Gender differences in information quality of virtual communities: A study from an expectation-perception perspective

Yuewen Liu [a], Yahui Li [a,*], Hongyun Zhang [a], Wei (Wayne) Huang [a,b]

[a] School of Management, Xi'an Jiaotong University, China
[b] Information Systems School, Queensland University of Technology (QUT), Brisbane, Australia

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ABSTRACT

Knowing the effect of user characteristics on information quality is important to optimize the quality of content and provide a satisfactory user experience. In this paper, we investigate gender differences in the assessment of information quality in virtual communities. To understand the influence of gender on information quality, this paper measures information quality by the discrepancy between expectation and perception. The proposed conceptualized model is validated by 144 survey observations being collected at a public university. Then, the multivariate analysis of variance is used to analyze the data. The results show that gender could indeed have an influence on information quality through expectations or perceptions. Specifically, males assess representational data quality more highly than females. Females have higher expectations of representational data quality than males. Males regard accessible data quality more highly than females. Managers of virtual communities need to realize that the same information may be perceived differently by different genders. They need to take the gender of users into account and provide customized information accordingly.

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1. Introduction

Virtual communities have grown exponentially in recent years (Huang, Wei, & Lim, 2003; Huang, Wei, Watson, & Tan, 2003; Lee, Vogel, & Limayem, 2003). A virtual community is a social aggregation that emerges from the Internet when many people carry on public discussions long enough, with sufficient human feeling, to form personal relationships in cyberspace (Ridings & Gefen, 2004). One important nature of virtual community is a type of relationship bonded by common interests among people on the Internet (Dennis, Pootheri, & Natarajan, 1998). An important aspect of virtual community is the Internet, using computer-mediated spaces or cyberspace (Lee et al., 2003). Members of virtual communities probably do not previously know each other, which is different from online social network services (e.g., Facebook) where people are friends before joining (Rau, Gao, & Ding, 2008; Zhang et al., 2015). An important motivation to join a virtual community is to exchange information (Ridings & Gefen, 2004). It is vital for virtual communities to provide high information quality, as information quality is an important antecedent for information system success

(DeLone & McLean, 2003). If members think that information quality is bad, they may stop participating in the virtual community.

Users characteristics, such as gender, age, education level and occupation, would affect judgement of information systems (Gefen & Straub, 1997; Gilroy & Desai, 1986). However, information is observer-independent and situation-independent (Dretske, 1981; Hjørland, 2007). While it is reasonable to expect that different people have the same assessment of information quality in a virtual community, in reality, females and males often have different assessments of the same information. So in virtual communities, do different individuals have the same assessment for information quality? In this research, we focus on only one characteristic of users: gender.

There are two reasons for this approach. First, gender difference is one of the most fundamental differences among individuals, as males and females have different decision-making processes (Venkatesh & Morris, 2000). Prior research in information systems has also found gender differences in individual adoption and usage of technology in the workplace (Venkateshprofile, Morrisprofile, & Ackermanprofile, 2000; Weiser, 2000). For example, males consider perceived usefulness to a greater extent than females in making decisions regarding the use of a new technology. On the other hand, perceived ease of use is more salient to females compared to males. Additionally, others' opinions (friends, family members, et.al.) are more important to females than males (Venkatesh & Morris, 2000). Second, information quality is an

* Corresponding author at: School of Management, Xi'an Jiaotong University, Xi'an 710049, China.
E-mail address: lyh1990@stu.xjtu.edu.cn (Y. Li).

important construct in Information System Model (DeLone & McLean, 2003). To ensure continued success, virtual communities should provide users with satisfying information quality. Practitioners could effectively manage gender segments (i.e., males vs. females) with different marketing strategies (Chih-Hung, Ju-Yu, Cheng-Chung, Sue-Huei, & Cheng-Fang, 2005).

