

Lim, S. and Kwon, N (Forthcoming). Gender differences in information behavior concerning Wikipedia, an unorthodox information source? *Library and Information Science Research*

Abstract

This study examined gender differences in information behavior concerning Wikipedia. Data were collected using a web survey in the spring of 2008. The study employed a convenient sample that consisted of students who had taken an introductory undergraduate course at a large public university in the mid-western United States. A total of 134 out of 409 students participated in the study. The major findings of this study include the following: as information consumers, male students used Wikipedia more frequently than did their female counterparts. With respect to the purposes of Wikipedia use, male students used Wikipedia for entertainment or idle reading more than did their female counterparts, while there were no gender differences regarding Wikipedia use for other purposes. With respect to risks, male students used Wikipedia due to their likelihood to discount the risks involved when using Wikipedia information, compared to their female counterparts. Furthermore, male students had higher ratings than female students regarding most aspects of Wikipedia, including outcome expectations, perceptions about its information quality, belief in the Wikipedia project itself, their emotional states while using Wikipedia, confidence in evaluating information quality, and further exploration. Finally, there was no gender difference regarding the number of years of Wikipedia use. However, male students reported having more positive experiences with the information quality of Wikipedia than did their female counterparts. Overall, the findings of this study were consistent with those of previous studies concerning gender. Given the acknowledgment of the knowledge value of Wikipedia in recent literature, it seems that there are more advantages of using Wikipedia than disadvantages. The current study shows that male students seem to enjoy

such benefits more than female students and may have more opportunities to develop their information literacy skills than female students by actively using Wikipedia. This finding suggests that educators need to encourage, in particular, female students to explore Wikipedia strategically as an initial information source so that they can develop their information literacy skills for unconventional sources.

1. Introduction

As of September 2009, a Pew Internet and American Life Project survey showed that the percentages of female and male adults (18 and older) who use the Internet are 76% and 78% respectively (Demographics of Internet Users, 2009). The survey data seem to validate recent studies that indicate a closure of the gender gap in basic connectivity or access to the Internet (Fallows, 2005; Hargittai & Shafer, 2006). However, a number of studies demonstrate that other types of gender gaps or differences still persist, such as the purposes of Internet use (Dholakia, 2006; Fallows, 2005; Jackson, Shao, Kolenic, Fitzgerald, Harold & Von Eye, 2008; Jones, Johnson-Yale, Millermaier, & Pérez, 2009; Wolin & Korgaonkar, 2003), the degree of involvement in a variety of online activities (Fallows, 2005; Jones et al., 2009), topic interests or news preferences (Harp & Tremayne, 2006; Knobloch-Westerwick & Alter, 2007; Royal, 2008), and confidence in computer or online-related skills (Abbiss, 2008; Enochsson, 2005; Hargittai & Shafer, June 2006; Ioanna Vekiri & Chronaki, 2008). This evidence clearly suggests that gender is an issue in various contexts. In particular, given the latest statistics that approximately 93% of the above Pew Research survey respondents between 18 and 29 years old used the Internet at least occasionally (Demographics of Internet Users, 2009), gender differences in Internet

activities are of concerns to educators because such differences can result in other gender disparities, such as career choices, subsequently leading to larger-scale social disparities.

Feminist researchers have long attempted to understand the origins of gender differences and have developed a number of approaches to studying gender and providing explanations of such origins (Marecek, 2001). As a result, it is desirable to examine gender from multiple perspectives in order to understand gender differences comprehensively. However, this task, requiring extensive discussion, is beyond the scope of this study. Therefore, it is not our intention to engage in such a discussion here. Instead, this study aims at determining gender differences among college students in their information behavior concerning Wikipedia.

2. Problem statement

Examining gender in the context of Wikipedia is particularly interesting due to its unique characteristics. That is, Wikipedia is a web-based free and on-going encyclopedia project that can be written and edited collaboratively by any volunteer (Wikipedia: About, 2009). Wikipedia also is a community where people build a space for common good through active interactions for collective knowledge building. This unique nature of Wikipedia distinguishes itself from other authoritative information sources whose authors are known for their expertise. This voluntary collaborative nature of Wikipedia, however, has generated skepticism regarding its information quality (Denning, Horning, Parnas, & Weinstein, 2005; Wallace & Fleet, 2005). Some academic communities prohibit students from citing Wikipedia in their academic papers (Waters, 2007). Given the evidence of gender differences in previous studies, it is likely that male and female students perceive this uneasiness surrounding Wikipedia differently. However, little is known

regarding whether female and male students have different perceptions, attitudes, emotions and behaviors toward this non-authoritative and volatile information source.

The importance of this study lies in the following points: first, it provides new knowledge of gender differences in the uses, purposes for use, risks, outcome expectations, perceptions, beliefs, verbal influence, emotions, information utility, confidence in evaluating information from Wikipedia, further exploration of using Wikipedia and past experiences with its information quality. Here, the term, “use” refers to the consumption of Wikipedia, but not including its production aspect. The findings may enhance our understanding of the gender perspectives of information behavior in an unconventional information environment, particularly, in terms of authorship and on-going collaboration, which can be applicable to studying similar information environments such as blogs. In fact, more and more individuals, who are both experts and non-experts, publish their thoughts and ideas on the web to unknown readers, who post their reactions to others’ postings. These interactive blogs and other web 2.0 applications have increasingly become important information sources to Internet readers, providing novel ideas in some cases and inaccurate information in other cases. Consequently, the findings of this study can be useful in studying gender differences in facing other information source that is useful as well as potentially problematic information quality, similar to Wikipedia. Second, this study’s findings may help educators understand the gender gaps or differences in their information behaviors in unconventional information environment, which may aid in the development of appropriate educational interventions intended to understand gender differences or to narrow gender gaps.

