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Health Answer Quality Evaluation by Librarians, Nurses, and Users in Social Q&A

Sanghee Oh (Corresponding Author) and Adam Worrall

College of Communication and Information, Florida State University,
142 Collegiate Loop, Tallahassee, FL 32306-2100
Office: 850-645-2493, Cell: 517-515-1932, Fax: 850-644-9473
Email: shoh@cci.fsu.edu, apw06@my.fsu.edu

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Abstract

Health information consumers and patients increasingly take an active role in seeking health information online and in sharing their health problems and concerns in online support groups and social media venues. However, they may risk being influenced by unreliable and misleading information in such environments, since no intermediaries monitor the quality of this information. This study focuses on evaluating the quality of health information exchanged in one of the social media venues, by investigating how librarians, nurses, and users assessed the quality of health answers in Yahoo! Answers, a social question-and-answering (social Q&A) service. Through statistical analysis, differences between the three participant groups, how the background characteristics of participants influenced their assessments, and relationships between characteristics of the content of answers and quality evaluation criteria were considered in detail. Librarians and nurses shared similar ratings of answer quality, but have differences in their level of medical knowledge and the types of services they offer, resulting in minor differences across criteria. Users perceived the quality of health answers in social Q&A to be higher than librarians and nurses for almost all criteria. Depending on the sources of information presented in health answers, librarians, nurses, and users gave different quality assessments. Implications exist for research into and practice of evaluating the quality of health information, which need to address both search and domain expertise along with the sharing of socio-emotional values preferred by users.

Highlights

- A set of ten criteria for evaluating the quality of health answers in social Q&A were proposed and tested in this study.
- Users perceived the quality of health answers as being higher than librarians and nurses on almost all of the criteria.
- Librarians and nurses showed a strong consensus on their quality evaluation of health answers.
- Findings from this study could be applicable to develop guidelines and programs for promoting health information literacy on the use of social media, with contributions from both experts – librarians and nurses – and users.

Introduction

Nowadays, the likelihood that people discuss health problems with anonymous others on the Internet has significantly increased. Health information consumers and patients have taken an active role in seeking information about their conditions on the Internet and are directly involved in the process of making decisions about their health care and treatment (Brennan & Starren, 2006; Mears & Sweeney, 2000; Sillence, Briggs, Harris, & Fishwick, 2007b). They participate in online support groups to share information and support among those who are dealing with similar health problems (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004). Recently, the concepts of Health 2.0 and Medicine 2.0 have been introduced, advocating the use of social media for active participation and collaboration among health professionals, researchers, patients, and their family members, with the goal of improving health care services (Eysenbach, 2008; Hughes, Joshi, & Wareham, 2008). Consumers and patients use social media for discussing their health problems and sharing their thoughts, opinions, and emotions with others by rating quality or leaving comments on blogs, wikis, or health websites (Fox & Jones, 2009; Fox, 2011).

Problem Statement

As opportunities increase to exchange massive volumes of health information extending far beyond personal contacts, the risk of consumers and patients being influenced by unreliable and misleading health information increases. Little is known, however, about how much they are aware of the quality of health information in social media and how their perceptions of quality differ from those of health information experts. Therefore, this study included evaluations of health information by experts—librarians and nurses—and by general users of social media. All of them were asked to evaluate the quality of health information in one social media venue, social questioning and answering services (social Q&A), and their evaluations of the quality of health answers exchanged in social Q&A were compared. Observing the different points of view on the quality of health answers among these groups is important, especially between experts—librarian and nurses—and general users, because experts have been closely involved in assisting their patrons and patients to access reliable sources of health information and in making

appropriate health decisions. Findings from this study could help both librarians and nurses learn how their patrons or patients consider the quality of health information obtained from social Q&A according to the different aspects of criteria proposed in this study.

This study answered three research questions:

1. What are the perceptions that librarians, nurses, and users have toward the quality of health answers in social Q&A? How do they differ from one another?
2. How do the background characteristics of librarians, nurses, and users influence their evaluations of health answers in social Q&A?
3. What relationships exist between the characteristics of answer content and the evaluations of quality across the three groups of participants?

Social Q&A is a community-driven Q&A service (CQA) that allows people to exchange information by posting questions and answers, the most natural form of conversation people utilize in seeking information. Social Q&A is popular due to the fast turnaround time for receiving answers to questions people have in everyday life (Kitzie & Shah, 2011). From websites such as Yahoo! Answers, people can obtain customized health answers from many others with various levels of expertise and experiences in health. Health care professionals, including physicians, surgeons, nurses, therapists, psychologists, and biology researchers, are among those providing answers, but a majority of answerers are lay people who would like to share their personal experiences and opinions (Oh, 2011). For this study, health answers posted in Yahoo! Answers, the largest social Q&A service were collected and used for the evaluation.¹

Librarians, nurses, and users were invited to participate in this study. Librarians and nurses are experts in health-related information distribution. Librarians, in particular in hospital or clinic libraries, are information search experts who are trained to help their users to access reliable health resources (Volk,

¹ As of December 2012, about nine million health-related questions and associated answers have been posted in Yahoo! Answers. This number is significantly larger than other comparative social Q&A services, such as WikiAnswers (623,400 questions about health), and AnswerBag (132,086 questions about health). The statistics were obtained from the health categories of the official sites.

2007). Nurses are health care experts who consult with their patients all the time; nurse-patient communication is also composed of questions and answers (Jones, 2003). Both librarians and nurses have high expertise in consulting sources to obtain health information, but they may be less motivated to obtain information from social Q&A. Users of Yahoo! Answers, representing lay people with health information needs, may have lower expertise in evaluating health information than librarians and nurses, but are more motivated to seek and use answers from social Q&A when making health decisions.

Perceptions of the quality of health answers were investigated by asking the participants to evaluate the quality of health answers obtained from Yahoo! Answers using ten evaluation criteria—*accuracy*, *completeness*, *relevance*, *objectivity*, *source credibility*, *readability*, *politeness*, *confidence*, *knowledge*, and *efforts*—and rate them using a five-point Likert scale (1 being the lowest, 5 the highest). In a preliminary report comparing the quality ratings across librarians, nurses, and users and how they evaluate the quality of answers differently, there were significant differences in the ratings of health answers among librarians, nurses, and users. In most criteria, except *politeness* and *empathy*, users rated answer quality higher than librarians and nurses (Oh, Yi, & Worrall, 2012). This paper presents an in-depth comparative analysis of the quality evaluation among and quality ratings from each of the three participant groups. In addition, further analysis examined whether (a) the demographic and background and (b) characteristics of health answers—answer length, whether a health answer contains information about answerers' health expertise, experiences, or URL for additional resources—influence the evaluations of the quality of health answers within and between the participant groups.