2. Related literature

2.1. Information quality

2.1.1. Definition and dimensions of information quality

In this paper, "data" is equivalent to "information", as in much research (Wang & Strong, 1996). Some definitions of information quality emphasize that information quality should meet the objective requirements of a particular activity (e.g., (Roberts, 1988)). Other definitions highlight that information quality should meet the user's subjective expectations (e.g., (Hilligoss & Rieh, 2008)). This research adopts the more general definition of information quality – fitness for use – which includes both subjective and objective aspects (Ge & Helfert, 2007; Wang & Strong, 1996). Much research has concluded that quality is based on a comparison between expectations of customers and actual perceptions (Parasuraman, Zeithaml, & Berry, 1985). In this study, information quality is measured by the gap between expectations and perceptions of quality level for a series of quality characteristics.

There is much research on information quality as a multi-dimensional concept (Arazy & Kopak, 2011; Hilligoss & Rieh, 2008; Wang & Strong, 1996; Knight & Burn, 2005). Studies by Wang and Eppler are the most representative and extensively cited on information quality dimension structures. In this paper, we adopt Wang's Information Quality Framework. In this framework, there are four dimensions of information quality, including intrinsic information quality, contextual information quality, representational information quality and accessibility information quality. The dimensions and definitions of these categories are shown in Table 1 (Ghasemaghaei & Hassanein, 2015).

2.2. Social role theory

Social role theory (SRT) holds that gender differences in social behavior come from the socialization process (Eagly, 1987). Although social role theory was developed primarily in Western cultures, it is reasonable to apply to theory in this research, as China is similar to Western cultures in masculinity versus femininity (MAS) values (Chen & Zahedi, 2016; Sia et al., 2009). According to SRT, many researchers have claimed that females are characterized as more communal, while males are characterized as more agentic (Archer, 1996; Eagly & Wood, 1988; Franke, Crown, & Spake, 1998). Communal traits refer to "unselfish, friendly, concerned with others, and emotionally expressive," while agentic traits are described as "independent, assertive, masterful, and

instrumentally competent" (Eagly & Wood, 1988). Many aspects of gender differences could be explained by communion and agency (Archer, 1996). For instance, in Dittmar and Helga (1989), females are found to value materials more from an emotional standpoint, while males value more from an instrumental perspective. For example, females may participate in a virtual community because it provides an opportunity to express emotion, and males may participate because it provides useful information. Additionally, Djamasbi and Loiacono (2008) apply SRT to the decision-making context and propose that females and males react differently to feedback. Specifically, outcome feedback, in particular the more negative outcome feedback, improves the decision accuracy of female users to a greater extent than their male counterparts. The overall moods of female subjects are significantly less positive after completing a task and receiving such negative feedback, while the moods of male subjects do not change.

3. Hypotheses development

3.1. Intrinsic information quality and gender

Intrinsic IQ denotes that information has quality in its own right (Lee, Strong, Kahn, & Wang, 2002). Dimensions of intrinsic IQ usually can be assessed by a reference standard, such as spelling mistakes (Shreeves et al., 2005). In general, intrinsic IQ attributes are persistent, depend little on context, and could be measured objectively (Shreeves et al., 2005). As the standard is objective, it is reasonable to conclude that females and males do not experience intrinsic information quality differently, both expectation and perception. Thus we propose:

H1a. Females and males do not have difference in the expectation of intrinsic information quality.

H1b. Females and males do not have difference in the perception of intrinsic information quality.

H1c. Females and males do not have difference in the intrinsic information quality.

