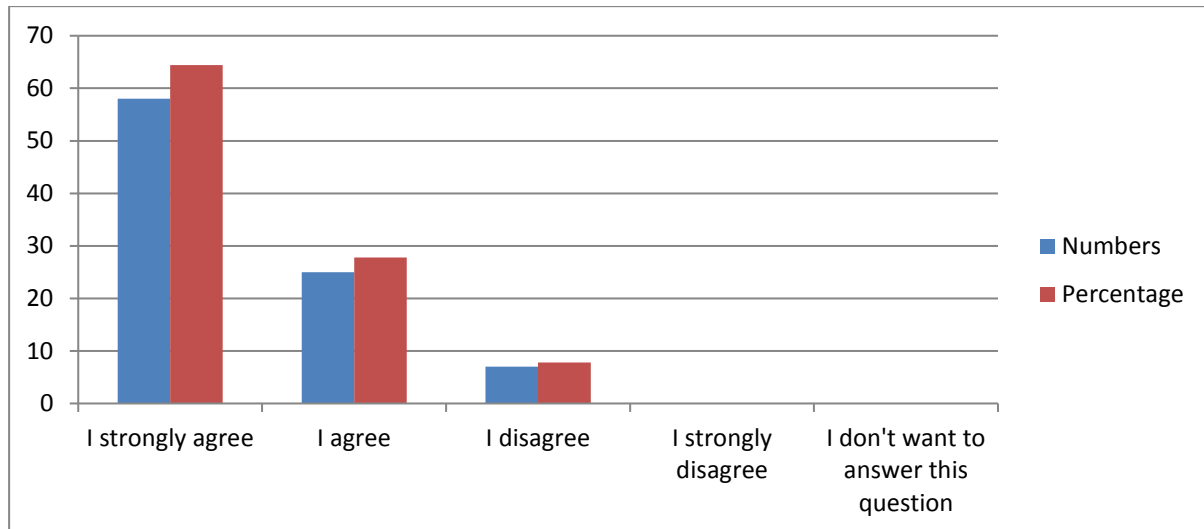


Figure 8 Trustworthiness of Information

Correlation between available and accurate

Table 2 below illustrates that the available information must be accurate and that if the information is not accurate it must not be made available therefore the availability of information depend on accuracy of such information. The statistics shows that the correlation is 0.632, which indicates a strong positive correlation and this implies that the correlation is significant in this case. There is a strong relationship between available information and accuracy of information.

		Information from Internet sources are accurate	Information must be available or easily and quickly retrievable
Information from Internet sources are accurate	Pearson Correlation	1	.632**
	Sig. (2-tailed)		.000
	N	90	90
Information must be available or easily and quickly retrievable	Pearson Correlation	.632**	1
	Sig. (2-tailed)	.000	
	N	90	90

** . Correlation is significant at the 0.01 level (2-tailed).

Table 2 Correlation between available and accurate

Correlation between quantity and sufficiency

The researchers calculated the correlation between quantity of information and sufficiency of information to find out if there is a relationship. This is a positive correlation of 0.418. This implies that there is significant correlation between the measured variables. From this table it can be said that the quantity of the information is not sufficient and the information may seem

sufficient but it may not be of the right quantity. Additionally this relevant information must be provided in time and in an appropriate amount (Huang & Wang, 1999). Information that is delayed or late has no added value. Excessively large volumes of information may make it difficult for consumers to access, interpret and understand the meaning within a reasonable time therefore it has little or no added value (Strong & Wang, 1997).

SUMMARY OF THE STUDY

Information quality is generally thought as a multidimensional concept. The importance of the individual websites cannot be underestimated. An individual website will create an image of and perception about its author. In this study, the researcher looked at user perception of information found on individual website and at a measurement for individual web site information quality. The researcher proposed a framework in information quality for analysing information quality of individual web sites. The information quality framework serves as a theoretical foundation for this research (Katerattanakul and Siau, 1999). The study was carried out amongst tertiary students. These students were used as subjects. The researcher distributed 90 questionnaires on their perception of information quality of individual web sites.