Literature Review

Quality of Answers in Social Q&A

The number of user-generated questions and answers exchanged in social Q&A is substantial. As of October 2012, a total of 135 million resolved questions and associated answers are available for use in

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Yahoo! Answers, the most popular and largest social Q&A site². In WikiAnswers, another popular social Q&A site, 17 million answers have been posted and are available for use.³ People can use these and other large-scale collection of questions and answers in social Q&A in a variety of everyday life information behaviors. The questions and answers serve as a rich source of experiences and opinions from anyone who has similar concerns or issues. On the other hand, the process makes it difficult for people to locate good quality information, because they have to search through and decide which answers are reliable and usable for their individual situation and context. While the correctness and accuracy of answers is one factor in this, there are many other objective and subjective factors used by both experts and users. Previous studies on the quality of answers in social Q&A have focused on developing models with which to identify the criteria people use for making judgments of the quality of answer content or to detect high quality answers using non-textual features. Blooma, Chua, and Goh (2008) identified textual and non-textual factors that can be used for identifying good quality answers in the topics of “computers and internet,” “mathematics and science,” “arts and humanities,” and “business”, proposing *accuracy*, *completeness*, *language*, and *reasonableness* as measures to evaluate the quality of the answer content. In their study, two Yahoo! Answers users with information technology backgrounds coded answers using the quality criteria. Liu, Bian and Agichtein (2008) identified user *satisfaction* as an indicator for evaluating the quality of answers in the topics of “education and reference,” “mathematics and science,” “sports,” “arts,” and “health.” They developed systematic models to predict user satisfaction with answers using the content, structure, and community-related features in social Q&A. They recruited paid raters from Amazon’s Mechanical Turk (MTurk) to obtain subjective judgment on satisfaction.

Harper, Raban, Rafaeli, and Konstan (2008) took a similar approach to Liu et al.’s (2008) study, but further compared the quality of answers in social Q&A to digital reference services and expert services, two other types of online Q&A services. While Liu et al. hired paid raters, Harper et al. (2008) invited undergraduate students to evaluate the quality of answers related to the topics of “technology,”

² Number retrieved on October 12, 2012, from Yahoo! Answers (<http://answers.yahoo.com>).

³ Number retrieved on October 12, 2012, from WikiAnswers (<http://wiki.answers.com>)

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“business,” and “entertainment” from the three types of Q&A services. Criteria included *correctness*, *confidence*, *helpfulness*, *progress towards receiving an answer*, *monetary compensation*, *degree of personalization*, and *answerers’ efforts*. They found social Q&A provided higher quality answers than digital reference services, due to the contribution of a community with a large and active number of participants. The answers from digital reference services were found to look dry and lack interest in the question, in opposition to the answers from social Q&A which showed evidence of care and concern by answerers. Harper et al. found *answerers’ efforts* to be a significant predictor for assessing answer quality. Questioners’ preferences for subjective answers and answers with emotional overtones were also observed in a study by Kim and Oh (2009). They analyzed the comments given by questioners on answers across a variety of topics and found socio-emotional criteria such as *agreement*, *emotional support*, *attitudes*, *humor*, *effort*, and *taste* were used frequently in evaluating answers, along with criteria related to the content and utility of the answers.

Zhu, Bernhard and Gurevych (2009) proposed a multi-dimensional model of quality assessment, composed of two high-level criteria: *understandability* and *content*. These were subdivided into facets of *informativeness*, *politeness*, *completeness*, *readability*, *relevance*, *conciseness*, *truthfulness*, *level of detail*, *originality*, *objectivity*, and *novelty*. Shah and Pomerantz (2010) adapted Zhu et al.’s model of criteria and invited paid raters from Amazon’s MTurk (as with Liu et al, 2008), having them evaluate the quality of 600 answers randomly selected from Yahoo! Answers in any topic. In addition to this manual review, Shah and Pomerantz (2010) automatically extracted features related to questions, answers, and users and used them to develop a model for predicting the quality of questions and answers in social Q&A. Recently, Fichman (2011) assessed and compared the quality of answers from four social Q&A sites: Askville, WikiAnswers, Wikipedia Reference Desk, and Yahoo! Answers. Two graduate students evaluated the quality of the answers using three criteria—*accuracy*, *completeness*, and *verifiability*—with yes/no responses.

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Previous studies about the quality of answers in social Q&A have been designed without much consideration of the topic differences in answers. In contrast, Stvilia, Mon, and Yi (2009) developed a set of criteria for assessing the quality of health answers, not from social Q&A but from a similar online Q&A service, the Internet Public Library (IPL). The answerers in IPL are different from most social Q&A users in that they are trained librarian volunteers. The model and criteria could be comparable, however, since answers in both IPL and social Q&A sites are created by human beings. Stvilia et al. assessed and compared the quality of health information from email scripts with health-related questions sourced from the IPL service and health web pages they randomly selected. They surveyed and interviewed health information consumers and tested the importance of the 21 proposed criteria, including *accuracy, reliability, credibility, trustworthiness, clarity, objectivity, utility*, and more. Based on our review of criteria from these previous studies, we proposed a set of 10 criteria for evaluating health answers in social Q&A: *accuracy, completeness, relevance, objectivity, readability, source credibility, empathy, politeness, confidence, and efforts*.

Answer Characteristics in Social Q&A

Social Q&A includes many specialized features people can use to predict the quality of answers. For example, in Yahoo! Answers users can vote on questions and answers either negatively or positively (i.e., “thumbs up” or thumbs down”). Users select one answer as the best answer among others and add star ratings, indicating how much they like the best answer. The profile information of an answerer is displayed along with their answers; it includes information about how long the answerer has been a member of Yahoo! Answers, how many answers they provided in the past, how many of these were selected as the best answers, and how many points they obtained by providing good answers. Other users may get a sense of how credible or trustworthy an answer is based on answerers’ profiles. The major interest of the current study, however, is in the content quality of answers in social Q&A regardless of these external features. Therefore, only the text of questions and answers were extracted and used for the evaluation.

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Nevertheless, there are textual characteristics of answers that may influence evaluation of their quality.

First, the length of answers (i.e. number of words) has proven significant for predicting the quality of answers. Text length has been found useful to measure online writings automatically (Larkey, 1998). In a similar way, several researchers have tested the length of answers as a predictor of the quality of answers in social Q&A, finding it to be one of the most influential features (Adamic, Zhang, Bakshy, & Ackerman, 2008; Agichtein, Castillo, Donato, Gionis, & Mishne, 2008; Blooma et al., 2008; Jeon, Croft, Lee, & Park, 2006; Lin, Quan, Sinha, & Bakshi, 2003). Second, the presence of source information in answers may also be an important feature for predicting the quality of health answers. In social Q&A, people judge answers based on the descriptions answerers give about their expertise or experiences in certain topics and/or direct links to URLs in answers. Syn and Oh (2011) extracted 15,099 unique URLs from health-related answers in Yahoo! Answers and used them to explain the importance of web resources in health. Oh, Oh, and Shah (2008) analyzed source information from answers in Yahoo! Answers and classified them into human and non-human-related sources. Human-related sources included personal / situational experiences, professional expertise / educational background, personal research, information obtained from a third party, and ethnicity. Non-human related sources included book titles and news articles, but a majority of these were URLs inserted in answers. Kim (2010) tested the credibility of answers in social Q&A using two types of criteria: message-related and source-related. Message-related criteria included those relating to the content and format of answers—overlapping those from previous studies—such as *accuracy*, *clarity*, *completeness*, *spelling/grammar*, *tone of writing*, and *layout*. Source-related criteria included *answerers' attitude*, *known answerers*, *perceived expertise*, and presence of *references*. Kim found source-related criteria have not been recognized as important as message-related criteria in assessing answers, despite their use as a primary set of criteria for evaluating documents on the Web (Rieh, 2002; Rieh & Belkin, 2000).

For this study, four types of answer characteristics as written text and as sources of health information were identified from the literature: (a) answer length, (b) presence of answerers' health expertise within

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answers, (c) presence of personal experiences related to health within answers, and (d) presence of internet sources (URLs) within answers. Answer length was decided by counting the number of words in a health answer. Answers can contain information about answerers' health expertise as health care professionals—i.e., “I'm a physician,” “medical health nurse, 18 years experience”—, information about their personal stories or experiences—i.e., “I had brain cancer”—, or information in the form of URLs that people can refer to in order to find further information. This study analyzed the influence of these factors in assessing the quality of health answers using the ten criteria within and between groups.

