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Health Information Seeking Behavior of Library Information Science Students

Edward Steffen Morrow Jr.

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St. Catherine University

LIS 7920 Information Seeking Behavior

Instructor: Dr. Joyce Yukawa

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Abstract

A pilot study using mixed methods to analyze the online Health Information Seeking Behavior (HISB) of LIS students at a small Midwestern University was conducted to establish the feasibility of investigating the online HISB of LIS students in a larger future study. The project sought to answer the following research questions: (1) what health information topics do library and information science students seek when they search online, (2) how do students find online health information, (3) what do they do with this information, and (4) what attributes of health-related Web pages do Library and Information Science students use when making credibility judgments about this information?

The top five health topics of interest to LIS students are a specific disease or medical condition (94%), a certain medical treatment or procedure (71%), exercise or fitness (67%), a particular doctor, clinic, or hospital (54%), and depression, anxiety, stress, or mental health issues (50%). LIS students find online health information by search engine (75%), specific site like WebMD (52%), general site like Wikipedia (14%), social media site like Facebook (12%), journal database (10%), and online health encyclopedia/reference sources (4%). LIS students reported the following reasons for seeking online health information: personal health concerns (47.6%), healthy life style (28.2%), for a family or friend (21.4%), and curiosity or research (2.9%).

In the quantitative survey, LIS students reported the mean reliability of online health information as 4.6 out of 7, indicating they have a high level regard for the reliability of online health information. However, interview results indicate that LIS students are generally skeptical of the health information they find online and that they choose to verify findings by checking out additional sources for confirmation. In addition, LIS students are highly influenced by information in the peripheral cue when making credibility judgments about online health information.

Introduction

In 2001, there were over 100,000 health related websites on the Internet (Dearness & Tomlin, 2001, p. 167). Today, a mere search for the keyword "health" using the popular Internet search engine Google pulls up over 3.5 billion Web pages. In 2003, Eysenbach suggested "4.5% of all searches on the Web might be health-related" (2003, p. 225). Today, Google processes about 3.5 billion searches per day ("Google search statistics," 2015). Using Eysenbach's 4.5%, this equates to over 158 million health-related searches conducted daily on one search engine. This number is probably larger in actuality, but what is important is that searching for health information online is a daily occurrence.

The Internet is the world's largest medical library (Morahan-Martin, 2004, pp. 497-498) and "consumers can access online health information directly from credible scientific and institutional sources (e.g. Medline, Healthfinder) as well as from unreviewed sources of unknown credibility (e.g. well-informed individuals along with quacks and charlatans)" (Cline & Haynes, 2001, p. 673). What kinds of health information are people searching for on the Internet? What are they doing with this information? How are health seekers making credibility judgments about online health information? These are important questions to consider for the answers will help health content providers and Web designers create more meaningful and appropriate health-related Web sites.

Background and Scope

The author has 17 years of prior experience working in the healthcare sector as a Clinical Laboratory Scientist. The author is also an LIS student. The nature of this project is both a personal and professional interest to the author. The authors' role in the project will be one of an objective investigator as he seeks out answers to the research questions.

This project is set within the context of the 'Information Society' as proposed by Webster (2006). In the 'Information Society', "modern information technologies are widely used and ... information-related work and sectors have become highly significant economic activities" (Miles, 2011, p. 3). There is controversy over whether or not we live in an 'Information Society'. Echoing the words of Mukherjee:

This project is based around the view that such a concept does exist and that although not everybody has equal access to the abundance of information resources around us as Digital Citizens (through financial or geographic limitations) the concept of an Information Age is tangible and realistic, especially in most major UK cities where Wi-Fi; broadband; tablet readers and smart phones are part of everyday terminology. (2011, p. 22)

Purpose

The focus of this project is on the examination of the Health Information Seeking Behaviors of Library and Information Science students at St. Catherine University.

Research Questions

There are four main questions in this project: (1) What health information topics do library and information science students seek when they search online, (2) how do students find online health information, (3) what do they do with this information, and (4) what attributes of health-related Web pages do Library and Information Science students use when making credibility judgments about this information?

Literature Review

What is health information?

In order to investigate the behavior associated with health information seeking we need to establish a framework for what exactly is health information. To do so requires combining the concepts of health and information into a single unit of understanding. Unfortunately, this is easier said than done. Fortunately, at a fundamental level of cognition, most people have a general idea of what is health information. At the same time, health information covers a broad range of concepts that address both the user/consumer and the provider of health information. Therefore, it is only natural to find there are many definitions of health information in the literature. For this project, health information is meant to be information:

Intended to be used to maintain or improve health, including, to understand disease processes, health care issues, etc., to prevent, diagnose, or treat health problems, to be rehabilitated from the effects of diseases, or treatments, and to seek and select health care plans, providers' or alternate therapy options. It also includes preventive information such as information about healthy eating or exercise regimens to promote health and well-being. (Mukherjee, 2011, p. 55)

Health information is a subjective term that embodies various concepts from the field of medicine (Mukherjee, 2011, p. 55). This is a key point to note when performing research of the public on their health information seeking behaviors. Each will have a different idea of what represents health information, and this representation may differ from that of the investigator (Mukherjee, 2011, pp. 55-56).

What is health information seeking behavior?

According to Mukherjee (2011, p. 55) "[h]ealth information seeking behavior (HISB) can be regarded as a knowledge-gathering process, resulting from a health query or need". Therefore, HISB involves the task of searching for information on some health related topic. However, in

general, there is no accepted definition for HSIB. Early examinations of the topic of HISB focused primarily on general information seeking behavior. There are many characteristics of HISB:

In sum, HISB is characterized by the type and amount of health-related information sought, the specific actions implemented to obtain the information, and the sources individuals use. Although authors have reported that individuals might have a general or stable tendency to either seek or avoid information, actual HISB are dynamic and might be expected to vary according to changing personal and contextual variables and time. (Lambert & Loiselle, 2007, p. 1013)

This project takes a broad view and states that HISB is any information search related behavior that involves the topic of health and happens about either directly through user's actions or indirectly through serendipity or from accidental browsing.

Health Information Seeking Behaviors

General Health Information Seeking Behavior

The public searches for health information for a variety of reasons. In general, three motives for seeking health information have been identified: coping with illness, involvement in medical decisions, and preventive health (Mukherjee & Bawden, 2012, p. 242).

In 2006, the Pew Internet & American Life Project polled 1990 individuals on their specific online health information seeking behavior. They specifically asked which of seventeen categories of health information the participants searched for. The categories of highest ranking were: specific disease or medical problem (64%), certain medical treatment of procedure (51%), diet, nutrition, vitamins, or nutritional supplements (49%) and exercise or fitness (44%) (Fox, 2006, p. i).