3. Literature review

3.1. Gender, purposes of Internet use and topic interests

A number of studies demonstrate that certain types of gender differences in various domains still persist. Studies show that women and men use the Internet for different purposes. Women tended to use the Internet more for communication, compared to men who use the Internet for entertainment and news information (Fallows, 2005). A large-scale study regarding college students displays similar patterns, demonstrating that female college students used the Internet for communicative and academic purposes more than did their male counterparts, while male students used the Internet for a wider variety of leisure activities than did female counterparts (Jones et al., 2009). Similarly, men surfed the Internet for entertainment or fun more than did women (Dholakia, 2006; Wolin & Korgaonkar, 2003), and male students downloaded music and videos more than did their female counterparts (Jones et al., 2009). Accordingly, men were the most intense video game players (Jackson et al., 2008).

In relation to the different purposes of Internet use, studies show gender differences in a range of topics of interest. Women tend to go online for a narrower range of topics, such as health and religion, while men tend to engage in a broader range of activities (Fallows, 2005). Similarly, Jones et al. (2009) reported that male students pursue a wider variety of activities including games, sports, technology, politics, personal finance and adult content than do their female counterparts. Further, the topics in which each gender is engaged parallel sex role stereotyping, mirroring the notion of the public and private (or domestic) dichotomy associated with men and women (Harp & Tremayne, 2006). For instance, Royal (2008) found that the categories of home and family were frequently used in sites targeted at women, while business, sports, and gambling were themes popular in sites designed for men. Similarly, Knobloch-

Westerwick and Alter (2007) reported that men and women show remarkably different sex-stereotyped news interests: men follow news on politics, sports and finance while women follow news on health and the community. Additionally, Harp and Tremayne's (2006) study examining political blogs showed a similar pattern; only 10% of the top bloggers were women, demonstrating the sex-stereotyped notion that politics belongs to the male domain.

3.2. Gender and risks

The literature of perceptions, attitudes and behaviors toward risks from a gender perspective provide useful insights into examining gender differences concerning Wikipedia, as some students may even perceive the use of Wikipedia as risky. Byrnes, Miller, and Schafer (1999) performed a meta-analysis of 150 studies that were coded into a variety of content domains and three types of hypothetical, self-reported and observed risks. Overall, their analysis demonstrates that men were more likely than women to take risks, with some variations according to context. Similarly, a study assessing risk taking in five content domains (financial, health/safety, recreational, ethical and social) provides consistent results that women were more risk-averse than men in all domains, except for the social domain (Weber, Blais, & Betz, 2002). In the same vein, other researchers have examined gender differences of the risks involving online behaviors. For instance, in a study examining file downloading behaviors among college students, Gallaway and Gallaway (2006) found that female students downloaded songs less than male students, possibly due to concerns of copyright law violation. Moreover, female students, compared to males, tended to the perception of file sharing as potentially illegal behavior, and agreed more with the importance of complying with copyright law than male students. By the same token, Steinerová and Šušol (2007) found that women had a higher proportion of licensed

resource use to free resources in comparison to men. Jones et al.'s (2009) finding is consistent with that of Steinerová and Šušol in that female college students were more likely to use mainstream information sources such as library websites than were male students. These studies suggest that women tend to be more sensitive to violating laws or taking risks than men.

On the other hand, Weber et al. (2002) provide a different perspective regarding gender differences in risk taking based on their study examining domain-specific risks. Weber et al. found that the risks and benefits in all domains were negatively correlated with each other. In other words, the greater the expected benefit of an activity, the smaller the perceived risk. Further, they found that gender differences in risk-taking were associated with differences in the perceptions of benefits and risks, rather than with differences in attitudes toward the perceived risks. Similarly, Hogarth, Portell, and Cuxart (2007) examined how students perceived and assessed such risks in their current activities when they were interrupted at random moments by text messages. They found that there was no gender difference in assessing the potential severity of risks. Interestingly, however, female students assessed the probability of such risks as more likely to happen than their male counterparts. In other words, the risk aversion of women is related to their assessment of the probability of risks happening rather than that of the severity of those risks. Despite some variations, these findings suggest that there may be a gender difference regarding Wikipedia use, library database use and expected outcomes of Wikipedia.

3.3. Gender, online shopping, online activities and collaboration

In a similar vein, the literature of online shopping, a less conventional way of shopping than the traditional manner, displays similar patterns regarding perceptions and attitudes toward risks. The use of an unconventional information source may be different from that of online

shopping. Nonetheless, the literature of online shopping provides useful insights into examining Wikipedia, as using the Wikipedia articles of unknown authors can be perceived as being as risky as dealing with unknown retailers in online shopping. Some studies show that women perceived a higher level of risk, or more concerns over the hassles of online shopping, than did men (Garbarino & Strahilevitz, 2004; Hui & Wan, 2007), despite no gender difference of online experiences (Hui & Wan, 2007). Similarly, Roogers and Harris (2003) reported that in general, men tend to be more positive and less skeptical regarding Internet-related activities than women. This gender difference in skepticism regarding the Internet may parallel gender differences in the perceptions of Wikipedia. On the contrary, the collaborative nature of Wikipedia may appeal to women more than men, as women are known to be more inclined to collaboration or cooperation, collaborative communication styles and community building than men (Dickerson, 2003; Li, 2006; Morahan-Martin, 1998; Prinsen, Volman, & Terwel, 2007).