Method

Participants

Three groups of participants were invited for the evaluation: librarians, nurses, and Yahoo! Answers users. Librarians who have experiences dealing with health-related inquiries in any type of library were invited from multiple, nation-wide contact lists. An invitation letter was distributed through several mailing lists of sections in the Medical Library Association (MLA)—including the Consumer and Patient Health Information Section (CAPHIS) and Hospital Libraries Section (HLS)—and Florida's Ask-a-Librarian virtual reference service. Also, a public contact list of librarians was sourced from the Florida Health Science Library Association and MedlinePlus's list of health libraries in Georgia and used for the distribution of invitations.

Nurses who have at least a Bachelor of Science in Nursing (BSN) and experience dealing with health-related information inquiries in any health care setting were invited. An invitation letter was distributed through several mailing lists of the Central Florida Advanced Nurse Practitioner Council in Tallahassee and Orlando, Florida, as well as the Nurse Practitioner Council of Palm Beach County, Florida. The invitations were also announced in the board meetings of the councils. Additionally, an invitation letter was sent to those on the graduate student mailing list of the College of Nursing at the Florida State University.

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Users of Yahoo! Answers who had posted at least one health-related question to Yahoo! Answers during April 2011 were randomly contacted. Yahoo! Answers does not expose the email addresses of users on the website for security reasons (protecting their users from spam). It does allow users to have a profile page and choose to be open or closed to receiving messages from others. Thus, an invitation message was sent to the users who made themselves open for communication via Yahoo! Answers messages.

Criteria for Evaluating the Quality of Health Answers

A set of 10 criteria—*accuracy, completeness, relevance, objectivity, readability, source credibility, empathy, politeness, confidence, and efforts*—was proposed in this study for evaluation of the quality of health answers in Yahoo! Answers. Review of previous studies indicated there are three dimensions for evaluating health answers in social Q&A: content / message, sources, and socio-emotional support. We first selected the most frequently used content-related criteria used in previous studies and used them for the health answer evaluation; these criteria were *accuracy, completeness, relevance, objectivity, and readability*. Second, *source credibility* was included in our criteria design because users may prefer information from health care professionals, services, agencies, experts, or those with similar experiences. Third, in order to reflect the socio-emotional nature of social Q&A, which allows people to be supportive and share dynamics in their feelings on answers, answerers' *empathy, politeness, confidence, and efforts* were included as criteria. Statements used to present each criterion are shown below.

- *Accuracy*: The answer provides correct information.
- *Completeness*: The answer includes everything. There is nothing to add.
- *Relevance*: The answer is relevant to the question.
- *Objectivity*: The answer provides objective information
- *Readability*: The answer is easily readable.
- *Source Credibility*: The source of information is authoritative.
- *Politeness*: The answerer is polite.

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- *Confidence*: The answerer is confident in the answer.
- *Empathy*: The answerer expresses his or her empathy to the questioner.
- *Efforts*: The answerer puts effort into providing the answer.

Questions & Answers from Yahoo! Answers

Yahoo! Answers is the top ranking social Q&A service worldwide (McGee, 2008). To embrace a wide spectrum of interests, Yahoo! Answers has established 25 top-level categories; Health is one of these. There are ten subcategories within Health: Alternative Medicine, Dental, Diet & Fitness, Diseases & Conditions, General Health Care, Men's Health, Mental Health, Optical, Women's Health, and Other-Health. Diseases & Conditions and General Health Care are further subdivided.⁴

A web crawler, designed for the current study using the Application Programming Interface (API) of Yahoo! Answers, collected 72,893 questions and 229,326 associated answers posted during April 2011 in the Health category of Yahoo! Answers. On average, a health question in this sample has 3.14 answers. For the evaluation, we intended to select multiple pairings of questions with corresponding answers. Several filtering techniques were used to identify the most appropriate answers for the quality evaluation. In Yahoo! Answers, questioners are allowed to choose the most satisfying answer among others, name it as "best answer," and then rate it with a five-star rating scale. The first filter was to select only best answers rated as five stars. Second, best answers less than 30 words were automatically dropped; this was done to remove answers simply reacting to questions (e.g., "You're right", "Go to see a doctor") which may have been marked "best answers," along with other answers for which it would be hard to draw out meaningful information because they were too short. Third, answers that did not provide appropriate information responding to questions and instead included disturbing and inappropriate sexual jokes or content were excluded.

⁴ For Diseases and Conditions, these subdivisions include Allergies, Cancer, Diabetes, Heart Diseases, Respiratory Diseases, STDs, Skin Conditions, and Other-Diseases. For General Health Care, these subdivisions include First Aid, Injuries, Pain & Pain Management, and Other-General Health Care.

Random Selection and Random Assignment of Health Questions and Answers

After the filtering procedure described above, 400 pairs of questions and associated answers (each pair includes one question and one corresponding “best” answer) were randomly selected for the quality evaluation. Participants were asked to evaluate the quality of answers, but the questions were provided along with answers as necessary context, to help the participants understand the information inquiry that calls for an answer. A total of 400 unique questions and associated best answers were reviewed three times by a participant from each group: librarians, nurses, and users. Within each group, 400 sets of questions and answers were randomly assigned to participants in order to eliminate individual selection and assignment bias.

Health Answer Evaluation Questionnaire

Each participant reviewed 10 questions and associated answers, rating the quality of answers using 10 criteria on a five-point Likert scale (1 meaning the lowest quality and 5 the highest quality) with an option for Not Applicable (NA). Participants also optionally provided additional criteria that they thought were important and rated them. An example of the evaluation form displayed for each question and answer pair is shown in Figure 1. Also, Figure 2 shows an example of the 10 criteria display for the review of each question and answer pair.

“Insert Figure 1 here”

“Insert Figure 2 here”

Following the quality evaluation, participants completed demographic and background questions, which were composed of three sections: (a) demographics, (b) working experiences or employment settings (for librarians and nurses only) and (c) Internet use. Due to the variety of demographic and background

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characteristics of the three groups in terms of health expertise, working experiences, or working settings, questions unique to each group were selected and provided.

Prior to the distribution of the questionnaire, a pretest was conducted in order to measure the validity of the statements of criteria and the duration time of evaluation. The questionnaire was revised based on the feedback from eight doctoral students and two librarians at the School of Library and Information Studies at Florida State University. The duration time for our pretesters to complete evaluation of 10 questions ranged from 60 to 90 minutes. Most of the participants in this pilot test were experts in the field of Library and Information Science and thoroughly reviewed the quality of the answers. We also expected that users might spend less time than either librarians or nurses, given the findings reported by Shah and Pomerantz (2010) that Amazon's MTurk raters averaged only 90 seconds to evaluate one answer using thirteen criteria (an equivalent of 15 minutes for 10 answers). Therefore, compensation rates reflected the assumption that users would spend less time evaluating questions than either librarians or nurses, on average. Librarian and nurse participants received a \$30 Amazon.com Gift Card, while user participants received a \$10 Amazon.com Gift Card.

An online health answer evaluation tool was developed using a survey tool, SelectSurveyASP, and used to collect data electronically. Once the invitations were sent out, participant recruitment continued until responses were collected from 40 members of each group. In total, 119 participants (40 librarians, 40 nurses, and 39 users) rated the quality of 400 health answers in Yahoo! Answers⁵.

Findings

Overall Comparison

Table 1 shows the mean ratings of the quality of health answers evaluated by librarians, nurses, and users.