The Pew Internet survey also reported the following:

48% of health seekers say their quest for [online health] information was undertaken on behalf of someone else, not themselves. An additional 8% of health seekers say the search was on behalf of someone else and to answer their own health questions. Thirty-six percent of health seekers say their last search was in relation to their own health or medical condition. (Fox, 2006, p. ii)

In 2002 and 2006, the Pew Internet Project has consistently shown "certain groups of Internet users are most likely to have sought health information online: women, internet users younger than 65, college graduates, those with online experience, and those with broadband access at home" (Fox, 2006, p. i).

In Mukherjee's research of the HISB of the general public, he found that most research participants started their online health search using Google, used keywords and limited their

retrieved results to the first few links (Mukherjee, 2011, p. 64). According to the Pew Internet Project:

77% of online health seekers say they began at a search engine such as Google, Bing, or Yahoo. Another 13% say they began at a site that specializes in health information like WebMD. Just 2% say they started their research at a more general site like Wikipedia and an additional 1% sat they started at a social network site like Facebook. (Fox & Duggan, 2013, p. 3)

Health Information Seeking Behavior of College students

General Behaviors

In regard to previous research on online health information seeking, "it has been limited in scope, focusing primarily on differences by basic demographic characteristics, and few studies have been focused on college students" (Percheski & Hargittai, 2011, p. 379). Escoffery et al., (2005, p. 184) studied the HISB of college students and reported 72.9% of the students surveyed reported using the Internet for health information. "The most common method used to find health information related Web sites was using a search engine (p. 184). Escoffery et al. further goes on to say that:

The health Web sites mentioned most frequently by the students were WebMD and Yahoo Health. Other health Web sites mentioned were Ask Jeeves, Centers for Disease Control and Prevention, Fit Day, Health.com, Mayo Clinic, Planned Parenthood, Men's Health, Sexeducation.com, and Shape.com. (2005, pp. 184-185)

Escoffery et al. reports that the health topics of most interest to college students were: fitness and exercise (49.9%), diet and nutrition (47.2%), medicines and pharmaceuticals (39.6%) and alcohol and other drugs (31.7%) (2005, p. 186). Escoffery et al. also reported on the frequency of health information seeking in this population: 7.7% (a lot), 49.3% (some) and 43% (a little) (2005, p. 184). Even though these reporting units are subjective, they give a relative idea of how often students are searching for health information online. Escoffery et al. also discusses additional information on the frequency of online health search:

Using the Internet to obtain health information was fairly frequent. Approximately 15% of the students reported that they had used the Internet for health information in the past day or week, and 32% reported doing so in the past month. (2005, p. 185)

However, students are not talking to their healthcare providers about the information they find online in high numbers. "Access to health care information online is not substantially influencing students' interactions with their health care providers. Only 131 of 516 students (25.4%) reported talking to a doctor about information they found online" (Escoffery et al., 2005, p. 185). However, Escoffery et al. does state the following:

Internet use for health information is improving consumers' belief that what they are finding online is having an impact on their health. Of the 514 students who reported seeking health information on the Internet, 204 (36.7%) felt that retrieving health information online improved the way they took care of their health *a lot or some*. (2005, p. 185)

Young adults and college students tend to have fewer chronic health problems when compared to the rest of the population, but they tend to have higher relative rates of sexually transmitted diseases, alcoholism and unplanned pregnancies (Percheski & Hargittai, 2011, p. 379). Consequently, "online information may be particularly important for these types of issues" (Percheski & Hargittai, 2011, p. 379). In addition, young adults have higher rates of being under-insured or not insured which then limits their access to medical professionals and makes online health information more valuable when it is accessible (Percheski & Hargittai, 2011, p. 379). Hanauer and colleagues, sighting a Harris Interactive poll, report that the highest percentage (66%) of people who search for health information range between the ages of 18 and 29 (2004, p. 197).

In regard to gender, Ogan et al. found in their study of college students that "young women were more likely than young men to seek health information" (2008, p. 175) but Hanauer and colleagues did not find any correlation between gender and online health information seeking (2004, p. 198). The Pew Internet Project also reports, "[w]omen are more likely than men to go online to figure out a possible diagnosis" (Fox & Duggan, 2013, p. 2).

Race and ethnicity are important variables in social research, however, no study of college students has reported any significant findings related to online HISB that is affected by race or ethnicity.

In the examination of specific fields of academic study, Rowley, Johnson and Sbaifi (2014, p. 6) examined the factors that contribute to trust judgments of health information on Websites with 239 participants from the academic disciplines of business, sports, and humanities. They did not delineate their findings by academic discipline. In addition, no other study of college students has reported how fields or domains of academic study affect HISB. There is also no reported HISB study of Library and Information Science students.

Credibility

Credibility can be defined as believability. It is also a perceived quality. One of the research questions in this project is to investigate how LIS students make credibility judgments about online health information. The question seeks to understand what characteristics of online health information do LIS students use when they make credibility judgments. This is an important concept because there is a lot of misinformation and questionable health information online. LIS students are trained to evaluate information for credibility. Given the nature of the

online health information, how good are LIS students at evaluating the credibility of online health information?

General credibility studies

There are many studies about the credibility of information on Web sites. The existing studies seem to agree on one central point:

Once on a Web page, readers primarily use the information on only that page to determine the credibility of the information. Very few read "About us" and other information about the sponsors and authors of information on the pages before using the information on a given page. (Freeman & Spyridakis, 2004, p. 240)

According to the Medical Library Association, one of the best methods of assessing the quality of health information on the Web is always to check the source and date of the information (2015). Yet, in 2006, the Pew Internet & American Life Project reported that:

"[f]ully three-quarters of health seekers say they check the source and date "only sometimes," "hardly ever," or "never," which translates to about 85 million Americans gathering health advice online without consistently examining the quality indicators of the information they find."(Fox, 2006, p. iii)

Fogg et al., (2001, pp. 61-65) conducted an extensive quantitative study of 1410 participants from the US and Europe in which they investigated various characteristics of Websites and how these factors influenced credibility judgments. Some of the characteristics that had a positive influence on credibility judgements include presence of attribution, author credentials, contact information, and pleasing aesthetics. Characteristics that had a negative impact on credibility judgments include advertising, typographical errors, difficult navigation, infrequent updates, and poor aesthetic design.