3.4. Gender and friends' influence

With respect to skepticism, according to Garbarino and Strahilevitz (2004), friends' recommendations reduced the perceived risks of online shopping for more females than males and increased their willingness to shop online, again more so for females than males. Similarly, Kim, Lehto, and Morrison (2007) found that friends' recommendations were more important for women versus men in choosing travel destinations. This finding supports that the females in these studies were more influenced and persuaded by friends' opinions than were males (Garbarino & Strahilevitz, 2004; Kim et al., 2007).

3.5. Gender and emotions

Some researchers have looked into emotions in relation to human information behavior. Nahl's (2005) affective load theory claims that positive emotions command persistence and integration to cognitive strategies by handling ambiguity and cognitive loads properly. This helped information searchers quickly reinstate cognitive strategies that can help perform task-relevant activities. Similarly, according to Isen, Daubman, and Gorgoglione (1987), positive emotion facilitates learning by simplifying the task and making research more efficient. Furthermore, Kwon (2008) suggested that students equipped with more positive emotion were more likely to demonstrate better critical thinking skills, whereas students with negative dispositions tended to exhibit poorer critical thinking skills.

Others pay attention to the role of emotion in gender differences. Reviewing the e-commerce literature, Roogers and Harris (2003) reported that positive emotion prompts the customer to make a decision well and to spend more time on surfing websites, thus leading to more online shopping. In their study, they found that women were less emotionally gratified with online shopping than men, and they provided a reason as to why women were less involved in online shopping than men. Additionally, Weber et al. (2002) remark that an individual's affective domain may influence one's perceptions of risk and benefit judgments, and in turn, may influence one's risk-taking. Similarly, Felton, Gibson, and Sanbonmatsu (2003) examined the relationship of optimism with gender on the riskiness of investment choices of students. They found that males make more risky investment choices than females, and that this difference was largely accounted by the riskier choices among optimistic males. On the other hand, Robinson, Johnson, and Shields (1998) examined gender differences in self-reported emotions. Their literature review reported that men tend to display more socially desirable self-oriented emotions

(such as pride) than women, while women tend to display more socially undesirable self-oriented emotions (such as guilt) than men. Given the fact that Wikipedia is not considered as an authoritative resource and that skepticism exists regarding the quality of Wikipedia, female students may have less positive emotional valence toward Wikipedia use than their male counterparts.

3.6. Gender and information utility

Relating to human beings' tendency to choose the path of least effort, Fallis (2008) points out that people tend to use easily available sources. A number of studies support this remark, demonstrating that convenience is one of the key reasons for using web information (Julien & Michels, 2004; Lim, 2009; Rainie & Tancer, 2007; Savolainen, 2008). With respect to gender involving online related activities for convenience, however, the literature provides inconsistent findings. Roogers and Harris (2003) reported that men are more likely than women to use the Internet for convenient, practical or utilitarian purposes. Similarly, Cyr, Hassanein, Head, and Ivanov (2007) provide evidence that the perceived usefulness and functionality of websites are the most important for men. They further found that men were more utilitarian regarding e-commerce website use than women. On the other hand, Hui and Wan (2007) found that there was no difference between gender regarding the convenience of online shopping. These inconsistent findings of the utilitarian aspects of the Internet use lead to further speculation.

3.7. Gender and self-efficacy

Studies show that women tend to evaluate their online skills lower than do men, despite no apparent gender difference in the ability to find information on the web (Hargittai & Shafer, 2006). In related studies, boys had a higher perceived sense of computer self-efficacy than girls

(Abbiss, 2008; Ioanna Vekiri & Chronaki, 2008). Enochsson (2005) provides similar results regarding confidence: boys displayed their technological knowledge and used technology language more than girls, despite the same level of interest in technology. Additionally, researchers have reported similar observations in off-line activities. For instance, by employing a laboratory experiment, Niederle and Vesterlund (2007) examined whether men and women differed with respect to their selection into competitive environments. Their study showed that men tend to be overconfident in the tournament and enter the tournament twice as often as women, despite little gender difference in actual performance.

3.8. Gender and exploration

Finally, according to Lim (2009), one of the positive consequences of using Wikipedia is that students tend to explore information further by following the links on Wikipedia articles in order to find more information and to discover new information. However, it may be possible that the degree of exploration for further information in Wikipedia and any benefits from such exploration differ, according to gender, due to different web searching behaviors and other factors. Roy and Chi (2003) reported that boys tend to follow up on more hits and click on more links than girls while searching the web. Other researchers point out the strong tendency or socialization of men toward experimentation of new or risky tasks/activities. For instance, in a study examining the readiness of self-service technologies, Elliott and Hall (2005) found that male students displayed a stronger desire to experiment with new technologies than their female counterparts. Similarly, Kim et al. (2007) reported that men tend to show a greater fondness for the latest information technology products than women. In addition, according to social control theory, males (sons) are freer to develop stronger risk preferences than females (daughters)

because females (daughters) are more constrained than males (sons) in patriarchal families, providing an explanation for why males are more likely to explore a variety of risky activities than females (Grasmick, Hagan, Blackwell, & Arneklev, 1996). This theory implies that different socializations result in different risk preferences between genders.

4. Research questions and hypotheses

4.1. Research questions

This study explores the following major research questions: 1) Are there gender differences regarding Wikipedia use and library database use? 2) Do female and male students use Wikipedia for different purposes? 3) Is there a gender difference regarding Wikipedia use in relation to the perception of risk? 4) Are there gender differences in the outcome expectations of Wikipedia, perceptions, beliefs, verbal persuasion, emotional state toward Wikipedia and its information utility such as ease, convenience and usefulness? 5) Is there a gender difference in confidence with respect to evaluating the quality of Wikipedia information? 6) Is there a gender difference in further exploring Wikipedia? 7) Finally, are there gender differences in years of Wikipedia use and past experiences with its information quality?