THE MAIN FINDINGS

The study was undertaken to investigate the quality of information found on individual websites using the Katerattanakul and Siau (1999) framework as a tool for measuring user's perceptions of information quality. It found that user's/information consumers perceptions on the information quality of information found on individual web sites is positive. They agree with the Katerattanakul and Siau (1999) Framework of which consists of four major information quality categories that the information of an individual website must have intrinsic information quality, contextual information quality, representational information quality and accessibility information quality.

Intrinsic Information Quality

The literature found on this category suggests that the main dimension of intrinsic information quality is the accuracy of the information. In this study, the researcher found that the respondents strongly believed that the information found on an individual web site is correct, exactly precise, true, relevant, workable and up-to-date. Making it accurate thereby agreeing with previous literature and this category. Since the respondents believe that the information found on an individual web is accurate, this fulfils one category of the framework used to conduct this study in measuring the information quality of an individual web site.

Contextual Information Quality

Contextual information quality is another category that the researcher focused on for the purpose of the study. The literature reviewed in this category showed that information consumers complained that the available information does not support their tasks. In order to add value to the tasks or purposes for which the information is provided, the information must be relevant and complete, additionally, this relevant information must be provided on time and in the appropriate amount. For this study the findings are contrary to previous literature because, 72% of the respondents felt that the information provided meets task or purpose needs and improves performance. In addition, that the information comprehensiveness provides rich, broad comprehensive, comparable information. Furthermore, the fact that the information is relevant, serves the purpose of the website, is up-to-date and complete, does

not lack breath and is complete, contributes to the point that the information on the web is sufficient to the respondent's tasks or purpose.

Representational Information Quality

Previous literature shows that representational information quality includes aspects related to the format of the information (concise and consistent representation) and its meaning (interpretability and ease of understanding). The findings of this study agree with a response of 100% that the representation of information must be clear, without ambiguity and easily comprehended. These findings indicated that these respondents believe that information is clearly understandable, without repetition of the structure of websites. It is easy to find information that is clearly understandable with explanatory text.

Accessibility Information Quality

Previous literature reviewed in Chapter 2 on accessibility information quality category of the Katerattanakul and Siau (1999) framework emphasises that the information system must be accessible but secure. This agrees with the findings of this study which indicates that 62% agrees and 23% strongly agree that access to information must be restricted and hence kept secure. These findings of the study shows that the users feel accessibility of information is safety guarantee, there is control order to prevent possible misuse of information and there is security of information.

Responses to the research questions

The main findings of this study in relation to each research question will be discussed in this section. Each question is followed by a discussion of the findings related to that question.

What are the individuals and influences of information quality on organizations?

Quality in an organization is in terms of quality as excellence, quality as value, quality as conformity to specifications, and quality as meeting customer expectations. Excellence in IS quality involves using state-of-the-art technology, following industry "best practice" software standards, and delivering "error-free" performance. The value of IS can be realized by improving profit margins for the firm, providing easy-to-use and useful applications, and designing easily maintainable software. IS quality as conformance, denotes designing systems that conform to the end users' information requirements, and adhere to industry standards.

Meeting customer expectations of IS quality is accomplished by offering appealing, user-friendly interfaces, entertaining user requests for changes, and satisfying the stakeholders of the IS. The above quality definitions broadly characterize IS quality measures, system quality, information quality, and service quality. For example, system quality represents the quality of information processing itself, which is characterized by relevant for decision making, and easy-to-understand (representing IS quality as value) as well as outputs that meet users' information specifications (representing IS quality as conformance to specification). Service quality is defined as the level of service delivered by IS service providers to business users (as compared to their expectations) in terms of reliability, responsiveness, and empathy.

These concepts of IS service quality are reflected through IS meeting user expectations (by satisfying IS users by providing services to users at the time promised, building confidence in IS users, and being courteous to users when dealing with service requests) and demonstrating IS excellence (by having highly knowledgeable IS experts and by ensuring

“error-free” performance). Employment of state-of-the-art technology, a system offering key functions and features (denoted as IS excellence), and software that is user friendly, easy to learn, and easily maintainable (denoted as IS value). Information quality, a concept that is related to the quality of information system outputs, can be described in terms of outputs that are useful for business users

Do Information Quality (IQ) dimensions behave differently across individual web domains of the WWW?