Credibility Studies of College Students

Escoffery et al. reported in a study of college students that the "criteria for assessing Web sites with health information important to college students are related to the accuracy, credibility, currency, clarity, and ease of understanding the health content rather than to the design and navigation of the Web page" (2005, pp. 185-186). This information conflicts with the work of Fogg, B. J. et al. (2002, p. 8) who found that a professional design and ease of navigation made significant positive contributions to credibility judgments in the content of Web sites. Other researchers have examined how these peripheral cues influence credibility judgments and according to Lim:

Peripheral cues such as information structure and professional design, influence users' assessment of Web credibility. Some researchers have further attempted to examine the effect of peripheral cues on credibility judgments, and have found that certain peripheral

cues, such as attractiveness of images or structural features, influence credibility judgments of information. (2011, para. 2)

Credibility and LIS Students

There are not many studies that examine the online credibility judgments of LIS students. In a study by Robins & Holmes (2008, p. 386), they examined the online credibility judgments of 20 LIS students. They reported, "when the same content is presented using different levels of aesthetic treatment, the content with the higher aesthetic treatment was judged as having the higher credibility". This study suggests that LIS students are influenced by characteristics of the peripheral cue when they make credibility judgments of online information. This is worth noting because LIS students are taught to make credibility judgements based on the arguments of the text, the source of the information, credentials of the author, and its' currency.

Models of health information-seeking behavior

In the literature, the two most relevant models of HISB specific to this project are the Health Information Acquisition Model (Freimuth, Stein, & Kean, 1989) and Johnson's comprehensive model of health information seeking (Johnson, 2003). Freimuth's Health Information Acquisition Model (HIAM) "developed as a means of recognizing the unique complexity of decision-making process specifically within the context of health information acquisition. The model maps key moments or decision points that people face when confronted or with seeking out health information" (Kahlor, 2010, p. 348). Longo's expanded model is quite comprehensive and sophisticated. It covers whether or not health information is acquired actively or passively.

In regard to credibility, there are two credibility models relevant to this project: the Prominence-Interpretation (P-I) theory (Fogg, B. et al., 2003, p. 11) and the Elaboration Likelihood Model (ELM) (Cacioppo & Petty, 1984).

Prominence-Interpretation (P-I) Theory

Prominence-Interpretation theory "posits that two things happen when people assess credibility: a person (1) notices something (Prominence), and (2) makes a judgment about it (Interpretation). If one of the other does not happen, then there is no credibility assessment" (Fogg, B. et al., 2003, p. 11).

Elaboration Likelihood Model (ELM)

The Elaboration Likelihood Model (ELM) examines how the various characteristics of a Web page:

Such as the presence of a street address or the reputation of a Web site sponsor can affect the credibility of information on a Web page. ELM, a theory of persuasion ... postulates

that readers tend to judge text credibility either on the basis of arguments within the text or through external cues such as the type of publication in which a text appears. (Cacioppo & Petty, 1984, pp. 240-241)

These two pathways are known as the central and peripheral routes. For this project, any information on a Web page that is not part of the central argument of the text is considered a peripheral cue. Therefore, peripheral cues include author and author credentials, source and citations, links, sponsor names and logos, images, contact information, etc. The central route is represented by the actual argument of the text on a Web page.

Methodologies Used in the Literature to Investigate HISB and Credibility

The methods in the literature relevant to this project used to investigate health information seeking behavior and credibility are basic to the investigation of common social phenomena. Mukherjee (2011) used both a traditional survey and semi-structured interview to investigate HISB of the general public. Fogg and colleagues (2002) used a survey with a 7 point Likert scale in their investigation of Web credibility. Rowley et al. (2014) used a quantitative survey in their investigation of trust judgments of online health Web sites. Escoffery et al. (2005) used a cross-sectional survey technique to investigate online health information seeking of college students while Hanauer et al. (2004) used a 1-page survey in their investigating of online health information seeking behavior in college students. The Pew Internet (2006, 2013) used telephone interviews for their research into online HISB of the general public. Telephone interviews are not appropriate for this project, but the questionnaire they used is publicly available and can be modified for an application in either paper-based or electronic survey format.

Summary

The literature reveals there is a lot of research on the HISB of the general public. However, there is little research on the HISB of Library and Information Science students. Assumptions drawn from the general public can be applied to the HISB of LIS students, but their HISB is really unknown. How different is the HISB of LIS students from the general public and students in other disciplines? LIS students are taught to be perceptive searchers and critical thinkers when it comes to finding and evaluating information. LIS students are instructed in the use of Boolean logic to construct effective searches, to utilize databases, and to seek out specialized Websites for credible information. This study aims to explore these assumptions by examining how LIS students search for online health information, where do they go online for health information, and how do they evaluate online health information. Answers to these questions will help further an understanding of how skilled LIS students are at finding and assessing online health information.

Methodology

Framed in Grounded Theory, this project uses a mixed methodology consisting of qualitative and quantitative techniques. To examine the HISB of LIS students, both a survey and a semi-structure interview are used. The survey and interview were conducted using Google Forms with a link to the instruments sent out via email.

Rationale for Methods

The application of a survey and semi-structured interview allows for a comparison of the data with the results in the published literature. These methods were used in the literature and are therefore some of the strongest techniques to examine the research questions. Using an electronic service for the survey allows for a rapid turn-around time and efficient analysis of the results. It is also convenient and familiar to most users. The choice to use email for the semi-structured interview is based on the time-constraint of the project. The two benefits for using email are it is easy to distribute the survey and it permits easier coding of the responses because the responses are already digitized and readily importable into the coding software.

Subjects

LIS students from the St. Catherine MLIS program are the subjects of this pilot project. Due to the constraints of the project, this population is the most convenient and accessible. Participants were recruited through email, word-of-mouth, and by the snowball method. The pilot project sought to recruit at least 50 participants for the survey and a minimum of 10 participants for the semi-structured interview.

Design, Data Collection and Investigator Role

The survey queried for basic demographics, search techniques, health topics, application of found health information, and credibility assessment. Open ended questions sought to gather information about search techniques. A series of health categories with a bi-nomial response examined the health topics searched for. The application of health information was assessed by a multiple choice question. Measures of credibility were assessed using a series of questions structured in a seven point Likert scale. The semi-structured interview used open ended questions to examine the research questions. The data was analyzed using descriptive statistics and qualitative coding. The survey was administered first. Survey participants were asked if they would like to participate in a followup interview. The followup is the semi-structured interview.

My role in this project is one of an objective observer. I have the advantage of being an LIS student and I have history of working in the health industry. I have a system I use to make credibility judgments concerning online health information. In addition, I also have a preference for which sites I trust. This created a bias I was mindful of as I constructed the instruments and evaluated the data. Another source of bias is the subject population. The LIS student population

is predominantly female and white. I recognize this bias and will address this issue when I analyze and write up the results.

