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# Conceptualizing Information Quality in Online Health Forums

*Emergent Research Forum (ERF)*

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## Abstract

Increased access to the Internet has provided patients with new sources of information, and the rapid growth of the Internet and ancillary services has changed the way in which people seek and consume information. An example of such transformation is the wide proliferation and acceptance of online health forums over the last decade. However, the narrative, personal, discursive, and experiential nature of knowledge shared by patients that make these online forums unique and attractive also challenges the quality of the health information. Moreover, there is a lack of consensus as to what information quality really means in the context of online health forums. Therefore, the purpose of this study is to establish a validated measure of the quality of health information on online forums targeted to patients and the general public discernated by certain communities.

## Keywords

Information quality, online forum, online health forum

## Introduction

Increased access to the Internet has provided patients with new sources of information, and the rapid growth of the Internet and ancillary services has changed the way in which people seek and consume information (Guan et al., 2018). An example of such transformation is the proliferation and acceptance of online health forums over the last decade (Shim & Jo, 2020). Such a reliance on online health forums has become even more pronounced due to the increasing number of reports from patients that the information they receive from their healthcare professionals are unsatisfactory and often lack clarity and relevance (Wang et al., 2021). As such, patients and the public seek information from online health forums in addition to their healthcare providers to fulfill their needs for health information (Pendry & Salvatore, 2015; Prescott et al., 2019; Solberg, 2014). Additionally, information obtained from online health forums have been found to elicit adaptive behavioral changes, improve conformity to treatment plans, minimize health risks, foster satisfaction with care and care providers, reach other individuals with similar health conditions, improve health outcomes on the part of patients as well as facilitate and enhance shared decision-making between patients and healthcare specialists (Daraz et al., 2011; Wang et al., 2018).

Yet concerns remain about the potential adverse effects of patients using independently obtained online health information. On one hand, the overabundance of online health information causes individuals to become overwhelmed from the search results, making it quite difficult for them to fully comprehend it (Jiang & Beaudoin, 2016). On the other hand, individuals' search for health information online subject them to numerous unverified, incorrect, or conflicting information, causing them to make hasty and ill-informed decisions which may have any number of unanticipated, adverse health effects (Sun et al., 2019). Moreover, the same narrative, personal, discursive, and experiential nature of knowledge shared by patients that make these online forums unique and attractive also challenges the credibility and validity of such information. Thus, the quantity and quality of online health information warrants caution. The purpose of this study is to assess the quality of health information on online forums targeted to patients and the public discernated by certain communities based on health condition or illness such as diabetes or cancer. To that end, this study will employ a mix of collaborative and semantic-based domain ontology to foster a common understanding of the structure of a semantic model of information quality combined with the aforementioned domain knowledge.

## Literature Review

An online health forum provides a virtual environment for people with similar medical conditions to gather together and exchange information, knowledge, experience, feelings, and support (Hanmei et al., 2013). These online health forums are distinct from other forms of online communities because the membership to a community or sub-community here depends on medical condition shared among the members (Hanmei et al., 2013). Given the increasing prevalence of and reliance on these online health forums, researchers have studied this phenomenon from variety of perspectives. For instance, prior studies in the context of online health forums have investigated the adoption decision of users (Jin et al., 2016), popular topics of discussion and user influences (Lu et al., 2013; Yang & Tang, 2012). Another stream of research has investigated the role of social support such as information support, emotional support, and tangible support (Bambina, 2007; McKenna et al., 2002). Information seeking behavior (Luke & Harris, 2007; Pfeil & Zaphiris, 2009), and user motivations (Kamel Boulos et al., 2006; Karimi & Danny, 2009) in online health environment have also been widely investigated. While these studies are extremely valuable in understanding users' adoption of online health forums, these studies do not assess dimensions of the quality of the information on online health forums.