4.2. Research hypotheses

H1. There is a gender difference regarding the frequency of Wikipedia use in the past semester.

H2. There are gender differences regarding Wikipedia use for different purposes (H2.1 academic purposes; H2.2. non-academic personal interests; H2.3. entertainment or idle reading; and H2.4. information for others)

H3. There is a gender difference regarding the perceptions of criticality of risks in the use of Wikipedia.

H4. There is a gender difference regarding the frequency of library database use.

H5. There is a gender difference regarding the outcome expectations of Wikipedia.

H6. There are gender differences regarding perception of information quality of Wikipedia (H6.1.) and belief in the Wikipedia project (H6.2).

H7. The level of verbal persuasion regarding Wikipedia differs between male and female students.

H8. There is a gender difference in emotions toward Wikipedia use.

H9. There is a gender difference in information utility, such as ease, convenience and usefulness regarding Wikipedia use.

H10. There is a gender difference regarding the level of information evaluation self-efficacy in the context of Wikipedia.

H11. There is a gender difference with respect to exploring further information in Wikipedia.

H12. There are gender differences regarding past experiences with Wikipedia in terms of the number of years of its use.

H13. There are gender differences regarding past experiences with Wikipedia's information quality.

5. Procedures

5.1. Population and sample

Data were collected using a web survey regarding students' purposes, uses of, outcome expectations of Wikipedia, perceptions, verbal persuasion, emotional state toward Wikipedia, its information utility, confidence in evaluating Wikipedia information and further exploration during the spring of 2008. The population consisted of undergraduate students at a large public university in the mid-western United States. The study used a convenient sample that consisted of students who had taken an introductory course in Journalism and Mass Communication. As a result, the findings of the study may not be generalizable to all female and male university student populations. The participating students received extra credit as compensation for participation. A total of 134 out of 409 students participated in the study, resulting in a 32.8% response rate. Two participants who did not report their gender were excluded in the analyses regarding gender.

5.2. Measurements of the study and conceptual definitions of variables

A wide range of literature was used to develop the measurements of the variables of the study. The items regarding the perception of *information quality* of Wikipedia were modified or developed based on the literature of news and web credibility (Cassidy, 2007; Gaziano & McGrath, 1986; Tsfati & Cappella, 2005; Warnick, 2004). *Information quality* was defined as one's evaluative judgment of the goodness of information, which is user's subject judgment depending on the context of the user's information needs and uses. This definition is derived from the dominant characterizations of information quality in the current library and information science literature (Taylor, 1986; Hilligoss & Rieh, 2008). The items for *belief in the Wikipedia project*, defined as one's confidence in the Wikipedia project, were developed based on studies by Forte and Bruckman (2005) and Bryant et al. (2005). Items regarding *verbal persuasion*, *emotional state*, and *outcome expectations* were developed based on the literature of Social

Cognitive Theory (Bandura, 1986; Bandura, 1997; Compeau & Higgins, 1995). *Verbal persuasion* was defined as others' verbal influence in using Wikipedia. *Emotional state* was defined as a positive or negative emotional condition when using Wikipedia. *Outcome expectation* was defined as one's expectation of the information quality and anticipated benefits from using Wikipedia. Items for *information utility*, defined as the ease, convenience and usefulness of information, were developed based on the literature of web behavior (Rieh & Hilligoss, 2007). Items for *information evaluation self-efficacy*, defined as one's confidence in evaluating information, was developed based on Bandura's concept of self-efficacy (Bandura, 1986). Items of *past experience-quality*, defined as a positive or negative direct experience with the information quality of Wikipedia, were developed based on the literature of news/web credibility and Social Cognitive Theory described above. Finally, items for *purposes of information use, criticality of risk and further exploration* were developed in an exploratory manner. Operational definition(s) of each variable is presented in Table 2. Each of the above variables was scored using a seven-point scale, ranging from (1) strongly disagree to (7) strongly agree, or from (1) not at all to (7) a lot. The variables are presented in Table 2. Finally, the variables for *years of Wikipedia use*, the frequency of *Wikipedia use in the past semester*, and *library database use in the past semester* were scored using a five-point scale: the variable of *years of Wikipedia use*, ranged from (1) less than one year to (5) four or more years. The variables of both the frequency of *Wikipedia use* and *library database use* in the past semester ranged from (1) zero to (5) more than 15 times. As described above, "Wikipedia use" refers to its consumption, but not including its production aspect.

6. Findings

This section is organized into two subsections. The first subsection presents the sample characteristics of the respondents. The second subsection reports the results of hypothesis testing, corresponding to the research questions.

6.1. Sample characteristics

Approximately 37.3% (N=50) of the respondents were male, and 61.2% (N=82) were female. According to the University of Wisconsin-Madison (2009) where the data were collected, among the undergraduate students who enrolled in fall 2007, 47% and 53% were male and female respectively. Thus, the proportion of female students of the study sample was higher than that of the population. The majority of the respondents (84.3%, N=113) were under the age of 20, and 14.2% of the respondents (N=19) were between the ages of 20 and 21. The rest (1.5%, N=2) were between the ages of 22 and 23. Approximately 89.6% (N=120) of the respondents were Caucasian, followed by Asian (3.7%, N=5), Hispanic (3.0%, N=4), mixed-race (1.5%, N=2) and African-American (0.7%, N=1). Two students (1.5%) fell into the group designated as “Other” that includes those who did not identify themselves with any of the above categories. With respect to major, approximately 38.8% (N=52) of the respondents had not yet decided upon their majors. Approximately 36.6% (N=49) of the respondents had declared their major as being in the humanities, followed by the social sciences (28.4%, N=38), the arts (10.4%, N=14) and the sciences (9%, N=12). Some students had more than one major. Finally, a majority of the respondents (75.4%, N=101) were first-year students, followed by sophomores (20.9%, N=28) and juniors (3.7%, N=5). Table 1 presents the sample statistics.