Ethics

The personal identification and the individual responses of each participant were kept confidential. Any information that could possibly identify a respondent was removed from the results prior to analysis. The master document of all responses is stored on Google Drive and is only accessible from the skate.edu domain under the authors credentials. Results have not and will not be submitted for publication in any format. This project does not have the capacity to harm any of its' participants and participation in this project is entirely voluntary, participants can stop participating in the project at any time. Due to the use of interviews, this project is classified at the expedited level of review for an IRB.

Overview

The pilot study consisted of a survey and a follow-up interview. Respondents were contacted by email with a link to the survey. Survey participants had an opportunity to receive the follow-up interview by entering their email address in the initial survey. The response rate for the survey is unknown. The survey request email was sent out by asking the professors in the LIS department to forward the survey request to their classes. The author did not ask for the number of students in each class. The interview response rate is 57.1% (12/21). A total of 52 respondents (survey), and 12 respondents (interview) make up the pilot project sample population. The survey consisted of 16 questions; the interview consisted of 15 questions.

Unit of Analysis

The unit of analysis in this pilot project is a single Library and Information Science student at St. Catherine University.

Procedures to Record Store and Summarize Data

The survey and interview were conducted using Google Forms and sent out through an email with a link to the questionnaires. Data collected from the questionnaires were stored on Google Docs as a Google Sheet.

Data Analysis

Methods of Analysis

Data from the questionnaires were imported into MS Excel 2007 and NVivo 10 for analysis. Descriptive statistics and frequency analysis were made using the Data Analysis Pack in Excel. Qualitative thematic coding of the narrative in both the survey and interview took place in NVivo 10.

Validity & Reliability of Results

Due to the small sample size in the interview as well as the way the overall sampling was conducted, the results from the pilot study cannot be generalized to the rest of the LIS student population. The results are specific only to the population participating in the pilot project. The survey questions were reviewed prior to going live by three practicing librarians and one colleague. The survey and interview questions were modified based on their feedback to improve the clarity of the questions.

Assessment of Results Quality

There is some concern about the quality of certain results in the pilot project. These concerns are addressed in the findings section that follows, as the quality issues are specific to certain survey questions.

Findings

The project research questions will serve as a framework for summarizing the results of the pilot study versus giving a detailed analysis of each question in the questionnaires. The results are presented as a cursory summary of the results from the survey and interview questions. A discussion section follows for each question in which the author explores the findings as they relate to the research question.

Demographics

Survey

44 females, 6 males, and 2 identifying as "other." Median age is 29, mode 23, minimum age 22, maximum age 55. Race and ethnicity were not collected.

Interview

11 females, 1 male. Median age is 32.5, mode 35, minimum age 23, maximum age 58. Race and ethnicity were not collected.

Health Topics

Regarding the first research question ("What health information topics do library and information science students seek when they search online?"), survey results show that the top 5 health topics are:

1. *Specific disease or medical condition (94%)*
2. *A certain medical treatment or procedure (71%)*
3. *Exercise or fitness (67%)*
4. *A particular doctor, clinic, or hospital (54%)*

5. *Depression, anxiety, stress, or mental health issues (50%)*

Qualitative analysis of the interview responses identified additional topics of interest not covered in the survey questionnaire.

- *General medical or health information including definitions and terms*
- *Symptoms*
- *Alternative medicine*
- *Home remedies*

These results are consistent with the results of previous researchers with the one difference being the higher rate of seeking information for depression and mental health issues. This could be a construct specific to this student population.

Finding Online Health Information

The second research question, ("How do students find online health information?"), the survey shows that LIS students begin their search at a:

- *Search engine (75%)*
- *Specific site like WebMD (52%)*
- *General site like Wikipedia (14%)*
- *Social media site like Facebook (12%)*
- *Journal database (10%)*
- *Online health encyclopedia/reference source (4%)*

The interviews revealed that respondents search using keywords or medical terms, follow breadcrumbs, and follow recommendations from friends on social media sites. There is a variety of Websites identified as sources for health information:

- Commercial sites
 - WebMD and You Tube were the most frequently mentioned in the interview.
 - Government sites such as the CDC, Medline Plus and NIH
- Medical association sites like the Mayo Clinic or American Cancer Society
- University sites that end in .edu
- Blogs

LIS students begin their search for online information much like any other person, the majority start at a search engine. Google was the only search engine mentioned in the interviews. You Tube is mentioned as being used primarily as a source for exercise videos.

Some respondents begin their search for health information at a specific site like WebMD, CDC, or the Mayo Clinic Websites. Another 14% begin at a general information site like Wikipedia, and even smaller percentages of respondents reporting using Facebook as a

starting point for health information. Some of the respondents will start at a subscription database like the Web of Science or access a digital health reference book online for health information.

Application of Online Health Information

Concerning the third research question, ("What do they do with Online Health Information?"), the survey finds the motivations for searching online for health information are for the following reasons:

- Personal health concerns (47.6%)
- Healthy life style (28.2%)
- Family or Friend (21.4%)
- Curiosity & research (2.9%)

Interview data indicates people also search online because it is convenient as well as providing a sense of privacy and confidentiality they do not get from seeing a medical provider. Respondents also indicate many are in the process of making a medical related decision and are seeking either general medical knowledge or specific medical information. Other respondents indicated that searching online for health information saves them money. They can make cost comparisons of medical products and services. A few respondents indicated they search for online health information because they have work or class assignments that require health related information.

In regard to using subscription databases or digital reference books for online health information, respondents stated they would do so when they needed to look up definitions or where needing comprehensive or quality knowledge about a specific health or medical issue. One respondent said they would use these sources only if referenced elsewhere as being a quality source of medical information specific to their need. Another respondent said they were highly unlikely to ever to use a subscription journal database or a digital medical reference book. One respondent indicated that using an online digital medical reference book would be his last choice of looking for health information.

Being able to access online health information is having an effect, 76.9% of the respondents indicated that having access to online health information has an impact on how they manage their health. Respondents are using online health information to make decisions about their own health care or the care of someone else. In addition, 63% of the respondents indicated they have had a conversation with their health care provider about the health information they found online. This value is higher than what has been previously reported by Escoffery et al., (2005, p. 185) in their study of the HISB of college students.

Making Credibility Judgments

The final research question, ("What attributes of health-related Web pages do Library and Information Science students use when making credibility judgments about this information?"), examines specific characteristics of Web pages and asks the respondents to rate how these characteristics contribute to the credibility of the information on the page.