⁵ It was intended to have 40 participants from each group, but a set of data from one user was not valid and was excluded from the analysis.

“Insert Table 1 here”

The grand means of all criteria evaluated by each participant group were 2.84 (SD = 4.92) for librarians, 2.97 (SD = .57) for nurses, and 3.67 (SD = .58) for users. Librarians rated *relevance* and *confidence* as the highest of all criteria; these were followed by *politeness*, *readability*, *empathy*, *efforts*, *accuracy*, *objectivity*, and *completeness*. *Source credibility* was the lowest. Nurses rated *confidence* as the highest, which was followed by *politeness*, *readability*, *relevance*, *empathy*, *objectivity*, *efforts*, *accuracy*, and *source credibility*. *Completeness* was the lowest. Users rated *readability* as the highest, which was followed by *confidence*, *relevance*, *politeness*, *accuracy*, *objectivity*, *efforts*, *empathy*, and *source credibility*. *Completeness* was the lowest. Overall, *confidence* was rated relatively high across the three groups. The pattern of rating either *source credibility* or *completeness* lower than other criteria was common across all of the three groups of participants, although the range of ratings varied. A series of one-way ANOVA were performed in order to evaluate the statistical mean differences on criteria ratings among the participant groups. As seen in Table 1, there were statistical significant differences across almost all of the criteria among the three groups, except *politeness* and *empathy*. Follow-up Tukey HSD post hoc tests were performed to identify pairwise differences of the means across the groups. There was a statistically significant difference between librarians and nurses on *source credibility*: nurses rated *source credibility* higher than librarians. There were statistical significant differences between experts—librarians and nurses— and users on all criteria except *politeness* and *empathy*; users rated higher than librarians and nurses on all other criteria.

Demographic Characteristics and Quality Ratings

Librarians

Among 40 librarians, 34 (85.0%) were female and 6 (15.0%) were male. Although the number of male participants is relatively smaller than female participants, independent samples t-tests were performed in

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order to observe the statistical mean differences on the quality ratings between male and female participants. There were no statistically significant differences on the quality ratings by gender.

The average age of librarians was 46.46 years old. The youngest librarian was 24 years old, while the oldest was 70. A series of bivariate linear regression analyses were conducted to evaluate the relationships between the quality ratings and age, but there were no statistically significant differences found in the quality ratings for librarians by age.

Twenty-seven librarians (67.5%) indicated that they are currently working or worked in health-related libraries (e.g., libraries in clinics, health science libraries, regional health libraries, consumer health libraries). Thirteen (32.5%) indicated non-health specific libraries, such as academic (7, 17.5%) or public libraries (6, 15.0%). There were no statistically significant differences in rating criteria by either health or non-health related libraries, nor across different types of libraries.

Librarians had been working professionally for an average of 12.13 years; the range varied widely from 1 to 40 years. A series of bivariate regression analyses were performed to evaluate the relationships between quality ratings and the number of working years, but there were no significant differences.

Among 40 librarians, 29 librarians (72.5%) answered that they have been providing online reference services, using email (23, 57.5%), chat, (14, 35.0%), social media (4, 10.0%), and text messaging (2, 5.0%). A series of independent sample tests were performed to evaluate the relationships between the quality ratings and whether librarians provided online services for each or not, but there were no significant differences between the quality ratings and the status of online services.

The average number of health inquires a librarian received per day was 3.84, ranging from 0 to 20 questions. Three librarians answered 0 to this question, perhaps because they might not be asked health questions every day in certain settings (e.g., academic libraries). A bivariate linear regression analysis was performed in order to evaluate the relationships between criteria ratings and the number of health inquires per day. There were statistically significant differences on *relevance*, *readability*, and *politeness* criteria.

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The more health inquiries librarians received, the lower they rated *relevance* ($B = -.056$, Std. Error = .025, $p = .031$), *readability* ($B = -.079$, Std. Error = .023, $p = .002$), and *politeness* ($B = -.075$, Std. Error = .032, $p = .023$).

A similar pattern was observed from the hours librarians spent in answering health questions per day. On average, librarians spent 1.22 hours answering questions, ranging from 1 to 3 hours. A series of bivariate linear regression were performed to evaluate the relationships between criteria ratings and the hours spent in answering health questions per day. There were significant differences on *relevance*, *objectivity*, *readability* and *politeness*. The more hours librarians spent, the lower they rated *relevance* ($B = -.169$, Std. Error = .057, $p = .005$), *objectivity* ($B = -.134$, Std. Error = .063, $p = .038$), *readability* ($B = -.190$, Std. Error = .056, $p = .002$), and *politeness* ($B = -.150$, Std. Error = .060, $p = .016$).

The average time librarians spent answering a health inquiry per session was 35.28 minutes, ranging widely from 1 to 180 minutes. This duration may vary by topic or the level of complexity of a health question, but this was not observed or examined in this study. A series of bivariate linear regression analyses were conducted to evaluate the relationships between criteria ratings and the time spent answering a health inquiry per session, but there were no significant differences on these relationships.

Nurses

Among 40 nurses, 37 (90.2%) were female, and 3 (7.3%) were male. A series of independent samples t-tests were performed to evaluate the relationship between criteria ratings and gender. There were no significant differences on any of the criteria. Like librarians, it may be because the number of male nurses in this study was too small. The average age of nurses was 41.73 years old; the youngest nurse was 23 years old, while the oldest was 64. A series of bivariate linear regression were conducted to evaluate the relationships between criteria ratings and age, but there were no statistically significant differences found in the quality ratings for nurses by age.

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All of the nurse participants were required to have at least a Bachelor of Science in Nursing (BSN) in order to participate in this study. When asked for their highest degrees, 17 nurses (41.5%) reported having BSN degrees. 19 (46.3%) have a Master of Science in Nursing (MSN), 2 (4.9%) have a Doctor of Nursing Practice (DNP) and 2 (4.9%) have a Doctor of Philosophy (Ph.D.) in nursing. A series of Spearman rank order correlations were conducted to evaluate the relationships between criteria ratings and the level of education, but there were no significant differences on the rating criteria by the level of degree held.

Eighteen nurses (43.9%) were Registered Nurses (RN), 18 (43.9%) were Advanced Registered Nurse Practitioners, and 4 (9.8%) were Certified Nurse Midwives (CNM). A one-way ANOVA was conducted to evaluate the relationships between criteria ratings and the type of nursing license. There was a significant difference on *relevance* between the nurse groups ($F = 3.74, p < .05$); a follow-up Tukey HSD post hoc test revealed that CNMs rated *relevance* higher than ARNPs, but there were no significant differences between other groups nor on other criteria.

The number of years nurses had worked professionally was 14.43 years on average, ranging from 2 to 38 years. A series of bivariate linear regressions were conducted in order to evaluate the relationships between criteria ratings and working years, but there were no significant differences on the rating criteria according to the number of years worked.

Seven nurses (17.1%) reported having experience with providing health information services online via discussion boards or email, while 33 (80.5%) did not have experience with providing information services online. A series of independent t-tests were performed to evaluate the relationships between criteria rating and whether a nurse has an experience of online services, but there were no significant differences on the rating criteria by online experience.

The average number of health-related inquiries nurses received per day was 9.97, ranging from 2 to 50; 15 (36.6%) received less than 5 health inquiries per day from their patients, 12 (29.3%) received 6-10

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inquiries, 1 (2.4%) received 11-15 inquiries, and 8 (19.5%) received 16 or more inquiries per day. A series of bivariate linear regression analyses were performed to evaluate the relationships between criteria ratings and the number of health inquiries per day, but there were no significant differences on the rating criteria by the number of health inquiries.