6.2. Results of hypothesis testing

The research hypotheses were tested employing t-tests as it was reasonable to expect the variance in the male and female populations to be equal, in advance of our data collection. A t-test is used to compare two group means where the independent variable is qualitative with two values or groups and the dependent variable is quantitative. A t-test requires the following assumptions: 1) a normal distribution of observations within each group and 2) equal variances of two groups (McDonald, 2009). A two-tailed test under $\alpha = .05$ was performed to test all of the hypotheses. The results of hypothesis testing are presented in Table 3.

6.2.1. Frequency of Wikipedia use and library database use

All female and male respondents reported having used Wikipedia (N=82 and N=50 for females and males respectively). There was a significant gender difference regarding the frequency of Wikipedia use in the prior semester relative to when the research was conducted ($t = -3.990, p < 0.000$). Male students used Wikipedia more frequently than did their female counterparts, thereby supporting H1. However, there was no statistically significant difference between genders regarding the frequency of library database use in the past semester, thus H4 was not supported.

6.2.2. Purposes of Use

With respect to the purposes of Wikipedia use, male students used Wikipedia for entertainment or idle reading more than did their female counterparts, which was statistically significant ($t = -2.631, p < 0.010$), thereby supporting H2.3. Male students tended to use Wikipedia for other purposes, such as such as academic work, non-academic information for personal

interests and information for others more than did their female counterparts, as well. However, the gender differences in Wikipedia use for other purposes were not statistically significant. In other words, H2.1, H2.2 and H2.4 were not supported.

6.2.3. Risk and outcome expectation

The criticality of risks in the use of Wikipedia was perceived less severely among male students than female students, thereby supporting H3 ($t=-2.860$, $p<0.005$). In addition, overall male students had more positive outcome expectations than did female students, which was statistically significant ($t=-4.112$, $p<0.000$), thus supporting H5. More specifically, male students had higher expectations about finding useful information than female students (mean values of 5.07 and 5.76 for female and male students respectively). Male students expected to become knowledgeable more than did female students (4.64 and 5.45). Male students had higher expectations about easily locating information than did their female counterparts (5.05 and 5.84). Male students expected to enjoy their time reading articles more than did their female counterparts (4.17 and 4.92). Male student had a higher expectation about not needing a lot of effort or time in finding information than female students (4.48 and 5.30). In addition, male students had higher expectations about the following aspects than did female students: obtaining accurate information (3.98 and 5.10), comprehensive information (4.20 and 4.92), current information (4.12 and 5.20), new ideas or perspectives (4.04 and 4.86) and reasonably good information (4.67 and 5.38). The numbers without the notations of t-statistics or p-values in parentheses above indicate the mean values of female and male students respectively throughout this paper.

6.2.4. Perceptions of Wikipedia

Two aspects of Wikipedia were examined: perceptions of its information quality and belief in the Wikipedia project. With respect to perceptions of Wikipedia's information quality, overall, male students had much higher perceptions of Wikipedia's information quality than did their female counterparts ($t=-4.555$, $p<0.000$), thereby supporting H6.1. More specifically, male students had higher ratings on each of the corresponding items than females: reasonable accuracy (4.66 and 5.58), verifiability elsewhere (4.85 and 5.63), the chance of obtaining accurate information (4.48 and 5.27), reliability (4.04 and 5.12), comprehensiveness (5.15 and 5.75), fairness (4.11 and 4.72) and the quality of being well-written (4.34 and 5.04).

In addition, male students had a higher belief in the Wikipedia project than did their female counterparts ($t=-5.252$, $p<0.000$), resulting in a significant difference between gender regarding belief in the Wikipedia project (supporting H6.2). More specifically, male students had more positive belief in the Wikipedia project for each of the following items than female students: prompt correction of inaccurate information (3.72 and 4.68); writers' knowledge (3.76 and 4.50); the strength of a collaborative effort (3.94 and 5.24); the integrity of the Wikipedia project (4.15 and 5.10), the idea of a collaborative encyclopedia (4.96 and 5.96); writers' contributions to a greater good (4.35 and 5.62); and writers' concerns about the information quality (4.37 and 5.20).

6.2.5. Verbal persuasion, emotional state and information utility

There was no significant difference between genders regarding verbal persuasion. Regarding emotional state, male students felt more positively about using Wikipedia than did their female counterparts (4.22 and 5.08), which was statistically significant ($t=-3.582$, $p<0.000$). Overall, there was no significant difference between genders regarding information utility

such as ease, convenience and usefulness. In other words, H8 was supported, while H7 and H9 were not.

6.2.6. Information evaluation self-efficacy

Overall, male students had higher confidence in evaluating information than did their female counterparts ($t=-2.148$, $p<0.034$), thus supporting H10. More specifically, the mean values of female and male students for confidence in evaluating the quality of Wikipedia articles were 4.22 and 4.74 respectively. In addition, male students' confidence was higher than that of female students in terms of evaluating the credibility of sources cited (4.09 and 4.74). However, the mean difference between genders with respect to evaluating the credibility of the authors of Wikipedia articles was not notable.

6.2.7. Further exploration through Wikipedia

Male students reported that they found more resources through Wikipedia articles than did female students, thereby supporting H11 ($t=-2.711$, $p<0.008$). More specifically, male students more often followed links on Wikipedia articles than did their female counterparts (4.41 and 5.20). Male students more often discovered new information when they were using Wikipedia than did female students (5.26, and 5.88). In addition, male students more often used a reference list in a Wikipedia article than did female students (4.04 and 4.71).