Survey, respondents were first asked to rate the general reliability of online health information. The mean score of the reliability rating is 4.6, and most respondents gave online health information a rating of 5 out of 7, with 1 being "much less reliable" and 7 being "much more reliable." In the interview, the respondents tell a different story. The respondents indicated they are aware that there is a fair amount of misleading health information online. The majority of the respondents said the quality of online health information is dependent on the source of the information and most respondents indicated they are highly skeptical of the health information they find online. Less than half of the respondents indicated that online health information is reliable. Two recommended methods for measuring the quality of online health information is to check the source of the information and its currency. Survey respondents reported the following responses when asked about checking sources and currency:

Frequency of Checking Sources

- Always (46.2%)
- Most of the Time (28.9%)
- Sometimes (15.4%)
- Hardly (3.9%)
- Never (3.8%)
- Don't Know (1.9%)

Frequency of Checking Health Information Currency

- Sometime (35.6%)
- Most of the Time (28.8%)
- Always (15.4%)
- Hardly Ever (15.4%)
- Never (5.8%)

These results indicate that more than half of all respondents do not consistently check the source of the information, and almost 85% do not consistently check for currency. Sadly, these numbers are higher than what has been previously reported by the 2006 Pew Internet Health Survey (Fox, 2006, p. iii). It appears that the majority of LIS students are not paying attention to information source and currency when they seek out online health information.

To directly examine the final research question, the survey also polled for which attributes of a health information Webpage did LIS students use to make credibility judgments

about the information on that page. The mean credibility rating on a 7-point scale (1 "much less believable" to 7 "much more believable") of the top 5 attributes that influenced positive credibility judgments are:

Question	Text	Mean
Q3	Contains content that differs from your opinion	6.4
Q6.	Authors credentials for each article are listed	6.3
Q1.	By an organization that is well respected	6.1
Q9.	Site has a commercial purpose	6.1
Q13.	Domain is rarely updated	5.4
Q14.	Domain ends in .edu	5.4

The top 5 attributes that contribute to a negative credibility rating are:

Question	Text	Mean
Q18.	Design is arranged in a way that makes sense to you	1.4
Q16.	One or more ads on each page	1.5
Q17.	Typographical errors are present	1.8
Q21.	It is hard to distinguish ads from content	2.0
Q20.	Domain ends in .org	2.6

These questions come from survey question 11. The author questions the validity of questions Q1, Q13, and Q18. Either the questions were misunderstood, the Likert scale was confusing, or they are bad questions and should be thrown out. The author does not trust the answers. A previous study (Fogg, B. J. et al., 2002), indicated very different values for these questions. In short, a well designed Web site is generally perceived to have higher credibility, fewer site updates and content differing from a users opinion lower credibility. However, the results do indicate that author' credentials, the presence of advertising, typographical errors, and the source of the information do influence credibility judgments.

One interesting note from the survey has to do with the mean value of questions 12 and 7 in survey question 11. They both have a mean value of 4.9.

- Q12 Provides comprehensive information that is unattributed to any source

- Q7 Provides comprehensive information that is attributed to a specific source

These questions suggest that the presence or absence of source attribution for online health information has the same impact on credibility judgments; furthermore, the absence of source attribution has a positive impact on credibility judgments. The author is somewhat suspect of the validity of these two questions, especially question 12. They should be rewritten and or tested with a larger sample.

In the interview, respondents indicated that the source of the health information is the most important feature for judging the credibility of online health information. The majority of the interview respondents said they confirm the credibility of online health information by checking additional sources for confirmation. These sources could be other Websites or from the comment sections of Websites and commentary on social media feeds. The respondents also indicated that the soundness of the information plays an important part in their assessment of credibility. Another factor that affects credibility positively is that the information comes from a respected health organization. A professional site design also contributes to a positive credibility judgment. Factors that contribute negatively to credibility include difficult navigation, an amateur site design, and advertisements. The aesthetics of a Website do affect credibility judgments, but several of the respondents replied with highly subjective replies. They said it either "greatly", "hugely" or by "quite a bit" impacted credibility.

Recommendations for further research

Before implementing a full study of the HISB of LIS students, the questionable survey questions need to be addressed. I recommend conducting another pilot study with an adjusted set of instruments reflecting the changes. I also recommend fielding the instrument questions to other experts in social research for their commentary to improve the quality of data gathered. The full study should also include an analysis of education backgrounds and if they impact HISB. Not enough respondents were present in either the survey or interview to permit a reliable analysis of the relationship between education and HISB. NVivo 10 provides a rich set of tools to examine relationships and this should be leveraged in the full study through the establishment of rich case nodes. The full study should use both qualitative and quantitative techniques as employed in the pilot project. The full study should be designed to randomly sample the LIS student population at multiple academic institutions. In addition, an incentive should be offered to entice students to participate in the full study to improve the response rate.

Timetable

Suggested here is a sample timeline for continuing further research into the online HISB of LIS students. It starts with soliciting feedback on the questionable survey questions.

Time Frame	Task
0 – 1 month	Solicit feedback from experts on survey questions
2 Weeks	Implement recommendations on survey question(s) design
1 Week	Design survey in Google Forms for second pilot study
2 Weeks	Determine second pilot study sample pool
2 Weeks	Go live with second pilot study
2 Weeks	Analyze second pilot study data
2 Weeks	Report pilot study results
1 Week	Does second pilot study support continuing of research? If yes, continue with time line. If no, consider options needed to continue research.
1 - 3 Months	Decide on full study sample pool
1 - 3 Months	Pick sample frame
2 Weeks	Develop full study survey and interview in Google Forms
2 Weeks	Go live with full study survey
2 Weeks	Go live with interviews
2 Months	Analyze survey and Interview results
1 Month	Collect additional interview data if needed
1 Month	Continue data analysis
4 Months	Write up results and submit for publication

Conclusion

Overall, the pilot project did answer the main research questions. There is some question about the validity and reliability of certain questions and these issues need to be examined in greater detail before implementing a larger study. But, the results of the pilot project indicate the LIS students in this study know where and how to look for credible health information and, they are using online health information to make decisions about how they take care of themselves and or the care of others. The LIS students in this study are aware that the Internet contains dubious or misinformation and these students know how to assess the credibility of online health information. Their actual practice of assessing the primary indicators of quality online health information is another matter, and their negligence in consistently checking the source and currency of health information is outside the scope of this project. The results simply reflect the reality of situation whereby there is a flood of information online and other issues are probably in play that contributes to this negligence. Lastly, women dominate the LIS field. The author is at odds on how and if to sample the field to include more males in future studies. Any constructed random sampling technique would have to be implemented separately on each gender pool to correct the imbalance. The author questions the validity of correcting for the gender bias through sampling techniques when gender imbalance is a reality in the sample population. The author does not have an answer to the question at this time.