3.2. Contextual information quality and gender

In traditional technology usage, males' technology usage decisions are more influenced than females' by perceptions of usefulness in the workplace (Venkateshprofile et al., 2000). In other words, males are more pragmatic, task oriented and motivated by productivity-related or task-oriented factors (e.g., usefulness) than females (Zhou, Jin, & Fang, 2014). However, virtual communities are more hedonic in comparison to many traditional technologies. Males tend to use traditional task-oriented (i.e., utilitarian) technologies in the workplace (e.g., using emails in an organizational setting) primarily for fulfilling instrumental needs, but use more hedonic or entertaining technologies (e.g., VCs) primarily for entertainment. Females are more process-oriented which means females are not limited by the specific nature of the target technology (e.g., usefulness) but more open to various possible applications throughout the whole process of usage (e.g., ease of use and enjoyment) (Zhou et al., 2014). Applied to this study, In the context of this study, the literature suggests that females tend to be less hedonic but more balanced toward other benefits (e.g., utilitarian benefit). We therefore propose

H2a. Females have higher expectation scores of contextual information quality than males.

Research shows that gender affects perceptions of usefulness in e-mail use (Gefen & Straub, 1997). In general, although intimacy and independence are shared needs of both genders, females focus more on creating intimacy while males focus more on asserting independence. Thus, compared to males, females are more likely to have face-

Table 1
IQ dimensions and definitions.

IQ categories	Dimensions and definitions
Intrinsic IQ	Believability, accuracy, objectivity, reputation. Information may have innate correctness regardless of the context in which it is being used.
Contextual IQ	Value-added, relevancy, timeliness, completeness, appropriate amount of data. Perceived quality may vary according to the particular task.
Representational IQ	Interpretability, ease of understanding, representational consistency, concise representation. The degree to which the information being assessed is presented in a clear manner.
Accessibility IQ	Accessibility, access security. The ease with which the information sought is obtained.

to-face conversations. Females would feel less comfortable in virtual communities as there is a lesser degree of intimacy. In addition, females are found to have higher computer anxiety than males (Gilroy & Desai, 1986). Although information technology has advanced dramatically in recent years, in the latest research, females still exhibit anxiety toward computer use, whereas males exhibit no computer anxiety (Huang, Hood, & Yoo, 2013; Lee & Huang, 2014). Thus, we propose:

H2b. Females have lower perception scores of contextual information quality than males.

Given the truth of previous hypotheses H2a and H2b, a logical derivation is as follows:

H2c. Females have lower scores of contextual information quality than males.

3.3. Representational information quality and gender

Maslow's classic motivational theory provides a hierarchy of needs, which is a major contribution to explaining human behavior (Koltko-Rivera, 2006; Maslow & Frager, 1997). It has been found to be useful in varied domains, such as business and health care. Maslow's theory also supports the formation of theoretical models to explain how females' underlying needs link to specific blogging experiences. Chen (2012) shows that females reveal a higher need for self-disclosure than males. Females with a strong need to self-disclose would be more likely to see blogging as a means to express their own voice. Therefore, they would pay more attention to the understanding and representational part (e.g. ease of understanding and concise representation). A virtual community is similar to a blog, as they both provide a channel to communicate with others (Brodie, Ilic, Juric, & Hollebeek, 2013). Thus, we propose:

H3a. Females have higher expectation scores of representational information quality than males.

As to the perception of representational information quality, the logic is the same as the perception of contextual information quality. Thus, we propose:

H3b. Females have lower perception scores of representational information quality than males.

Given the truth of previous hypotheses H3a and H3b, a logical derivation is as follows:

H3c. Females have lower scores of representational information quality than males.

3.4. Accessible information quality and gender

Accessibility IQ refers to the ease with which the information sought is obtained (Huang, Lee, & Wang, 1998). Literature shows that males are likely to feel more at ease with computers (Gefen & Straub, 1997). As mentioned earlier, females present more computer anxiety, so they would value ease of use. It is reasonable to conclude that females would have higher expectation of accessible information quality than males. Thus, we propose:

H4a. Females have higher expectation scores of accessible information quality than males.

As to the perception of accessible information quality, the logic is the same as the perception of contextual information quality. So we propose:

H4b. Females have lower perception scores of accessible information quality than males.

Given the truth of previous hypotheses H4a and H4b, a logical derivation is as follows:

H4c. Females have lower scores of accessible information quality than males.