6.2.8. Past experience with Wikipedia use and information quality

There was no significant difference between genders regarding years of Wikipedia use, thus not supporting H12. However, male students had more positive experiences with the information quality of Wikipedia than did their female counterparts, thereby supporting H13 ($t=$ -

2.751, $p < 0.007$), while overall, both genders had positive experiences. In particular, male students showed more positive experiences with the following features of information quality: appearance of accuracy (5.32 and 5.82), consistency with the respondent's previous knowledge (5.29 and 5.82), and verifiability (5.28 and 5.84). However, mean differences between gender regarding the plausibility, accuracy and usefulness of information were not statistically significant.

7. Discussion

This study provides a number of implications for educators and library practice. Male students tend to use Wikipedia more frequently than female students, and follow links on Wikipedia more than their female counterparts. Thus, female students who actively use Wikipedia may have the advantage of discovering and learning new information and knowledge. In fact, some authors point out that Wikipedia is a useful initial source that can lead to the discovery of other sources (Shaw, 2008). Others acknowledge the knowledge value of Wikipedia (Fallis, 2008; Lim, 2009) and reasonably good information quality (Chesney, 2006; Stvilia, Twidale, Smith, & Gasser, 2008). In other words, it seems that there are more advantages of using Wikipedia than disadvantages, and the current study shows that male students seem to enjoy such benefits more than female students by actively using Wikipedia. It also suggests that educators need to encourage, in particular, female students to explore Wikipedia more strategically as an initial information source. By actively exploring Wikipedia, students can develop and improve their information literacy skills, as well. At the same time, it is important for educators and librarians to provide guidelines for the best use of Wikipedia. In fact, Wikipedia itself provides the best ways of using Wikipedia and certain considerations as a

research source (Wikipedia: About, 2009). It would be helpful to students for librarians to post such guidelines to their library websites, which may particularly appeal to female students. In this way, students can take advantage of the knowledge value of Wikipedia while critically examining Wikipedia articles.

On the other hand, there was no gender difference in the frequency of library database use, which is an indication of no gender difference in the use of authorized information sources, contrasting with Jones et al.'s (2009) finding. Despite the need for more evidence on library database use, this result can be interpreted as male students utilizing more Internet information resources than female students, thus showing a similar pattern of the degree of Internet activity involvement, as described above. Additionally, Wikipedia use for entertainment or idle reading is comparable with overall Internet use from a gender perspective. This implies that not only do male students use Wikipedia more frequently than their female counterparts, but they also use Wikipedia for more variety of purposes than their female counterparts, which is consistent with previous study findings of gender differences in Internet use.

There may be two interpretations regarding the gender difference finding of Wikipedia use linked to individual perceptions of unimportance of the potential risks of Wikipedia information. Firstly, male students may perceive the potential risks of Wikipedia to a lesser extent than females, as previous study findings report regarding gender difference in risk perception, generally speaking. In fact, the current study shows that despite insignificant correlations between the unimportance of risk and Wikipedia use for both genders, its correlation for males ($r=0.275$) was higher than that for females ($r=0.087$). Secondly, given the finding that male students tend to use Wikipedia for entertainment or idle reading more significantly than

female students, compared to comparable use for other purposes including academic use, male students may feel freer regarding the accuracy of information than their female counterparts. In other words, the accuracy of information for entertainment or idle reading would not be as critical as that for academic purposes.

One of the most interesting findings was that there was no gender difference regarding the number of years of Wikipedia use; however, male students had more positive experiences with the information quality than their female counterparts. Given that the percentages of Internet use by gender are currently comparable (Demographics of Internet Users, 2009) and that the study sample falls into the Net generation, who highly uses digital technologies, no gender difference in years of Wikipedia use is not surprising. However, it is unclear as to why male students had more positive experiences with the information quality of Wikipedia than female students. Similar phenomena were observed with respect to the perception of Wikipedia's information quality, belief in the Wikipedia project itself, outcome expectations and emotional state when using Wikipedia. In particular, the results of perception of Wikipedia's information quality and outcome expectations may be related to the phenomenon of "blind skepticism." According to (Tseng & Fogg, 1999), expert users tend to be overly skeptical about unfamiliar information (blind skepticism), while novice users tend to easily believe unfamiliar information (blind faith). Interestingly, however, based on her study of students' information behavior using Wikipedia, Lim (2009) remarks that experts and novices seem to have reversed roles, and students tend to underestimate the quality of Wikipedia, despite their positive past experience with it. With respect to gender, this phenomenon of "blind skepticism" regarding Wikipedia appeared to be stronger for female students than for their male counterparts. It is uncertain as to why this was the case. One possible interpretation is that female students may perceive

Wikipedia use as less socially desirable than male students, leading to becoming more skeptical about Wikipedia information than their male counterparts. It is necessary to further examine whether females tend to underestimate unauthorized information sources, compared to males, and if so, why they do.

Another interesting finding was male students' more positive belief in the Wikipedia project than female students. This finding is particularly interesting (unexpected), as some indicators of the concept measured the collaborative nature of Wikipedia, and females are known for their propensity toward collaboration and cooperation, as described above. One possible interpretation is that the perception of Wikipedia's information quality as an information source is more critical in shaping individuals' beliefs in the Wikipedia project than the collaborative nature of Wikipedia. In other words, it appears that the collaborative nature of Wikipedia did not favorably affect females' beliefs in the Wikipedia project when the quality of information was perceived skeptically.