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Appendices A – Survey Questions

In this survey, ONLINE refers to any online resource, those found on the open web and in subscription databases.

1. How often do you look ONLINE for health information?

Daily Weekly Monthly A few times a year Don't Know N/A

2. What are your motivations when you look ONLINE for health information?

Personal health concern
Health concern of a friend of family member
Health life style
N/A
Other

3. In the last 12 months, when you went ONLINE for health information ... Where did you begin looking?

A search engine such as Bing, Google or Yahoo
A site that specializes in health information, like WebMD
A more general site like Wikipedia, that contains information on all kinds of topics
A social networking site like Facebook or Twitter
Journal articles
A medical or health encyclopedia/reference source
Other

4. Overall, about how many Websites did you visit the last time you got health information ONLINE?

One
Two to three
Four to five
Six to Ten
11 to 20
More than 20
Don't Know
N/A

5. Have you ever talked to a medical professional about the health information you found ONLINE?

Yes
No
Don't know

6. Did the health information you found IN YOUR LAST SEARCH ONLINE have a MAJOR impact on your own health care or the way you care for someone else, a MINOR impact, or no impact at all?

Major impact
Minor impact
No impact at all
Don't know
N/A

7. Have you ever looked for information ONLINE about certain health or medical issues. Specifically, have you ever looked online for information about ...

[7.1] A specific disease or medical problem
[7.2] A certain medical treatment or procedure
[7.3] Experimental treatments or medicines
[7.4] Diet, nutrition, vitamins, or nutritional supplements

- [7.5] Exercise or fitness
- [7.6] Prescription or over the counter drugs
- [7.7] Immunizations or vaccinations
- [7.8] How to quit smoking
- [7.9] Problems with drugs or alcohol
- [7.10] Depression, anxiety, stress, or mental health issues
- [7.11] Sexual health
- [7.12] A particular doctor, clinic or hospital
- [7.13] Health insurance
- [7.14] Dental health
- [7.15] Other

8. How reliable would you rate the health information you find ONLINE?

1 2 3 4 5 6 7

8a. Do you have any comments about the reliability of ONLINE health information?

9. How often do you look to see who provides the information on the health Web sites you visit?

- Always
- Most of the time
- Only sometimes
- Hardly ever
- Never
- Don't know
- N/A

10. How often do you look to see when the health information on a health Web site was last updated or reviewed by a medical professional?

- Always
- Most of the time
- Only sometimes
- Hardly ever
- Never
- Don't know
- N/A

11. Imagine you are looking at a health Website. How would the following characteristics of the Website impact your perception of the CREDIBILITY of the health information on the site?

Please select a value from 1 (Much less believable) to 7 (Much more believable) for each row

- [11.1] By an organization that is well respected
- [11.2] Gives a contact email address
- [11.3] Contains content that differs from your opinion
- [11.4] Looks professionally designed
- [11.5] Navigating the site is difficult
- [11.6] Author's credentials for each article are listed
- [11.7] Provides comprehensive information that is attributed to a specific source
- [11.8] It appears on the first page of search engine results
- [11.9] Site has a commercial purpose
- [11.10] Citations and references are present
- [11.11] Domain ends in .gov
- [11.12] Provides comprehensive information that is unattributed to any source
- [11.13] The site is rarely updated

- [11.14] Domain ends in .edu
- [11.15] Automatically pops up new windows with ads
- [11.16] One or more ads on each page
- [11.17] Typographical errors are present
- [11.18] Design is arranged in a way that makes sense to you
- [11.19] Represents a non-profit organization
- [11.20] Domain ends in .org
- [11.21] It is hard to distinguish ads from content

12. What is your age in years?

13. What is your gender?

Female Male Other

14. What is your undergraduate degree(s)?

15. If you have any other degrees or qualifications please list them below

16. Do you have any questions, concerns, or comments about this survey?

Appendices B. Interview Questions

1. How often do you look for health information ONLINE?
2. When you seek health information ONLINE, which kind(s) of health information are you looking for?
3. What are your reasons for looking ONLINE for health information?
4. What Websites do you routinely use to find health information?
5. Because the Internet and the Web have made it relatively easy to find health information ONLINE, what affect has this had on your own healthcare or the care you provide to someone else?
6. Please describe the process of how you search for and find health information ONLINE.
7. How would you describe the reliability of ONLINE health information?
8. What criteria do you use to judge the credibility of online health information?
9. How does the design or aesthetics of a Website impact your perception of the credibility of the health information on that site?
10. What would be your motivations, needs, or reasons for consulting a journal article through a database such as Google Scholar or PubMed for health information?
11. What would be your motivations, needs, or reasons for consulting an ONLINE medical/health encyclopedia or medical/health reference book for health information?
12. Please enter your age in years
13. What is your gender?
Female Male Other
14. What is your educational background and qualifications?
15. Do you have any comments, concerns, or questions about this interview?

Appendices C. Interview Codebook

Interview Code Book	
Name	Description
Ads	<i>Advertisements on the website that provides health information</i>
Advocacy	<i>Able to advocate for the health care of someone else</i>
Aesthetics	<i>How the website looks, design and functionality</i>
Alternative Medicine	<i>Alternative medicines</i>
Amateur Look	<i>Site looks poorly designed.</i>
American Cancer Society	<i>Cancer.org The American Cancer Society Website as a source of health information</i>
American Heart Association	<i>References to the American Heart Association as a source of health information</i>
Assignment	<i>For a class project or assignment</i>
Assignment	<i>School or work assignment</i>
Autonomy	<i>Making informed decisions</i>
Awareness of Misleading Information	<i>Seeker is aware and wary of misleading information sites</i>
Babycenter.com	<i>the babycenter.com website</i>
Blogs	<i>Any mention of blogs for health information</i>
Bread Crumbs	<i>Following related links, friends suggestions, recommendations for health information</i>
CDC.gov	<i>Centers for disease control website</i>
Clean & Easy to Read	<i>Site is clean and easy to navigate and read and use</i>
Clinic or Provider Information	<i>Information about a specific clinic or provider</i>
Comments Content	<i>Quality and presence of a comments section and the tone and quality of the comments</i>
Commercial	<i>Commercial health related websites</i>
Comprehensive Knowledge	<i>For learning in-depth knowledge about a medical or health related topic</i>
Control	<i>People feel they have more control of how they take care of them self</i>
Convenience	<i>Any mention of ease of use or time savings or easy access to online health information</i>
Cost Savings	<i>Saving money. Researching health info online so one can avoid medical expenses</i>
Credentials	<i>The credentials of the source impact the perception of credibility of the health information on the site. This can be the author or source.</i>
Crowd-Sourcing	<i>Using crowd-sourcing to verify health information. If the same information is found to be endorse by actual people elsewhere it is considered valid. Such as commentary in several social media feeds or on comment section in other websites. Includes confirmation by Doctors, Nurses and other medical professionals in conversation, email etc.</i>
Curiosity	<i>For the sake of enjoyment or fun etc.</i>
Curiosity	<i>Searching for health information just because</i>
Currency of Information	<i>Checking the date of the information. Is it outdated? References to the site being updated</i>
Daily	<i>Coding of any occurrence of the word day in the this question</i>
Database	
Decision Making	<i>To decide if one should see a Dr.</i>
Doctors Association	<i>Site is endorsed by a medical association</i>
Domain ends in .gov or .org or .edu	<i>These domains are considered trustworthy</i>
Ease of Use	<i>Specific Mentions of Ease of Use and Easy to Access</i>
Ease Worry and Anxiety	<i>Able to reduce worry and anxiety of health or medical issues/concerns</i>
Easily Accessible Search Box	<i>Site has an easy accessible search box</i>
Easy to use	<i>Respondent said source is easy to use or access</i>