4. Research method

4.1. Questionnaire development

We used a questionnaire with four parts to test our theoretical model. The first part examines the usage of virtual community respondents. The second part measures the expectation of information quality. The third part measures the perception of information quality. The fourth part investigates demographics, such as gender, age and Internet experience. Each item corresponding to the constructs is measured using a seven-point Likert scale. These items are adopted from Lee et al. (2002), as this paper is the most cited article in information quality assessment. It has been cited 1119 times in Google Scholar since publication. All of the constructs were developed and refined based on one pretest and one pilot test using recommended procedures (Boudreau, Gefen, & Straub, 2001). The pretest and pilot test involved 8 and 10 participants, respectively. The instrument went through minor revisions after the pretest and the pilot test. Backward translation was also conducted to ensure the instrument consistency between the Chinese version and the original English version. An example of the dimensions and related measured items is shown in Table 2.

4.2. Data collecting

A web-based survey was administered in a virtual community, a university forum in western China. This forum is used for communication of daily life for approximately 30,000 university students. We posted our research and a link to our online survey in the forum. Participants would receive a coupon for online shopping after they finished the questionnaire. We received 162 responses in one week. In the 162 responses, ten of them were uncompleted and seven of them answered all of the questions with "6", i.e. "agree". After eliminating these seventeen responses, 145 valid responses were used in the following data analysis. However, one of the 145 responses was missing the gender item, leaving 144 usable observations. The demographics information of all of the participants is as follows in Table 3.

5. Data analysis

To analyze the collected data, we followed a two-step process. First, we examined the measurement model to measure reliability and convergent and discriminant validity. Second, we used multivariate analysis of variance to examine the strength and direction of the relationships.

The reliability and validity of the model are as follows in Table 4. The correlations between dimension constructs are shown in Table 5.

Confirmatory factor analysis (CFA) using LISREL 8.8 showed that our information quality instrument had acceptable model fit (RMR 0.055, CFI 0.99, NNFI 0.97, GFI 0.86), good reliability, good

Table 2
Dimensions and items.

Dimension	Item
Expectation of believability	The information should be believable. 1 2 3 4 5 6 7
Perception of believability	The information is believable. 1 2 3 4 5 6 7

Table 3
Respondents' characteristics.

Items	Freq.	Percent
Gender		
Male	102	70.3%
Female	42	29%
Missed	1	0.7%
Last use		
Today	30	20.7%
In 3 days	37	25.5%
In 1 week	18	12.4%
In 1 month	15	10.3%
In 1/2 year	22	15.2%
>1/2 year	22	15.2%
Missed	1	0.7%
Internet experience		
≤1 year	31	21.4%
2–3 years	58	40%
4–6 years	35	24.1%
>7 years	20	13.8%
Missed	1	0.7%
Age		
<18	0	0%
18–22	67	46.2%
23–27	72	49.7%
28–32	6	4.1%
>32	0	0%
Missed	0	0%
Use freq		
Per day	79	54.5%
Per 3 days	15	10.3%
Per week	33	22.8%
Per month	7	4.8%
Per 1/2 year	1	0.7%
>1/2 year	9	6.2%
Missed	1	0.7%

Table 4
Reliability and validity of the model.

Construct indicators	Number of items	Composite reliability	Average variance extracted	Cronbach alpha
Intrinsic IQ	4	0.83	0.55	0.82
Representational IQ	4	0.84	0.56	0.83
Contextual IQ	4	0.83	0.56	0.83
Accessible IQ	3	0.71	0.45	0.71

convergent and discriminant validity of the constructs, with maximum likelihood estimation for the covariance matrix. The results of CFA are shown in Table 6.

Table 5
Correlations between dimension constructs.