The present study also revealed another noteworthy finding with respect to emotional state for further discussion. It appears that positive emotion plays an important role in information behavior concerning Wikipedia. This present study reported that male students had more positive emotional state to the use of Wikipedia than their female students. As described above, these male students tended to use Wikipedia more frequently, feel less afraid of taking risks as exploring this unauthorized information source, and had greater confidence in their ability to evaluate information quality among male students and more positive past experience with Wikipedia. These phenomena observed in male student's Wikipedia use may be explained by their positive emotion toward the use of Wikipedia. Further research is needed to examine the

role of positive emotions, such as optimism and critical thinking disposition, in relation with the use of an unconventional information source. At the same time, librarians teaching information literacy should employ positive emotion as well as cognitive skills when developing strategies to make effective use of Wikipedia for college students.

Finally, the study is consistent with other studies described above regarding self-efficacy. This finding can be interpreted as male students simply showing more confidence in their abilities than female students, despite no differences in their abilities, just as other researchers have pointed out (Enochsson, 2005; Hargittai & Shafer, 2006; Niederle & Vesterlund, 2007). Another interpretation may be that this finding confirms another type of gender difference, as observed in other studies. That is, Greene and DeBacker (2004) reported some studies demonstrating gender differences according to the tasks and specificity of expectancies: girls tend to have lower self-expectancies for success than boys on novel tasks, but not on familiar tasks. Similarly, girls rated themselves lower on generalized expectancies, but not on specific ones. In the context of Wikipedia, the students were asked to respond to more general questions involving the evaluation of Wikipedia articles. In addition, the fact that anyone can contribute to Wikipedia articles may create more uncertainty and difficulty regarding the evaluation of its information quality. In other words, female students scored lower on the general questions than male students regarding uncertain information. With subject areas known to both male and female students and specific tasks, this result may differ; this possibility needs further investigation.

The study has certain limitations and a few suggestions for further research emerged from the current study. First, this study focused more on determining gender differences in the context

of Wikipedia, rather than on explaining why they existed in the first place. In other words, this study did not provide further fundamental explanations for gender differences. Second, this study employed a convenient sample drawn from one class from a large public university. Further, the proportion of female students of the study sample was higher than that of the study population. Among the undergraduate students who enrolled in fall 2007 at the University of Wisconsin-Madison, 47% and 53% were male and female respectively (University of Wisconsin-Madison, 2009). Consequently, the findings of the study may not be generalizable to all female and male university student populations. Third, there is room for improvement in the measurements of the variables. In particular, the variable of risk needs to be improved by parceling it into multiple items. For instance, it would be desirable to measure a variety of aspects, including perception, attitude and behavior separately. Fourth, this study examined students' confidence in evaluating the quality of Wikipedia articles in a *general* way, employing a survey. Further research can examine gender differences in confidence when evaluating *specific* articles on topics that are familiar to students, employing both the survey and experimental methods. These techniques can constitute effective ways of finding out whether there are gender differences in specific tasks, and whether different methods result in comparable results. Fifth, further research employing qualitative methods such as interviews and/or focus groups would enrich the findings of the study, which may serve as the evidence of convergent validity. Sixth, the study findings suggest the need for further investigation of the role of positive emotions in relation with the use of an unconventional information source. Finally, it is necessary to further examine whether there are gender differences regarding Wikipedia, with and without experts' approval or encouragement in using Wikipedia.

8. Conclusion

This study highlighted gender differences in information behavior concerning Wikipedia. Overall, this study was consistent with previous studies. Male students had more positive or active attitudes, emotions and behaviors toward this unconventional (or non-authoritative) information source than their female counterparts, whereas female students displayed more cautious or conservative attitudes, emotions, and behaviors than their male counterparts. The study contributes to enhancing our understanding of the gender perspectives of information behavior in an unconventional information environment by providing new knowledge of gender differences concerning Wikipedia. In addition, the study findings have implications for future studies that examine gender differences in similar web 2.0 information environments in which Internet users increasingly seek and obtain information. Finally, this study helps educators and librarians develop appropriate information literacy programs intended to narrow gender gaps concerning web 2.0 information sources.

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Table 1. Sample Characteristics

		Frequency	Percent
Gender	Female	N=82	61.2%
	Male	N=50	37.3%
Age	Under 20	N=113	84.3%
	20-21	N=19	14.2%
	22-23	N=2	1.5%
Race	African-American	N=1	0.7%
	Asian	N=5	3.7%
	Caucasian	N=120	89.6%
	Hispanic	N=4	3.0%
	Mixed	N=2	1.5%
	Other	N=2	1.5%
Major	Humanities	N=49	36.6%
	Arts	N=14	10.4%
	Social Sciences	N=38	28.4%
	Natural Sciences	N=6	4.5%
	Applied Sciences	N=6	4.5%
	Undecided	N=52	38.8%
	School year	First year	N=101
	Sophomore	N=28	20.9%
	Junior	N=5	3.7%

Table 2. Variables

Conceptual variables (Cronbach's α)	Survey items	Mean (F)	S.D. (F)	Mean (M)	S.D. (M)
Purpose	Academic work	3.57	1.750	4.02	1.464
	Non-academic personal information needs	4.49	1.952	5.14	1.620
	Entertainment or idle reading	2.91	2.050	3.90	2.104
	Information for others	3.20	1.822	3.74	1.712
Risk	I use Wikipedia because the potential risk of inaccurate information from Wikipedia is Not critical for my needs	4.06	1.808	4.94	1.544
Outcome expectation $\alpha=0.939$	If I use Wikipedia, I will find useful information.	5.07	1.438	5.76	1.061
	I will become more knowledgeable.	4.64	1.434	5.45	1.119
	I will easily locate information I need.	5.05	1.625	5.84	1.131
	I will enjoy my time reading articles.	4.17	1.748	4.92	1.338
	I will NOT need to put a lot of effort or time into finding information.	4.48	1.790	5.30	1.432
	I will find accurate information.	3.98	1.507	5.10	1.165
	I will find comprehensive information.	4.20	1.511	4.92	1.209
	I will find current information.	4.12	1.391	5.20	1.195
	I will obtain new ideas or perspectives	4.04	1.471	4.86	1.355
	I will find reasonably good information.	4.67	1.524	5.38	1.323