On average, nurses spent 3.75 hours per day answering health questions from their patients; 16 (39.0%) spent 1-2 hours per day, 7 (17.1%) spent 3-4 hours, and 13 (31.7%) spent more than 5 hours. A series of bivariate linear regression analyses were performed in order to evaluate the relationships between criteria ratings and hours spent responding to health inquiries per day, but there were no statistically significant differences on criteria ratings according to the hours spent responding to health inquiries per day.

The mean time spent answering a health question per session was 68 minutes; however, the distribution was skewed because some nurses spent much longer times than others, up to 8 hours. In contrast, the median value of this time distribution was 15 minutes; 14 (34.1%) spent 1-10 minutes with a patient in answering a health question, 8 (19.5%) spent 11-20 minutes, 4 (9.8%) spent 21-30 minutes, and 10 (24.4%) spent more than 30 minutes. A series of bivariate linear regression analyses were performed to evaluate the relationships between criteria ratings and time spent answering a health question per session, but there were no statistically significant differences on rating criteria according to the session time.

Users

Among 39 users, 27 (69.2%) were female and 12 (30.85) were male. A series of independent samples t-test was performed to evaluate the relationships between criteria ratings and gender, but there were no significant differences on the criteria ratings between male and female users. On average, user participants were 25.54 years old, ranging from 18 to 48; 29 (74.4%) were older than 18 but younger than 30 years old, 7 (17.9%) were between 31 and 40, and 3 (7.7%) were between 41 and 50. A series of bivariate linear regressions were performed in order to observe the relationships between criteria ratings

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and age. There were statistically significant differences on *accuracy* ($B = -.034$, Std.Error = .014, $p < .05$), *relevance* ($B = -.037$, Std.Error = .011, $p < .05$), and *readability* ($B = -.038$, Std.Error = .010, $p < .05$).

The younger the users were, the higher they rated *accuracy*, *relevance*, and *readability*.

Nine users (23.1%) had not attended college, 21(53.8%) had received some college education or had bachelor degrees, and 8 (20.5%) had advanced degrees, such as a masters or Ph.D. A series of Spearman rank order correlation analyses were conducted to evaluate the relationships between criteria ratings and the level of education, but there were no significant differences in criteria ratings by education level.

On average, users spent 3.5 hours per day using the Internet; 7 (17.9%) used the Internet up to 2 hours per day, 19 (48.7%) indicated between 3-4 hours, and 13 (33.3%) indicated 5 hours or more of use per day. A series of bivariate linear regression analyses were conducted in order to evaluate the relationships between criteria ratings and hours spent on the Internet per day, but there were no significant differences on criteria ratings and the hours using the Internet per day. Twenty-two users (56.4%) indicated they ask health-related questions once per week, 8 (20.5%) indicated twice per week, 2 (5.1%) indicated three times per week, 2 (5.1%) indicated four times, and 1 (2.6%) indicated five times per week. A series of bivariate linear regression analyses were performed to evaluate the relationships between criteria ratings and the number of questions posted per week, but there were no significant differences on criteria ratings by the number of health-related questions asked per week.

Characteristics of Answer Content and Quality Ratings

Answer length

The health answers used for this study averaged 120.46 words in length. The shortest was 36 words, while the longest was 900 words. A linear regression was conducted in order to identify the relationship between answer length and the criteria ratings. Librarians rated longer answers higher when evaluating *accuracy* ($B = .001$, S.E. = .001, $p < .05$), *completeness* ($B = .001$, S.E. = .001, $p < .05$), *source credibility* ($B = .002$, S.E. = .001, $p < .05$), and *efforts* ($B = .004$, S.E. = .001, $p < .05$). Nurses rated longer answers

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higher on *completeness* ($B = .002$, $S.E. = .001$, $p < .05$), *source credibility* ($B = .002$, $S.E. = .001$, $p < .05$), *confidence* ($B = .001$, $S.E. = .001$, $p < .05$), and *efforts* ($B = .004$, $S.E. = .001$, $p < .05$). Users rated long answers higher on *accuracy* ($B = .001$, $S.E. = .001$, $p < .05$), *completeness* ($B = .001$, $S.E. = .001$, $p < .05$), *readability* ($B = .001$, $S.E. = .000$, $p < .05$), *confidence* ($B = .001$, $S.E. = .000$, $p < .05$), and *efforts* ($B = .003$, $S.E. = .001$, $p < .05$).

A linear regression was also performed to observe whether there were significant differences across the participant groups in criteria rating by answer length. Dummy variables were created for specifying the participant groups. There was a statistical significance in the relationship between answer length and quality ratings across groups for all criteria (Table 2).

Table 2. Mean comparison of criteria ratings by length of health answers across librarians, nurses, and users

“Insert Table 2 here”

The coefficient values showed there were pairwise differences in the mean ratings among the three groups. There were no statistical significances between librarians and nurses across all criteria. However, there was a significant difference between the expert groups and users; users rated all of the criteria higher than librarians and nurses on longer answers.

Presence of health expertise

Presence of health expertise in answers indicates whether answerers self-claimed their health-related occupations, degrees, or job settings in answers (i.e., “I’m an orthodontist, D.M.D., M.S.,” “a licensed

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nurse,” “medical health nurse, 18 years experience, ” “dental assistant,” etc.). Among the 400 answers in this study, 52 answers included information about answerers’ health-related expertise. An independent samples t-test was conducted in order to investigate the relationship between the criteria ratings and presence of health expertise in answers. Librarians rated answers with health expertise higher than answers without health expertise on *accuracy* ($t(387) = 2.853, p < .05$), *completeness* ($t(393) = 2.675, p < .05$), *relevance* ($t(395) = 2.089, p < .05$), *objectivity* ($t(377) = 2.608, p < .05$), *source credibility* ($t(370) = 5.765, p < .05$), *confidence* ($t(394) = 2.822, p < .05$), and *efforts* ($t(386) = 3.525, p < .05$). Nurses rated answers including answerers’ health expertise higher on *accuracy* ($t(396) = 2.951, p < .05$), *relevance* ($t(396) = 2.009, p < .05$), *objectivity* ($t(397) = 2.489, p < .05$), *source credibility* ($t(354) = 3.927, p < .05$), and *efforts* ($t(397) = 2.384, p < .05$). Users rated answers with health expertise higher on *source credibility* ($t(359) = 3.824, p < .05$) and *politeness* ($t(384) = 1.984, p < .05$).

A linear regression with dummy variables for the participant groups was performed to observe whether there was a significance difference across the participant groups in criteria by the presence of health expertise in answers. There were statistically significant differences in the relationship between the presence of health expertise in answers and quality ratings across groups for all criteria (Table 3).

Table 3. Mean comparison of criteria ratings related to the presence of URLs in health answers across librarians, nurses, and users

“Insert Table 3 here”

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The coefficient values showed there were pairwise differences in the mean ratings among the three groups.

There were no significant differences between librarians and nurses on rating the quality of health answers by the presence of health expertise in almost all criteria, except *source credibility*; nurses rated *source credibility* higher for answers including health expertise. There was a significant difference between the expert groups and users; the latter rated all of the criteria higher than librarians and nurses for answers including health expertise.