	Intrinsic	Contextual	Representational	Accessible
Intrinsic IQ	1 (total)			
	1 (males)			
	1 (females)			
Contextual IQ	0.73 (total)	1 (total)		
	0.70 (males)	1 (males)		
	0.77 (females)	1 (females)		
Representational IQ	0.91 (total)	0.77 (total)	1 (total)	
	0.89 (males)	0.72 (males)	1 (males)	
	0.93 (females)	0.87 (females)	1 (females)	
Accessible IQ	0.73 (total)	0.80 (total)	0.86 (total)	1 (total)
	0.74 (males)	0.77 (males)	0.88 (males)	1 (males)
	0.69 (females)	0.86 (females)	0.82 (females)	1 (females)

Table 6
Confirmation factor analysis for model.

Fit index	Threshold	Model
RMR	(≤0.10)	0.055
Chi-square		194.82
d.f.		84
Chi-square/d.f.	(≤5.0)	2.32
CFI	(≥0.90)	0.99
NNFI	(≥0.90)	0.97
GFI	(≥0.90)	0.86
AGFI	(≥0.80)	0.79

Then we used multivariate analysis of variance to test gender differences in information quality. Age (AGE) and Internet experience (IEX) are included as covariates. The results are presented in Table 7.

Thus we could conclude as follows in Table 8.

We then calculated means and standard deviations for gender. The results are presented in Table 9.

6. Discussions and conclusions

6.1. Discussions

Both information quality and virtual community are advancing recently. However, there is little research that considers them together. In this research, we focused on the effect of gender on the expectations or perceptions of information quality in the context of virtual community. Our results show that gender could indeed influence the expectations and perceptions of information quality, thus affecting information quality.

There is no significant influence of gender on either expectations or perceptions of intrinsic information quality. H1a, H1b, H1c, H2a, H2b, H2c, H3a, H3b and H3c are supported. This is consistent with previous findings that intrinsic information quality is objective, depends little on context and has nothing to do with gender difference (Shreeves et al., 2005). So for virtual communities, it is appropriate to provide female and male users with same intrinsic information quality.

For contextual information quality, gender has no significant influence on either expectations or perceptions of contextual information quality. Dimensions of contextual information quality include value-added, timeliness and completeness (Ghasemaghaei & Hassanein, 2015). In this research, the virtual community is a university forum which is used for communication of daily life for all students of the university, especially news about class and job. This type of virtual community is less hedonic and more utilitarian. Males and females both pay much attention to the usefulness of targeted information technology (Zhou et al., 2014; Gefen & Straub, 1997). Therefore there is no significant effect of gender on contextual information quality in this research. It would be interesting to test this hypothesis in other type of virtual communities.

For representational information quality, females have higher expectations of representational information quality and lower representational information quality than males. Maslow's theory tells us that females have a higher need for self-disclosure than males. Females with a strong need to self-disclose would be more likely to see a virtual community as a means to express their own voice and would pay more attention to understanding and representational qualities. Thus, females have higher expectations of representational information quality. The perceptions of representational information quality have no differ across gender, so overall females have lower representational information quality than males. In practice, a virtual community should provide females with clearer representational content.

For accessible information quality, females have less accessible information quality than males. Accessibility IQ refers to the ease with which the information sought is obtained (Ghasemaghaei & Hassanein, 2015).

Table 7
Multivariate analysis of variance results (F-values and probability levels and effect size).