Geared towards understanding and evaluating the quality of information on online health information, scholars have investigated the role of website quality [e.g.(Fennell et al., 2017)]. The findings from this study indicated that a well-designed website leads users to form a positive attitude toward the information deeming such information as relevant, readable, and effective at enhancing health knowledge and subsequent outcomes (Fennell et al., 2017). However, these studies have not investigated the dimensions of quality pertaining to the informational contents available on online health forums. As such, online health forums warrant a deeper investigation with respect to the quality of informational contents (Shim & Jo, 2020). Prior studies along the same line of research have investigated the proportions of inaccurate information to indicate the prevalence of undesirable information or the risk of encountering misinformation online (Eysenbach et al., 2002). The findings from this meta-study indicated that scholars tend to evaluate quality indicators consisting of only accuracy, completeness, readability, design, disclosures, and references. Similarly, another systematic literature review of 165 scholarly works illustrated that researchers have investigated accuracy, completeness, currency, and formality as quality indicators of information (Diviani et al., 2015; Zhang et al., 2015). Likewise, the findings from this study also indicated that most studies tend to focus on platform design, such as interactivity and aesthetics (Choung et al., 2017; Zhang et al., 2015). Accordingly, some studies have assessed health information quality in terms of fitness for use, usefulness, current, trustworthiness, expertise, and objectivity (Sun et al., 2019). Thus, it is evident that there is a lack of consensus as to what information quality really means in the context of online health forum (Sun et al., 2019). Since there is a lack of consensus, we refer back to seminal IQ papers to understand the IQ construct (Lee et al., 2002; Wang and Strong, 1996).

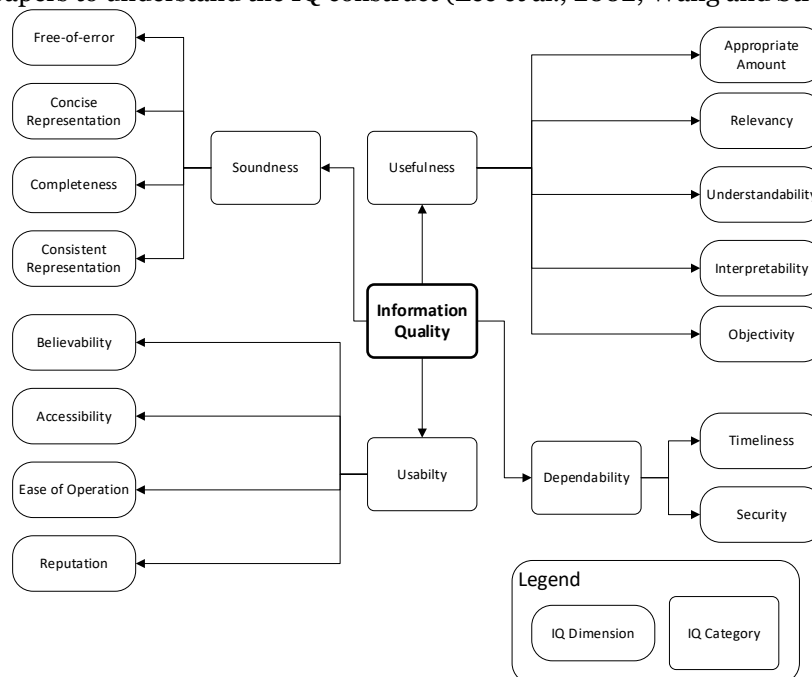


Figure 1. IQ Dimensions and Categories from Lee et al., (2002)

## Information Quality Dimension Analysis

We start from the principle found in (Wang & Strong, 1996) that the dimensions of IQ are dependent upon the context in which they are deployed and the perspectives of the users. However, Lee and colleagues also give

four categories of IQ that must be covered as a starting point for IQ constructs. Each of these categories have one or more dimensions of IQ under it. These categories are soundness (four dimensions), dependability (two), usefulness (five), and usability (four). Soundness for IQ is based on the ideas of accuracy, conciseness, and completeness of information. Dependability for IQ relate to the information being timely and secure. Usefulness in IQ is seen in having the appropriate amount of information, having it be understandable, and relevant to the subject’s interest or inquiry. Finally, the usability category of IQ contains the believability of the information as well as the reputation of the information’s author. The categories and their dimensions are shown in Figure 1. Arrows in Figure 1 emanate from the information quality box, indicating that all dimensions were modeled as reflective.

Since definitions of the various dimensions were not given in (Lee et al., 2002), in the present paper we use the items to develop definitions of the dimensions. Definition development was done by the research team by examining each item proposed by Lee et al., (2002) In the original context. The original context was individuals in a business organization using data in reports to make decisions. We developed definitions of each dimension through a process of proposing a definition, debating it, and refining it until all researchers believed it fully captured the original intention of the dimension. While the derived definitions of the IQ dimensions from Table 1 are well-suited to the workplace, they are less suited to online health forums.