Presence of personal health experiences

Presence of personal health experiences indicates whether answerers share their own experiences of certain diseases or conditions in answers (i.e., “I had brain cancer,” “Currently I’m using [certain medication or supplements],” “When I end up in an emergency room...,” etc.). Among 400 answers in this study, 111 of them (27.75%) included information about answerers’ personal experiences related to health. An independent t-test was conducted in order to investigate the relationship between the criteria ratings and presence of personal experiences in answers. Librarians rated answers with personal experiences higher than answers without personal experiences on *empathy* ($t(381) = 3.301$), while they rated answers with personal experiences lower on *accuracy* ($t(387) = -2.779$, $p < .05$), *completeness* ($t(393) = -2.404$, $p < .05$), *relevance* ($t(395) = -2.241$, $p < .05$), and *objectivity* ($t(395) = -4.988$, $p < .05$). A similar pattern of the quality rating was observed from nurses. Nurses rated answers with personal experiences lower than answers without personal experiences on *accuracy* ($t(396) = -3.614$, $p < .05$), *completeness* ($t(396) = -2.556$, $p < .05$), *relevance* ($t(396) = -2.373$, $p < .05$), and *objectivity* ($t(397) = -4.558$, $p < .05$). Users rated higher on *empathy* ($t(374) = 4.374$, $p < .05$), but rated lower on *objectivity* ($t(358) = -2.258$, $p < .05$), for answers with personal experiences.

A linear regression with dummy variables was performed to observe whether there was a significant difference across the participant groups by criteria rating related to the presence of personal experiences

in answers. There were statistically significant differences in the relationship between the presence of personal experiences in answers and quality ratings across the groups for all criteria (Table 3).

Table 4. Mean comparison of criteria ratings related to the presence of personal experiences in health answers across librarians, nurses, and users

“Insert Table 4 here”

Presence of URLs

People may assess the quality of health answers differently depending on whether there is a URL with which to locate additional information. Among the 400 health answers randomly selected and used for this study, 61 (15.2%) included at least one URL. An independent t-test was conducted to observe the relationship between the criteria ratings and the presence of one or more URLs in the health answers.

Librarians rated health answers with URLs higher when evaluating *accuracy* ($t(387) = 2.097, p < .05$), *completeness* ($t(393) = 2.763, p < .05$), *source credibility* ($t(370) = 4.306, p < .05$), *confidence* ($t(394) = 2.148, p < .05$), and *efforts* ($t(386) = 2.558, p < .05$). Nurses also rated answers with URLs higher when evaluating *accuracy* ($t(396) = 1.993, p < .05$), *completeness* ($t(396) = 2.097, p < .05$), *source credibility* ($t(354) = 4.216, p < .05$), *confidence* ($t(396) = 2.996, p < .05$) and *efforts* ($t(397) = 3.804, p < .05$).

Users rated answers with URLs higher when evaluating *accuracy* ($t(371) = 2.406, p < .05$), *objectivity* ($t(358) = 2.550, p < .05$), *source credibility* ($t(358) = 4.981, p < .05$), and *confidence* ($t(384) = 2.674, p < .05$).

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A linear regression with dummy variables for the participant groups was performed to observe whether there was a significance difference across the participant groups in criteria rating by the presence of URLs in answers. There were statistically significant differences in the relationship between the source URL presence and all criteria across the groups (Table 4).

Table 5. Mean comparison of criteria ratings related to the presence of URLs in health answers across librarians, nurses, and users

“Insert Table 5 here”

The coefficient values showed there were pairwise differences in the mean ratings among the three groups. There were no significant differences between librarians and nurses on rating the quality of health answers regarding the URL presence in almost all criteria, except *source credibility*; nurses rated this criteria higher for answers with URLs than librarians. Users rated all of the criteria higher than librarians and nurses for answers with URLs.

Discussion

A set of ten criteria—*accuracy, completeness, relevance, objectivity, source credibility, readability, politeness, confidence, empathy, and efforts*—was proposed in this study to identify how experts—librarians and nurses—and users perceive the quality of health answers in social Q&A, one of the most popular venues in social media in which people can easily access and obtain health information from personal experiences and expertise among their peers. Findings indicated that there is a significant difference between experts and users in assessing the quality of health answers. Such a difference

between experts and users to evaluate the quality of health information is not surprising, because a similar pattern has been observed in previous studies about health websites. For example, health information consumers were more likely to be influenced by the design of health websites than experts and paid less attention to the content of health information, such as disclosure statements or ownership of the websites (Eysenbach & Kohler, 2002; Stanford, Tauber, Fogg, & Marable, 2002). Findings from these previous studies have led to the development of useful guidelines for consumers to locate reliable health websites, such as “Assessing the quality of Internet health information” from Agency for Healthcare Research and Quality (1999) and “The HON Code of Conduct for medical and health Web sites” from Health on the Net Foundation (1997). These guidelines are inadequate, however, for applying to the use of health information that people obtain from the new context of social media. What people discuss in social Q&A is full of personal experiences, stories, emotions, advice, and opinions alongside factual information. Therefore, the evaluation criteria proposed in this study identified important social aspects of information people share, including not only content quality but also socio-emotional values, and investigated how experts and users used these criteria when assessing the quality of health answers.

Findings from this study specified the criteria that experts and users used to evaluate the quality of health answers differently. When they evaluated the same set of health answers, users rated the quality higher than experts on eight out of ten criteria: *accuracy*, *completeness*, *relevance*, *objectivity*, *source credibility*, *readability*, *confidence* and *efforts*. Users were more likely to consider health answers to be accurate, complete, objective, and relevant to questions than experts did. Users also rated *source credibility* higher than experts. If users consider the presence of health expertise, experiences, or URLs in answers as the sources of health answers, they might be influenced by them, because it was found that users rated answers with the presence of these sources higher than experts. For users, health answers were judged to be easier to read than they were for experts. Experts and users showed different perceptions on evaluating health answers with socio-emotional criteria as well. When reading the health answers, users more likely considered the answerers as being confident in providing health information and putting efforts into

creating answers than did the experts. Overall, users considered the quality of health answers to be higher than experts did.

Findings about the criteria suggest that both experts and users would need to be fully aware of the different perspectives each bring to evaluating the quality of health information in order to promote health information literacy on the use of social media for health information. The use and evaluation of online health information has been widely investigated in the area of research and practice of health information literacy (Marshall & Williams, 2006; Breckons, Jones, Morris, & Richardson, 2008). This study shed light on the use of evaluation criteria applicable in the contexts of social media. Considering the criteria that show differences between experts and users, experts—librarians and nurses—would need to help users to be selective when assessing the quality of health answers or other kinds of health information people obtained from social media. In fact, there were a few librarians and nurses who were surprised by the fact that people who obtained health information from social Q&A expressed strong opinions against using it for health information, emphasizing that people should obtain health information from authoritative health websites only (Worrall & Oh, under review).

Users have obtained health information from answers that are especially customized to their personal concerns or situations. Personalization is an important factor for people to build trust in health information on the Internet (Briggs, Burford, De Angeli, & Lynch, 2002). Sillence et al. (2007a, 2007b) also found that patients intentionally seek people who have similar experiences or stories because they handle situations from the same points of view and share highly relevant and useful information related to those situations and conditions. The high demand for personalized advice and answers to individual questions leads people to look for channels beyond search engines or health websites, for communities and social environments where they can discuss their common problems and engage socially in sharing information and emotionally supporting one another (Burnett & Buerkle, 2004; Frost & Massagli, 2008; Gooden & Winefield, 2007; Pennbridge, Moya, & Rodrigues, 1999). Both librarians and nurses need to understand patients and patrons' preferences for personalized information and the way they evaluate the

quality of information in social media and provide guidelines for them to use appropriate strategies of evaluation when obtaining health information from a variety of sources in social media.