Education	<i>Any comment about using the Internet for increasing ones understanding of some health topic, matter or issue. This also includes for work or school.</i>
Empowered	
Exercise	<i>Topics related to exercise</i>
Experimental Medicine	<i>Experimental or research medical procedures</i>
Facebook	<i>Using face book as a source of medical information</i>
Fact Checking	<i>Using other sites to confirm the information on the primary site</i>
Family member	<i>Searching for health information for a family, friend, loved one, child, husband etc.</i>
Family or Friend	<i>Seeking health information for a family or friend</i>
Fitsugar	<i>Any mention of the health trend called Fitsugar</i>
Follow Favorites	<i>Following links marked as favorites in a web based information source like a browser or social media interface</i>
Follow Friends Recommendations	<i>Following the recommendations from friends in a social media interface</i>
General Knowledge	<i>Searching for health information to gain more knowledge about a topic without necessarily having an affliction</i>
General Product Sites	<i>non specific sites with medical or health information pertaining to health and medical products</i>
General Topic Knowledge	<i>Using source to gather additional information about a health or medical topic</i>
Google	<i>Google.com the search engine</i>
Google	<i>Many seekers use Google and simply use this as a surrogate for finding health information. They click on whatever relevant websites are retrieved from their keywords</i>
Government Websites	<i>Any .gov health related website</i>
Greatist.com	<i>The greatist.com website</i>
Greatly	<i>References to words like greatly</i>
Hard to Navigate	<i>Site is difficult to navigate</i>
Health Insurance Information	<i>Any mention of health insurance</i>
HealthPartners.com	<i>The Health Partners Website</i>
Healthy You	<i>Health You Website</i>
Home Remedies	<i>Treatments and procedures done at home</i>
Hugely	<i>References to words like hugely</i>
Information Agrees with Seekers' Opinion	<i>Information agrees with the opinion or prior knowledge of the seeker. The information adds up and does not sound suspicious or dubious</i>
Informed Consumer	<i>Access to online health information makes people feel more informed on health related matters</i>
It Depends	<i>The quality and reliability of health information DEPENDS on the source and context of the need</i>
It depends	<i>Reliability depends on the source</i>
Key Words	<i>entering symptoms or diagnosis or health or medical terms into a search box</i>
Knowledge	<i>For information about definitions and types of medical related issues</i>
Make Better Decisions	<i>Able to make better health related decisions</i>
MayoClinic.org	<i>The Mayo Clinic Website</i>
Medica.com	<i>The medica.com website</i>
Medical Association Sites	<i>Professional endorsed medical and health websites</i>
Medical Treatments	<i>Medical treatments for health conditions</i>
Medline plus	<i>The Medline plus website of NLM www.nlm.nih.gov/medlineplus</i>
Mental Health	<i>Depression, psychology, mental health issues</i>
Monthly	<i>Coding of any mention of Month or Monthly is terms of frequency</i>
Negative Impact	<i>Characteristics that have a negative impact on the perception of the credibility of health information on a Website</i>
Negative Impact	<i>Information overload and anxiety</i>
New Research Insights	<i>To learn about new techniques, treatments, procedures and experimental medicine</i>
NIH.gov	<i>The National Institutes of Health Website</i>
No Impact	<i>Access to Online health information has not had any impact on this persons healthcare or health care decisions</i>
Nutrition	<i>Nutrition, food etc Health Supplements</i>
Past Experience with Site	<i>The seeker has been to the site in the past and found previous visits helpful or truthful etc.</i>

Personal Health Concern	<i>Searching because one has a medical condition and the information relates to that condition</i>
Pleasing Design	<i>Website is visually appealing</i>
Positive Impact	<i>Characteristics that have a positive impact on the perception of credibility of the health information on a website</i>
Presence of Ads	<i>Advertisements impact perceptions of the credibility of health information</i>
Presence of Typographical Errors	<i>Grammar and spelling errors on the source</i>
Privacy	<i>Searching because one can do so in the privacy of their home as well as maintaining a sense of confidentiality</i>
Quality Information	<i>If someone wanted to have premium medical information</i>
Quite a bit	<i>References to the statement "quite a bit"</i>
Referenced Elsewhere	<i>Information is backed up by other references or a reference points to this information and the information is relevant to need</i>
References and Links to Other Sources	<i>Source has links to other sources of medical and health information</i>
Relevancy	
Respected Health Organization	<i>Source is well respected or considered an expert</i>
Rxlist.com	<i>he Rxlist.com website</i>
Savvy Consumer	<i>Able to make comparison shopping and manage their health care dollars better</i>
Search Engine	<i>Using a Internet Search Engine to begin finding health information</i>
Serious Medical Concern	<i>Major medical issues or concerns</i>
Site has been Reviewed by Medical Professionals	<i>Site indicates endorsement or review by the medical professional community</i>
Skeptical	<i>Mentioning that someone is skeptical of the quality and reliability of Online Health Information</i>
Skeptical of .com sites	<i>Mentioning a skepticism for .com sites providing health information</i>
Somewhat Reliable	<i>Stating online health information is somewhat or slightly reliable</i>
Soundness of the Information	<i>The health information sounds or seems correct. It does not seem suspect.</i>
Source Credibility	
Source Funding	<i>Seeker is concerned about how source funding impacts the credibility of the information on the site/source</i>
Specific Disease or Medical Condition	<i>Information about a specific disease or medical condition</i>
Start at a Specific Website	<i>Starting a HI search by going to a specific website and seeking out health information including Facebook</i>
Subjective Labels	<i>Words used to describe how the aesthetics affect credibility perceptions</i>
Subscription Database	<i>Accessing health information through a subscription database like web of science etc.</i>
Symptoms	<i>Any mention of disease or medical condition symptoms</i>
Terminology	<i>Using source to understand definitions and terminology</i>
Timely	<i>Mentions of time savings in using online health information</i>
Trusted Source	<i>The source is from a respected organization, has been used in the past and found reliable or is considered an expert on the topic matter</i>
Trustworthy	<i>General statements that describe online health information as being trustworthy</i>
Unable to find Topic information elsewhere	<i>Would only use source if they could not find information elsewhere</i>
University Sites (.edu)	<i>University sites that have a domain ending in .edu</i>
Unlikely to Use Journals	<i>Unlikely to use this kind of resource</i>
Unlikely to use this reference	<i>Respondent said they would not use this reference</i>
Very Reliable	<i>Stating online health information is highly reliable</i>
Web of Science	<i>Accessing webofscience provided by the Thomson Reuters Website</i>
WebMD.com	<i>The WebMD website</i>
Websites	<i>What websites do people use when they search for health information?</i>
Weekly	<i>Some unit of frequency mentioning "week"</i>
Wikipedia	<i>Mentioning that users find Wikipedia to be reliable for health information</i>