Some of the dimensions are not relevant in the online health forum context. Thus, we propose the following dimensions for the online health context, given in Table 2. For each dimension from Lee et al., (2002) we do not include in our context, Table 2 gives a justification for exclusion or modification. We reached these conclusions about what dimensions to include by examining the definitions given in Table 1 and the items for the dimensions from Lee et al., (2002). We then debated if the item could reasonably make sense to users in an online context. If there was disagreement among the researchers, we revisited the items and definitions and debated again until we reached 100% consensus. Table 2 shows that from the original IQ dimensions, only three (free-of-error, understandability, and believability) can be used in online health forums without modification. Five other dimensions (completeness, appropriate amount, relevancy, objectivity, and timeliness) may be used with modifications, and seven dimensions (concise representation, consistent representation, interpretability, accessibility, ease of operation, reputation, and security) cannot be used.

**Table 1. Derived Definitions of Extant IQ Dimensions from Lee et al., (2002)**

Dimension	Definition
Free-of-error	The information is found to be correct and accurate.
Concise Representation	Related to the presentation, formatting, and space economy of the information.
Completeness	Related to the information being comprehensive enough to perform job tasks based on the information.
Consistent Representation	The information is compared to the formatting and presentation of past similar information for uniformity.
Appropriate Amount	Determining if the volume of information presented meets the needs of the user to perform job tasks.
Relevancy	The information is evaluated for usefulness and applicability as support for performing job tasks.
Understandability	The information is comprehensible and easy to understand to the user.
Interpretability	The information is presented with pertinent measurement units, or it is clear what is meant by coded information.
Objectivity	The information is based on facts and is without bias.
Beliavability	The information is from a credible source and has face validity.
Accessibility	It is quick and easy to get to the information.
Ease of Operation	It is easy to manipulate the information by aggregation or other techniques or is easily combined with other information.
Reputation	The information is known historically to be sound and reliable.
Timeliness	The information is considered new enough or up to date enough to perform job tasks.
Security	The information is protected against unauthorized access and the security measures put in place are considered adequate for protecting the information.

**Table 2. IQ Constructs for Online Health Forums**

Dimension	Action	Justification for Change
Free-of-error	Keep	(No changes)
Concise Representation	Drop	On forums, information is presented in paragraph form and not expected to be “compact” or “concise” in its formatting.
Completeness	Modify	Some of the items can be kept but others should be dropped such as “This information includes all necessary values.”
Consistent	Drop	There is no basis or expectation for a post to be consistently formatted with other posts in an

Dimension	Action	Justification for Change
Representation		online health forum.
Appropriate Amount	Modify	While the definition for this dimension would work with online forums, some of the items are not consistent with online forums. We will modify the inconsistent items to work with online health forums.
Relevancy	Modify	This dimension assumes the subject will do something with the information related to their work. In the online health forum context this means that posters would be able to apply the information found in response to their post to their own health.
Understandability	Keep	(No changes)
Interpretability	Drop	This dimension is about interpreting data. It is not necessary to interpret paragraph-based content in this way as it has already been turned into information by the poster.
Objectivity	Modify	One item asks if the information was “objectively collected” which would be hard for a person in an online health forum to evaluate.
Believability	Keep	(No changes)
Accessibility	Drop	Ease of access is irrelevant in the case of online health forums. Also, we have no plans to accurately measure this via experiment.
Ease of Operation	Drop	This dimension assumes the subject will do something to manipulate the information. This is not expected or desired in the online health forum context.
Reputation	Drop	Medical forums are publicly accessible on the Internet, so this dimension does not apply.
Timeliness	Modify	Timeliness of information is not relevant for online health forums. But an argument could be made that the question-asker would appreciate a timelier response over a delayed response. This is not easily tested with 3rd party subjects. We can measure it objectively using time stamps on posts.
Security	Drop	Medical forums are publicly accessible on the Internet, so this dimension does not apply.

## Conclusion and Future Research Directions

Online health forums represent a place where high-quality information is essential to the health and well-being of users. The IQ construct modified for online health forums in this paper can serve as a basis for evaluating the IQ of information posted such forums.

Future work on this construct will include modifying existing items and developing new items for the online health forum context. Since the use of ontology has been well-documented to offer a shared and common understanding of the structure of the semantic model as well as help define links between different semantic knowledge (Holsapple & Joshi, 2002, 2004), this study will involve a mix of collaborative and semantic-based domain ontology to foster a common understanding of the structure of information quality associated with the information circulating in the online health forums. Next, a focus group of users will be tasked with the validation of definitions of sub-dimensions of information quality construct. Then, the items will be tested using a web-based survey of online health forum users. Subjects will be prompted with questions and responses to questions posted on online health forums. For the responses, subjects will evaluate IQ on a Likert scale. After data collection, items should be tested for loadings with an exploratory factor analysis (EFA). We choose EFA instead of confirmatory factor analysis (CFA) because several new items need to be developed and the loadings of these items onto their desired dimensions should not be assumed.

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