From the information gathered by the results of the questionnaires, information quality dimensions behave differently across individual web domains of the WWW. A framework was developed based on the idea of commonality and then refined in context of the World Wide Web. For practitioners wanting to develop websites with high IQ, the first nine dimensions in relative rankings are understandability, accuracy, credibility, navigation, amount of data, completeness, advertising, concise representation and consistent representation. Results show that these dimensions are not significantly impacted by any of the factors and more importantly these dimensions maintain high mean values for their importance ratings across all factor levels. The authors contend that the nine dimensions form the core group cannot be neglected while developing a high IQ website. In other words it can be interpreted to mean that these dimensions will hold their relative importance across the World Wide Web. Generalizing these results means that the ‘set of nine’ is the core set valid for any website, for any domain and for all nationalities in the World Wide Web.

RECOMMENDATIONS

The researchers recommend that there should be a course taught at first year of study at tertiary institutions on how to evaluate information quality of information found on the web.

The study focused on the perspectives of the most frequent user group of individual websites. Although this helped to narrow down the scope of the study and to look at the problem from definite perspectives, the proposed framework can merely be used to evaluate the perception of students on the quality of individual web sites.

In designing a particular type of website used for a specific purpose, it is not possible to satisfy all requirements. There are always trade-offs to be made. In evaluating individual websites as well, based on the purpose of the evaluation, the perspective upon which a website is evaluated, there are definitely some quality factors that would have much more importance than the rest of the factors. Thus, identifying critical factors for the quality of the web site under consideration is important. Moreover, while identifying the importance of the quality factors for evaluating the websites, the needs of different user groups need to be considered.

Therefore, the following points are recommended for future research work:

- the proposed evaluation framework focuses on only one group of users. The evaluation result of a given individual website using the proposed framework will only reflect the quality of the website from the student’s point of view. It is not possible to evaluate the quality of a given individual website from any other user point of views. Thus, it is important to consider different group of users’ perspective to design a more comprehensive evaluation framework.
- as previously mentioned, different websites have critical quality characteristics. Some characteristics are more important than others based on the type and purpose of the

websites. The importance of the factors also differs for different types of users. Therefore, it is important to differentiate which of the quality factors are highly important for individual websites and which ones are less important. This can be done by assigning weight values for each of the quality factors in the framework based on the need and expectations of different user groups. The needs of users can be determined as user requirements of the website either at the beginning of its development or after implementation.

- the proposed framework only consists of structured lists of quality factors. After assigning weights to the high level quality factors and sub quality factors, it would be interesting to design and develop a software tool that simplifies the evaluation activity.
- the quality factors and sub factors in the proposed framework are arranged based on their intrinsic definitions. However, in the case study it is shown that some of the sub-factors reflect inconsistent item scores, which indicated that they do not measure a similar concept to the rest of the factors. To arrange the hierarchy of the factors in a more reasonable way, a factor analysis method can be used. Using factor analysis will help to get a well-refined and structured list of high-level quality factors and sub quality factors.

LIMITATIONS OF THE STUDY

The first limitation that was encountered during the circulation of the study questionnaires was the fact that the study background was not provided; this led to some of the participants finding it difficult to understand the meaning of information quality and the overall aims and objective of the study. Some participants failed to return the copies of the questionnaires handed out to them and some delayed with their responses. Another limitation experienced by the researcher which possibly made an impact on the findings/ results of the study was identified under research methods. The subjects used in the round of data collection were students; some scholars argue that using students as subjects limits the generalization of the findings to the general populace of web users. Though one would argue that students included in the study match the general demographics of Web consumers, the researcher hoped to do further testing on other Web consumer groups.

CONCLUSION

This research presents an information quality framework for analyzing websites and an instrument that was developed based on a framework. The developed instrument was tested in the individual website context. Reliability tests indicate that it is a highly reliable instrument. Factor analysis reveals that the developed instrument is fairly consistent with the proposed research framework. Three of the four categories/factors (intrinsic, representation and accessibility) emerging from data analysis are consistent with three information quality categories in the research framework. The results, however, suggest that one category/factor (contextual) may be used in the individual or personal web context, and that there has been major advancement on this category of the framework since early literature. Despite the promising results, the instrument can be further refined. The wording of each question may be adjusted and unimportant questions or concepts showing low mean scores may be dropped from the questionnaire. In addition, the research framework may need to be redefined or regrouped for the individual or personal web context.

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