Wikipedia	<i>Mentions Wikipedia for Health Information</i>
Work Related	<i>Searching for health information is part of this persons job</i>
Yearly	<i>Frequency unit of years</i>
YouTube	<i>Any mention of the You Tube website for health information</i>

Appendices D. – Pilot Project Demographics

Figure D1

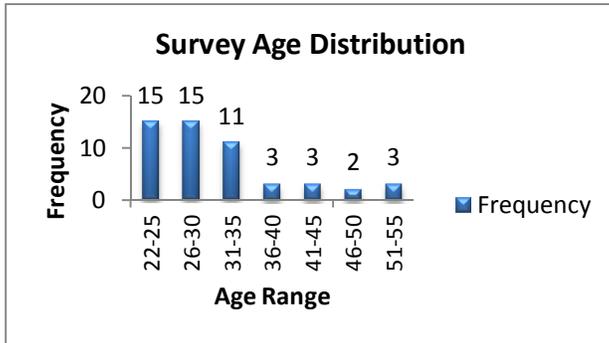
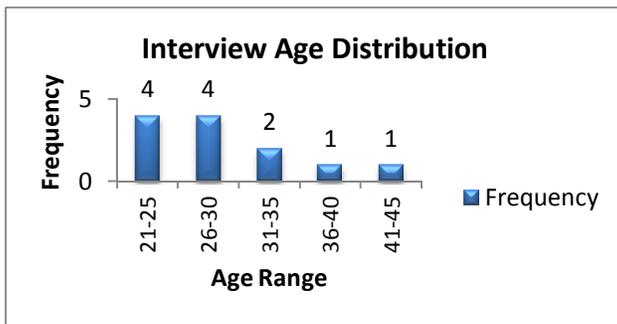


Figure D2



Appendices E. Pilot Study Gender Distribution

Figure E1

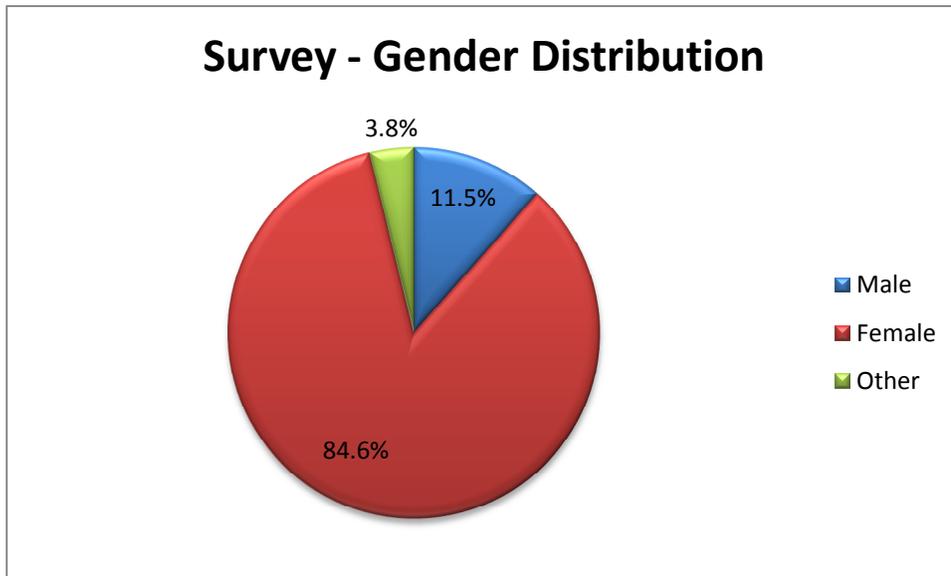
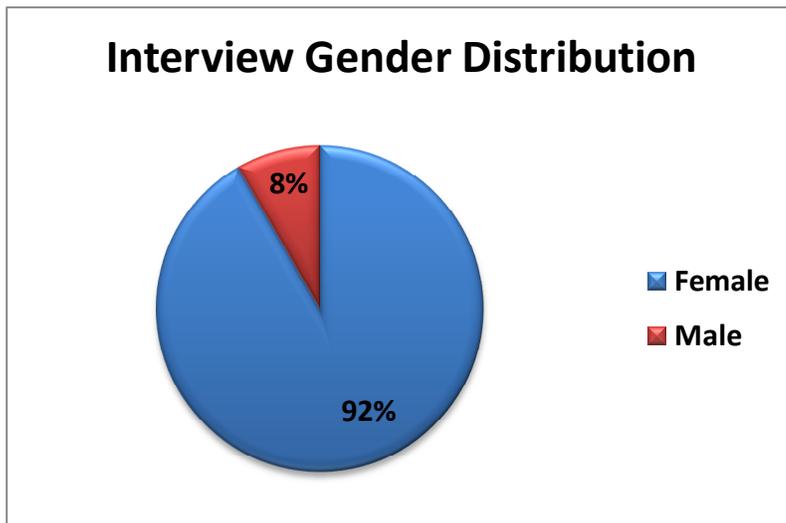


Figure E2



Appendices F. Survey Question 11.