Another important finding from this study is that there is a great deal in common between librarians and nurses in assessing the quality of health answers. Among the ten criteria, there was a statistically significant difference between librarian and nurses on *source credibility* only. What kinds of strategies or indicators librarians or nurses have used to assess source credibility of health answers was not covered in this study, but it seems librarians have been more critical and thorough on reviewing health answers because they have been professionally trained to select reliable sources of health information from among many others.

When testing the influence of answer characteristics to the quality evaluation, librarians and nurses showed a similar pattern of using criteria such as *accuracy*, *completeness*, *relevance*, *source credibility* and *efforts*. This study found that all three groups are influenced by answer length in evaluating the quality of health answers. The longer the answers are, the higher both librarians and nurses rated them on *completeness*, *source credibility*, and *efforts*. Previous studies found a positive correlation between answer length and the evaluation of its accuracy and completeness (Adamic et al, 2008; Agichtein et al., 2008; Kim, 2010). In addition to *accuracy* and *completeness*, findings of the current study identified the relationships between answer length and two more criteria in social contexts: both librarians and nurses considered that longer answers are better for showing *credibility* of sources and answerers' *efforts* in creating answers than shorter answers. In terms of answers containing health expertise, both librarians and nurses evaluated those higher on *relevance*, *objectivity*, *source credibility*, and *efforts* than answers without that information. Although health expertise presented in answers was based on self-reports from answerers, both librarians and nurses considered those answers as relevant to the questions, as providing objective information, as including credible sources, and as showing answerers' efforts to create the answers. Librarians and nurses rated answers with personal experiences lower on *accuracy*, *completeness*, *relevance* and *objectivity* than answers without personal experiences. Both librarians and nurses gave

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answers with personal experiences less credit on the content quality of answers as well as on socio-emotional aspects of confidence and efforts, while users were not influenced by the presence of personal experiences in assessing quality with most of the criteria. Also, librarians and nurses rated answers with URLs higher on *accuracy*, *completeness*, *source credibility*, *confidence* and *efforts* while users rated higher those answers on *objectivity* only.

Findings about the consensus between librarians and nurses suggest a possible collaboration between the two groups for promoting health information literacy on the use of social media. Since they are on the same page in perceiving the quality of health answers, they may be able to discuss their expertise and experiences of helping patients and patrons without much conflict. In this study, findings about demographic backgrounds indicate that nurses have much less experience in consulting with their patients online for health information than librarians have with patrons, although it is hard to generalize with the sample population in this study. As experts in searching for information online, librarians can help nurses better understand users' needs and behaviors for seeking health information in social media. By collaborating together, librarians would also benefit from nurses in learning about patients' use of health information in medical settings.

There were a few limitations in this study. First, Yahoo! Answers was chosen as a test bed because it is the most popular and widely used social Q&A service, but it is a single website. The findings could be strengthened if they were found to hold true for questions and answers from multiple other social Q&A sites. Second, the participants who evaluated the quality of health answers are not the questioners. Experts and users were recruited for this study in order to examine the views of evaluators other than the original questioners. The questioners who are highly motivated to obtain information from answers may evaluate the quality in a different way. Third, participants' completion time for the quality evaluation could influence the assessment of the quality of health answers across the participants, but it was not possible to collect reliable time data. This study was carried out online, allowing participants to access the evaluation tool at their convenience. They were able to temporarily stop if they felt fatigued and come back and

finish the evaluation later. This method was chosen in order to not create an environment where the evaluations were made under time pressure for the participants. However, quality ratings may have been different if the three groups of participants were given a stricter time limit to evaluate the health answers. Fourth, the demographic variables chosen for this study are inconsistent across the three groups because this study selectively used the demographic variables unique to each group of participants. Designing the evaluation so that the demographic variables are comparable across the groups and testing for statistical differences on quality ratings by those variables could provide additional findings.

Conclusion

This study is unique from previous studies about the quality of answers in social Q&A in that (a) it specified the subject domain as health, (b) it involved both search and domain experts for the evaluation, and (c) the perceptions and evaluations of experts were compared to those of lay people (users). In terms of the overall quality, Harper et al. (2008) indicated the quality of answers in social Q&A was slightly better than answers from digital reference. The quality evaluation of answers in social Q&A could vary depending on who the evaluators are and how they have been trained to assess the quality of health answers. The ten criteria proposed in the current study reflected not only the content value (*accuracy, completeness, relevance, objectivity, and readability*) but also socio-emotional value (*politeness, confidence, empathy and efforts*) of health answers. The value of sources embedded in health answers was also tested, using the *source credibility* criterion. The influence of answer characteristics on quality evaluation across the three groups of participants were also tested and compared.

The gap between the experts and users in evaluating the quality of health answers in social Q&A may be caused because the experts have been highly trained to support their health information consumers in a variety of ways. What is encouraging from our findings is that librarians and nurses have been on the same page in considering the value of health answers in social Q&A, although they have differences in

their level of medical knowledge, how they treat their health information consumers, their work environments, and the types of health services they offer. Collaboration between librarians and nurses could create synergy in promoting health information literacy, by addressing both search and domain expertise along with the sharing of experiences with health information consumers.

With an attempt to understand the different perspectives of experts and users on health answers, this study focused on investigating the criteria that have been used, but did not cover how and why experts and users assess the quality differently. As the next step, the factors influencing experts and users to use the criteria will be investigated. How experts and users read and understand health answers will be further compared. Also, the answers that were evaluated were provided by users of Yahoo! Answers, and were not compared against answers provided by medical or information professionals. Comparing evaluations of multiple answers from different sources will be further investigated and compared to the findings from this study. We expect the findings from the current and future studies will lead to developing specific guidelines for the use of health information in social media. A continuous effort to involve librarians and nurses will be integrated to better understand their uses of social media and to develop health information literacy programs facilitating better access and evaluation of health information in social media.

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TR_dimension_model.pdf

Figure 1. Sample Question and Answer

Set 2 of 10

Please read the question and answer here.

C009

Question	What is the cause for severe and excessive itching? Can anyone tell me what may be the cause for SEVERE and EXCESSIVE itching of the palm of my hands and the SOLES of me feet?? It's very irritating and I would like to know if this may be a cause of any severe disease. Also, it's definitely not allergies because I'm not allergic to anything. (By the way, I'm over 50 years old) NOTE: I am diabetic and have some back pains PLEASE SOMEONE TELL ME WHAT IS MAY BE THE CAUSE!! Thank You.
Answer	Could be a number of things 1) beginning of neuropathy 2) you've developed an allergy (allergies can develop at any time) 3) it could be the cold weather. I had the same thing happen to my hands to the point I could not use them and it lasted 3 months and went away when the weather warmed up and hasn't happened since. I am type 1 for 35 years and I hope yours is like mine and will go away, if not the Dr. should start you on gabapentin. The allergies are doubtful because they don't just occur on your hands and feet Mf

Figure 2. Sample Display of 10 Criteria for Health Answer Quality Evaluation

Please rate the quality of the answer related to each criterion statement below on a scale of 1 to 5 (1 – lowest to 5 highest), or choose NA if the statement is not applicable to evaluate the quality of the answer.*