Perception of information quality	Wikipedia is reasonably accurate.	4.66	1.269	5.58	.950
$\alpha=0.895$	Information in Wikipedia is verifiable elsewhere.	4.85	1.677	5.63	1.236
	The chance of obtaining accurate information by using Wikipedia is high.	4.48	1.230	5.27	1.238
	Wikipedia information is reliable.	4.04	1.409	5.12	1.092
	Wikipedia articles include major facts or details on their topics.	5.15	1.344	5.75	1.101
	Wikipedia articles present views fairly and without bias.	4.11	1.457	4.72	.970
	Wikipedia articles are generally well written.	4.34	1.354	5.04	1.136
Belief in Wikipedia project	If inaccurate information is posted on Wikipedia, people would correct it within a couple of days	3.72	1.460	4.68	1.449
$\alpha=0.912$	Wikipedia authors are knowledgeable about the particular subject(s) they deal with.	3.76	1.301	4.50	1.282
	I believe that the strength of a collaborative effort such as Wikipedia.	3.94	1.372	5.24	1.205
	I believe in the integrity of the Wikipedia project.	4.15	1.450	5.10	1.279
	The idea of a collaborative encyclopedia is cool.	4.96	1.382	5.96	1.177
	Wikipedia writers contribute to a greater good.	4.35	1.247	5.62	1.276
	Wikipedia writers have a concern for the quality of information.	4.37	1.222	5.20	1.212

Verbal persuasion	My friends or classmates have encouraged me to use Wikipedia.	4.76	1.725	4.44	1.960
$\alpha=0.965$	My friends or classmates often suggest that I look into Wikipedia.	4.63	1.788	4.66	1.912
Emotional state	I feel good about using Wikipedia	4.22	1.396	5.08	1.209
Information utility	I use Wikipedia because it is easy to use.	6.09	1.269	6.20	1.030
$\alpha=0.803$	I use Wikipedia because its information is useful.	5.14	1.339	5.60	1.262
	I use Wikipedia because I can find information quickly.	5.82	1.335	6.08	1.226
	I use Wikipedia because I have an immediate need for information.	4.91	1.682	5.20	1.338
Information evaluation self-efficacy	I am confident in evaluating the quality of information of Wikipedia articles.	4.22	1.396	4.74	1.259
$\alpha=0.835$	I am confident in evaluating the credibility of the author(s) of Wikipedia articles.	3.72	1.526	4.04	1.414
	I am confident in evaluating the credibility of the sources cited in a Wikipedia article.	4.09	1.525	4.74	1.549
Further exploration	I often follow links on Wikipedia articles to find more related information	4.41	1.777	5.20	1.761
$\alpha=0.801$	I often discover new information while I am using Wikipedia	5.26	1.350	5.88	1.136
	I often use a reference list in a Wikipedia article to find more	4.04	1.882	4.71	1.826

information					
Past experience-quality	Wikipedia articles I have read appeared to be plausible most of the time.	5.37	1.212	5.76	.916
$\alpha=0.931$	Wikipedia articles I have read appeared to be accurate most of the time.	5.32	1.185	5.82	.834
	Wikipedia articles I have read were consistent with my previous knowledge most of the time.	5.29	1.232	5.82	.774
	Wikipedia articles I have read were accurate most of the time.	5.34	1.091	5.68	.868
	The information I have obtained from Wikipedia was verifiable elsewhere.	5.28	1.189	5.84	.934
	Wikipedia articles I have read were useful to me most of the time.	5.55	1.177	5.84	.934

Table 3 Results of Hypothesis Testing

Variable [hypothesis]	t	df	p-value	Mean Difference	Std. Error Difference
Wikipedia use in the past semester [H1]	-3.990	129	.000	-.854	.214
Purposes of use [H2]					
Academic work [H2.1]	-1.511	130	.133	-.447	.296
Non-academic personal information interests [H2.2]	-1.977	129	.050	-.655	.331
Entertainment or idle reading [H2.3]	-2.631	129	.010	-.983	.374
Information for others	-1.705	130	.091	-.545	.320

[H2.4]					
Unimportance of risk [H3]	-2.860	130	.005	-.879	.307
Library database use in the past semester [H4]	.124	130	.902	.024	.197
Outcome expectation [H5]	-4.112	130	.000	-8.2331	2.0022
Perception of IQ [H6.1]	-4.555	130	.000	-5.5218	1.2122
Belief in Wikipedia project [H6.2]	-5.252	130	.000	-6.6418	1.2646
Verbal persuasion [H7]	.450	130	.653	.2902	.6450
Emotional state [H8]	-3.582	130	.000	-.847	.236
Information utility [H9]	-1.805	130	.073	-1.3433	.7441
Information evaluation self-efficacy [H10]	-2.148	130	.034	-1.4514	.6757
Further exploration [H11]	-2.711	130	.008	-2.0226	.7461
Years of Wikipedia use [H12]	.435	130	.664	.075	.173
Past experience –quality [H13]	-2.751	130	.007	-2.7162	.9875

Note: Missing values for composite scores were replaced with a mean of the corresponding variable.