	Intrinsic IQ			Contextual IQ			Represent IQ			Accessible IQ		
	Expect	Percept	Minus	Expect	Percept	Minus	Expect	Percept	Minus	Expect	Percept	Minus
GEN	1.187	0.253	2.036	2.432	0.151	2.132	**4.967**	0.223	**4.634**	2.566	0.558	**3.610**
	(0.308)	(0.777)	(0.135)	(0.092)	(0.860)	(0.123)	**(0.008)**	(0.800)	**(0.011)**	(0.081)	(0.574)	**(0.030)**
	(0.17)	(0.05)	(0.14)	(0.19)	(0.05)	(0.17)	(0.30)	(0.07)	(0.27)	(0.18)	(0.02)	(0.15)
AGE	0.450	0.845	1.822	0.638	2.301	**3.643**	1.460	1.284	**3.864**	1.155	0.098	1.228
	(0.639)	(0.432)	(0.166)	(0.530)	(0.104)	**(0.029)**	(0.236)	(0.281)	**(0.024)**	(0.318)	(0.906)	(0.296)
	(0.06)	(0.10)	(0.15)	(0.09)	(0.15)	(0.20)	(0.14)	(0.10)	(0.21)	(0.11)	(0.02)	(0.14)
IEX	1.915	0.848	0.212	**3.597**	1.488	0.096	0.780	1.034	0.082	**4.412**	2.114	**3.503**
	(0.152)	(0.431)	(0.809)	**(0.030)**	(0.230)	(0.909)	(0.461)	(0.359)	(0.922)	**(0.014)**	(0.125)	**(0.033)**
	(0.16)	(0.10)	(0.07)	(0.15)	(0.15)	(0.02)	(0.09)	(0.10)	(0.01)	(0.25)	(0.15)	(0.15)

The bold numbers in the table mean that they are significant ($p < 0.05$).

Table 8
Hypothesis and results.

Hypothesis	Results
H1a	Supported
H1b	Supported
H1c	Supported
H2a	Not supported
H2b	Not supported
H2c	Not supported
H3a	Supported
H3b	Not supported
H3c	Supported
H4a	Not supported
H4b	Not supported
H4c	Supported

As information technology develops, females show less and less computer anxiety, and there are no significant differences between males and females in overall computer anxiety levels (Hong & Koh, 2002). Therefore, gender has no significant effect on accessible information quality.

6.2. Contributions

This study provides several important contributions. First, this paper studies basic aspects of information quality. We know what information quality means, what dimensions information quality has and how to measure information quality. To our knowledge, it is the first study that measures information quality by the gap between the expectations and actual perceptions of information quality. Second, gender is found to have influence on either expectation or perception of information quality. Overall, the perception of information quality is mainly the same for males and females. Gender mainly influences expectations of information quality. Theoretically, gender could be used as a control variable in future research. Practically, females tend to have high expectations, leading to lower satisfaction with information quality and low satisfaction. Studies found that users who hold unrealistically high preimplementation expectations about a system are less likely to be satisfied than those who are less enthusiastic (Staples, Wong, & Seddon, 2002). Virtual community managers need to realize that the same information quality may be perceived differently by the genders. To sustain a virtual community, it is useful to provide female and male users with customized information.

6.3. Future research

Although this study has yielded many significant results, there is still some meaningful research to be conducted in the future. First, there are many factors that can influence the expectation or perception of information quality. In our research, we investigated gender only. There may be additional factors of information quality that are not addressed in this study. Further examination of this topic, using diverse theoretical perspectives from other disciplines, such as personality (Lee, Ahn, & Kim, 2014; Seidman, 2013), is required to propose a more comprehensive explanation of information quality. Second, in this paper, we found that gender could influence information quality, but we did not investigate the underlying mechanism, which is a very interesting future research topic. Third, in this research, convenience sample was used. It would be helpful to collect data more randomly. Fourth, a college forum in China was used in this research, and the results would be more interesting if other samples or other countries were used in future research.

Table 9
Means and standard deviations of gender.

	Gender	N	Mean	SD
M-represent	Males	102	0.60	1.00
	Females	42	1.17	1.07
E-represent	Males	102	5.70	0.85
	Females	42	6.17	0.66
M-accessible	Males	102	0.70	1.06
	Females	42	1.02	1.07

References

Arazy, O., & Kopak, R. (2011). On the measurability of information quality. *Journal of the American Society for Information Science and Technology*, 62(1), 89–99.