	1 (lowest)	2	3 (moderate)	4	5 (highest)	NA
The answer provides correct information. (Accuracy)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answer includes everything. There is nothing to add. (Completeness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answer is relevant to the question. (Relevance)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answer provides unbiased information. (Objectivity)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The sources of the answer are authoritative. (Source Credibility)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answer is easy to read. (Readability)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answerer is polite/kind. (Politeness/Kindness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answerer is confident in the answer. (Confidence)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answerer expresses his or her empathy to the questioner. (Empathy)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The answerer put a good amount of effort into creating the answer. (Effort)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Table 1. Mean differences on quality ratings across librarians, nurses, and users of Yahoo! Answers

Criteria	Librarians		Nurses		Users		F	df	p-value
	M	SD	M	SD	M	SD			
Accuracy	2.62	.66	2.68	.61	3.63	.76	27.10	118	.000*
Completeness	2.07	.60	2.07	.61	3.08	.78	29.03	117	.000*
Relevance	3.72	.64	3.36	.65	4.10	.65	18.42	118	.000*
Objectivity	2.55	.67	2.80	.75	3.62	.89	20.28	117	.000*
Source Credibility	1.79	.64	2.31	.86	3.30	.92	34.79	118	.000*
Readability	3.30	.65	3.41	.86	4.15	.61	15.81	118	.000*
Politeness	3.44	.62	3.54	.77	3.91	.58	2.90	117	.059
Confidence	3.72	.75	3.77	.76	4.11	.57	3.54	118	.032*
Empathy	3.09	.63	2.99	.78	3.38	.75	3.00	117	.054
Efforts	2.63	.66	2.76	.61	3.39	.77	13.08	117	.000*

* Statistically significant in 95% confidence intervals ($p < .05$)

Table 2. Mean comparison of criteria ratings by length of health answers across librarians, nurses, and users (Answers with presence of health answers)

Criteria	F	df	p-value
Accuracy	56.69	3	.00*
Completeness	59.49	3	.00*
Relevance	38.87	3	.00*
Objectivity	46.34	3	.00*
Source Credibility	110.19	3	.00*
Readability	38.99	3	.00*
Politeness	4.16	3	.00*
Confidence	9.37	3	.00*
Empathy	7.45	3	.00*
Efforts	32.06	3	.00*

* Statistically significant in 95% confidence intervals ($p < .05$)

Table 3. Mean comparison of criteria ratings on answers with the presence of health expertise across librarians, nurses, and users

Criteria	Librarians		Nurses		Users		F	df	p-value
	M	SD	M	SD	M	SD			
Accuracy	3.08	1.29	3.17	1.41	3.79	1.10	56.69	3	.00*
Completeness	2.46	1.39	2.37	1.37	3.40	1.36	59.49	3	.00*
Relevance	3.68	1.36	3.67	1.26	4.12	1.16	38.87	3	.00*
Objectivity	2.98	1.37	3.25	1.48	3.98	1.28	46.34	3	.00*
Source Credibility	2.54	1.49	2.96	1.62	4.00	1.13	110.19	3	.00*
Readability	3.52	1.15	3.63	1.24	4.08	1.15	38.99	3	.00*
Politeness	3.73	1.02	3.90	1.14	3.64	1.17	4.16	3	.00*
Confidence	4.13	1.03	3.81	1.34	4.10	1.19	9.37	3	.00*
Empathy	3.32	1.11	3.23	1.32	3.15	1.41	7.45	3	.00*
Efforts	3.20	1.30	3.15	1.33	3.51	1.27	32.06	3	.00*

* Statistically significant in 95% confidence intervals ($p < .05$)

Table 4. Mean comparison of criteria ratings related to the presence of personal experiences in health answers across librarians, nurses, and users

Criteria	Librarians		Nurses		Users		F	df	p-value
	M	SD	M	SD	M	SD			
Accuracy	2.31	1.18	2.29	1.28	3.52	1.25	58.04	3	.00*
Completeness	1.81	1.02	1.81	1.19	3.02	1.33	58.55	3	.00*
Relevance	3.10	1.10	3.13	1.29	3.95	1.21	41.51	3	.00*
Objectivity	2.00	1.06	2.29	1.39	3.33	1.40	57.02	3	.00*
Source Credibility	1.57	.86	2.19	1.42	3.10	1.45	88.57	3	.00*
Readability	3.21	1.11	3.35	1.37	4.09	1.10	39.30	3	.00*
Politeness	3.54	1.04	3.50	1.28	4.03	1.06	4.06	3	.00*
Confidence	3.68	.99	3.74	1.25	4.06	1.04	8.67	3	.00*
Empathy	3.36	1.16	3.03	1.44	3.86	1.17	13.95	3	.00*
Efforts	2.65	1.24	3.03	1.44	3.44	1.26	27.10	3	.00*

* Statistically significant in 95% confidence intervals ($p < .05$)

Table 5. Mean comparison of criteria ratings related to the presence of URLs in health answers across librarians, nurses, and users

Criteria	Librarians		Nurses		Users		F	df	p-value
	M	SD	M	SD	M	SD			
Accuracy	2.92	1.37	2.98	1.38	4.00	1.19	56.21	3	.00*
Completeness	2.43	1.40	2.38	1.31	3.36	1.41	59.91	3	.00*
Relevance	3.55	1.24	3.52	1.18	4.34	1.20	6.14	3	.00*
Objectivity	2.63	1.60	3.02	1.58	4.02	1.43	42.36	3	.00*
Source Credibility	2.28	1.59	2.95	1.59	4.12	1.16	111.53	3	.00*
Readability	3.36	1.07	3.57	1.30	4.24	1.14	38.869	3	.00*
Politeness	3.56	1.13	3.85	1.13	3.88	1.16	4.195	3	.00*
Confidence	4.02	.95	4.20	0.95	4.46	1.06	15.425	3	.00*
Empathy	2.90	1.17	3.04	1.32	3.24	1.42	7.445	3	.00*
Efforts	3.00	1.21	3.33	1.25	3.63	1.41	34.297	3	.00*

* Statistically significant in 95% confidence intervals ($p < .05$)

Health Answer Quality Evaluation by Librarians, Nurses, and Users in Social Q&A

Brief biography for each author

Sanghee Oh

Sanghee Oh is an assistant professor in College of Communication & Information at Florida State University (<http://shoh.cci.fsu.edu/>). She obtained her Ph.D. in Information & Library Science from the University of North Carolina at Chapel Hill, and her Master of Library and Information Science from the University of California at Los Angeles. Her areas of research interest are human computer interaction, user-centered interface design, health informatics, and social informatics. She has studied about information behaviors of various populations, such as lay people, undergraduate students, librarians, and nurses, investigating their motivations and usages of social media and social Q&A in seeking and sharing information about health as well as other topics. The details about her projects in research can be found at <http://socialqa.cci.fsu.edu/>. At FSU, she teaches Advanced Online Searching, Introduction to Information Architecture, and Digital Libraries. For the digital libraries course, she designed a project-based course curriculum of building a small-scale digital library in group projects. The exhibits of students' digital libraries are available at <http://shoh.cci.fsu.edu/dl.html>.

Adam Worrall

Adam Worrall is a Doctoral Candidate in Information Studies at Florida State University's College of Communication and Information. He also holds a MS in Library and Information Studies from FSU and a BS in Computer Science from the University of Central Florida. His research interests center around social informatics and broadly include digital libraries; collaborative information behavior; scientific collaboration; social media; social Q&A; and social and community theories in information science. These interests fall under the common thread of studying information behavior within and around the social contexts—groups, communities, worlds, and other collaborative environments—of information and communication technologies (ICTs). Adam's current focus in his dissertation is on the social, community, and collaborative contexts of digital libraries as boundary objects within and across social worlds, information worlds, and communities. Adam's Web site and portfolio are at <http://www.adamworrall.org>.