Archer, J. (1996). Sex differences in social behavior. Are the social role and evolutionary explanations compatible? *The American Psychologist*, 51(9), 909–917.

Boudreau, M. -C., Gefen, D., & Straub, D. W. (2001). Validation in information systems research: A state-of-the-art assessment. *MIS Quarterly*, 1–16.

Brodie, R. J., Ilic, A., Juric, B., & Hollebeek, L. (2013). Consumer engagement in a virtual brand community: An exploratory analysis. *Journal of Business Research*, 66(1), 105–114.

Chen, G. M. (2012). Why do women write personal blogs? Satisfying needs for self-disclosure and affiliation tell part of the story. *Computers in Human Behavior*, 28(1), 171–180.

Chen, Y., & Zahedi, F. M. (2016). Individuals' internet security perceptions and behaviors: Polycontextual contrasts between the United States and China. *MIS Quarterly*, 40(1).

Chih-Hung, K., Ju-Yu, Y., Cheng-Chung, C., Sue-Huei, C., & Cheng-Fang, Y. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *Journal of Nervous and Mental Disease*, 193(4), 273–277.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30.

Dennis, A. R., Pootheri, S. K., & Natarajan, V. L. (1998). Lessons from the early adopters of web groupware. *Journal of Management Information Systems*, 65–86.

Dittmar, & Helga (1989). Gender identity-related meanings of personal possessions. *British Journal of Social Psychology*, 28(2), 159–171.

Djamasbi, S., & Loiacono, E. T. (2008). Do men and women use feedback provided by their Decision Support Systems (DSS) differently? *Decision Support Systems, 44*(4), 854–869.

Dretske, F. (1981). *Knowledge and the flow of information.*

Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation.* Lawrence Erlbaum Associates.

Eagly, A. H., & Wood, W. (1988). Explaining sex differences in social behavior: A meta-analytic perspective. *Personality and Social Psychology Bulletin, 17*(3), 17.

Franke, G. R., Crown, D. F., & Spake, D. F. (1998). Gender differences in ethical perceptions of business practices: A social role theory perspective. *Journal of Applied Psychology, 82*(6), 920–934.

Ge, M., & Helfert, M. (2007). *A review of information quality research - Develop a research agenda. Paper presented at the International Conference on Information Quality, 76–91.*

Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. *MIS Quarterly,* 389–400.

Ghasemaghaei, M., & Hassanein, K. (2015). Online information quality and consumer satisfaction: The moderating roles of contextual factors–A meta-analysis. *Information Management, 52*(8), 965–981.

Gilroy, F. D., & Desai, H. B. (1986). Computer anxiety: Sex, race and age. *International Journal of Man-Machine Studies, 25*(6), 711–719.

Hilligoss, B., & Rieh, S. Y. (2008). Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context. *Information Processing & Management An International Journal, 44*(4), 1467–1484.

Hjørland, B. (2007). Information: Objective or subjective/situational? *Journal of the American Society for Information Science and Technology, 58*(10), 1448–1456.

Hong, K. S., & Koh, C. K. (2002). Computer anxiety and attitudes toward computers among rural secondary school teachers. *Journal of Research on Technology in Education, 35*(1), 27–48.

Huang, K. -T., Lee, Y. W., & Wang, R. Y. (1998). *Quality information and knowledge.* Prentice Hall PTR.

Huang, W. -H. D., Hood, D. W., & Yoo, S. J. (2013). Gender divide and acceptance of collaborative Web 2.0 applications for learning in higher education. *The Internet and Higher Education, 16,* 57–65.

Huang, W., Wei, K. K., & Lim, J. (Jan.-Mar. 2003). "Using GSS to Support Global Virtual Team-building: A Theoretical Framework". *International Journal of Global Information Management, 11*(1), 72–89 USA.

Huang, W., Wei, K. K., Watson, R. T., & Tan, C. Y. (2003). Supporting virtual team-building with a GSS: An empirical investigation. *Decision Support Systems, 34*(4), 359–367.

Knight, S. -A., & Burn, J. M. (2005). Developing a framework for assessing information quality on the World Wide Web. *Informing Science: International Journal of an Emerging Transdiscipline, 8*(5), 159–172.

Koltko-Rivera, M. E. (2006). Rediscovering the later version of Maslow's hierarchy of needs: Self-transcendence and opportunities for theory, research, and unification. *Review of General Psychology, 10*(4), 302–317.

Lee, C. -L., & Huang, M. -K. (2014). The influence of computer literacy and computer anxiety on computer self-efficacy: The moderating effect of gender. *Cyberpsychology, Behavior and Social Networking, 17*(3), 172–180.

Lee, Y. W., Strong, D. M., Kahn, B. K., & Wang, R. Y. (2002). AIMQ: A methodology for information quality assessment. *Information Management, 40*(2), 133.

Lee, F. S. L., Vogel, D., & Limayem, M. (2003). Virtual community informatics: A review and research agenda. *Jitta Journal of Information Technology Theory & Application, 5.*

Lee, E., Ahn, J., & Kim, Y. J. (2014). Personality traits and self-presentation at Facebook. *Personality and Individual Differences, 69*(0), 162–167. http://dx.doi.org/10.1016/j.paid.2014.05.020.

Maslow, A. H., & Frager, R. (1997). *Motivation and personality.* Pearson.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *The Journal of Marketing,* 41–50.

Rau, P. L. P., Gao, Q., & Ding, Y. (2008). Relationship between the level of intimacy and lurking in online social network services. *Computers in Human Behavior, 24*(6), 2757–2770.

Ridings, C. M., & Gefen, D. (2004). Virtual community attraction: Why people hang out online. *Journal of Computer-Mediated Communication, 10*(1), 00.

Roberts, N. (1988). In R. S. (Ed.), *Value-added processes in information systems.* Norwood, NJ: Ablex Publishing Corporation (1986. 257 pp. ISBN 0 89391 273 5).

Seidman, G. (2013). Self-presentation and belonging on Facebook: How personality influences social media use and motivations. *Personality and Individual Differences, 54*(3), 402–407. http://dx.doi.org/10.1016/j.paid.2012.10.009.

Shreeves, S. L., Knutson, E. M., Stvilia, B., Palmer, C. L., Twidale, M. B., & Cole, T. W. (2005). *Is 'quality' metadata 'shareable' metadata? The implications of local metadata practices for federated collections.*

Sia, C. L., Lim, K. H., Leung, K., Lee, M. K. O., Huang, W., & Benbasat, I. (2009). Web strategies to promote internet shopping: Is cultural-customization needed? *MIS Quarterly, 33*(3), 491–512.

Staples, D. S., Wong, I., & Seddon, P. B. (2002). Having expectations of information systems benefits that match received benefits: Does it really matter? *Information Management, 40*(2), 115–131.

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly, 24*(1), 115.

Venkateshprofile, V., Morrisprofile, M. G., & Ackermanprofile, P. L. (2000). A longitudinal field investigation of gender differences in individual technology adoption decision-making processes. *Organizational Behavior and Human Decision Processes, 83*(1), 33–60.

Wang, R. Y., & Strong, D. M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information Systems, 12*(4), 5–34.

Weiser, E. B. (2000). Gender differences in internet use patterns and internet application preferences: A two-sample comparison. *Cyberpsychology & Behavior, 3*(2), 167–178.

Zhang, Z., Liu, Y., Ding, W., Huang, W., Su, Q., & Chen, P. (2015). Proposing a new friend recommendation method, frutai, to enhance social media providers' performance. *Decision Support Systems, 79*(C), 46–54.

Zhou, Z., Jin, X. L., & Fang, Y. (2014). Moderating role of gender in the relationships between perceived benefits and satisfaction in social virtual world continuance. *Decision Support Systems, 65*(1), 69–79.