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Previous literature on Web credibility has shied away from controversial topics because of the unique challenges they present. This paper seeks to examine how students evaluate online sources about abortion, and how they categorize those sources as pro-choice, pro-life, or neutral. By asking students to evaluate the bias of sources, this study identifies some of the characteristics by which students judge partiality in online information, and what role their own biases play in that assessment. In this study, participants identified expertise and association with an organization to be important criteria for assessing credibility. They found neutral Web pages to be most credible overall, while pro-life pages were least credible. These results are complicated by the fact that participants considered their personal opinions to play a role in evaluation, and because of the small sample size of pages and participants.

Headings:

Abortion -- Internet resources.

Use studies -- Internet.

Web sites -- Evaluation.

ASSESSING CREDIBILITY IN ONLINE ABORTION INFORMATION

by
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Introduction

As the number and variety of documents on the Web continues to increase exponentially, the need to examine how information seekers evaluate resources grows greater. The very nature of the Web, with its variety of publishing venues, has forced information seekers to question the very qualities of accuracy, truthfulness, and trustworthiness that became established throughout the long history of print publishing. Documents on the Web may not face the same scrutiny and review processes as academic discourse in print. Also, it can be harder to identify characteristics like source and author, which previously distinguished a credible document in print from a less credible one. Still, the Web makes a vast amount of information accessible from reliable sources. In this study, I examine the criteria university students use to evaluate whether or not a Web source is credible.

Literature from the fields of library and information science and communications has illuminated some of the criteria that people use to determine Web credibility. Previous research has often shied away from controversial topics, as Web sources that discuss contentious issues may present unique problems. In my experience, I have noticed that abortion information may be represented online in biased ways. The topic of abortion continues to divide people in political and social discourse, and is a highly contested issue in the online world as well. Sites that discuss abortion may attempt to provide information that is religious, medical, political, or legal in nature, and may attempt to convey various messages to different audiences. For individuals who research

and study abortion, the differences between pro-life, pro-choice, and neutral Web sources may be obvious, but it is possible that others, who may not be as well versed in the terminology or images commonly used by different content creators, may not be able to readily identify the perspective of a source.

Research questions

In my study, I will address the following questions:

- What criteria do people use to evaluate the credibility of online abortion information?
- What criteria do people use to classify a Web source as pro-choice, pro-life, or neutral?
- To what extent do people's preexisting opinions about an issue affect their assessments of credibility and bias?

Literature Review

Introduction

In the past few years, the need for research about credibility of Web sources has become a topic of great interest. While early research speculated that the deregulated publishing environment of the Web might lead to lessened credibility of all Web resources, it has become clear that information seeking (both scholarly and general) is well on its way to occurring primarily online. Within the fields of communications and library and information science (along with other fields such as psychology), much has

been written about evaluating credibility, and in recent years, specifically about credibility of Web sources.

Foundations of Web credibility

Wathen and Burkell (2002) compiled a literature review of research that examines the factors responsible for influencing perceptions of credibility on the Web. They discuss the importance of credibility as a filter that users employ to deal with potential overload of information. The researchers synthesize the gamut of Web credibility research, and suggest that the credibility of a piece of information is made up of three parts: source, message, and receiver (Wathen & Burkell, 2002, p. 135). They also provide a special section about online health information, emphasizing the need for greater research on credibility of health information on the Web. They cite the results of multiple researchers to suggest that one of the most disadvantageous aspects of the Internet is its capacity to widely distribute inaccurate medical information (Wathen & Burkell, 2002, p. 139).

Wathen and Burkell (2002) also looked at literature on credibility from various fields. Researchers from the fields of communications and journalism have a vested interest in evaluating how people identify credibility, as they work with documents that are intended to be authoritative and unbiased sources. Coming from a mass communications background, Johnson and Kaye (1998) performed a study comparing perceptions of credibility of print information to perceived credibility of online information. Their study focused on “issue-oriented” publications, having participants examine newspapers, news magazines, candidate literature, and other issue-oriented sources. Particularly relevant was their discussion of candidate information, as people

often search for candidate views on hot topic issues (such as abortion) when formulating opinions and making decisions about who to vote for. However, their findings suggest that of the different sources, users find candidate literature the least trustworthy (both online and in print, although to a lesser extent online). Overall, the results suggest that while users are skeptical of political information as a rule, they viewed online information as more credible than print. Additionally, the researchers concluded that the source of the material affected credibility to a larger extent than the medium through which it was portrayed (Johnson & Kaye, 1998, p. 335).

Exemplary of Wathen and Burkell's (2002) summary of credibility as source, message, and receiver, Greer's (2003) study examined how source and advertising affect perceptions of information credibility in online news stories. The findings suggest that source cues were very important in participants' credibility assessments (i.e., participants identified stories from the *New York Times* as credible), whereas advertising cues were largely unimportant, perhaps because they were ignored. Greer speculates that perhaps all cues besides the source were ignored, although that hypothesis does not seem to hold up in later research. I am inclined to suggest that Greer's research was limited because it looked only at news stories, about which individuals already have a great deal of assumptions due to their long-standing prominence in print publication.

Other studies look more closely at how the Web is fundamentally different from print publishing. Burbules (2001) writes about the unique problems posed due to the nature of the Web, stating, "how to differentiate credible from fraudulent information is not a new problem, but unraveling these in the context of a vast rapidly changing networked system is" (Burbules, 2001, p. 442). He outlines some of the key conditions

which make the context of the Web more challenging, namely the sheer volume of deregulated content, the self-sustaining nature of Web references, and the fast rate of growth and dispersion (Burbules, 2001, pp. 442-443). The last condition proves particularly relevant, as the risk that inaccurate information about abortion will be published and widely dispersed while redactions go unnoticed is both likely and problematic.

Tseng and Fogg (1999) wrote a seminal piece on credibility and computers that provided a foundation for future Web credibility research. Coming at their research with the aim to enhance credibility of computer products, Tseng and Fogg (1999) attempted to define when credibility might be applicable to human-computer interactions by laying out seven specific categories of situations. Particularly resonant is the first category, that is, “when computers act as knowledge repositories” (Tseng & Fogg, 1999, p. 40). The idea of a knowledge repository aptly describes the Web, which is basically a collection of information-rich documents.

Tseng and Fogg (1999) argued for the definition of credibility as “believability,” a brief and literal conceptualization with which they are frequently credited in later work. Also widely utilized by other researchers are the researchers’ four types of credibility: presumed (preexisting assumptions of the perceiver), reputed (third party endorsements), surface (appearance upon simple inspections), and experienced (first hand expertise) (Tseng & Fogg, 1999, pp. 41-42). Building on their work, Liu (2003) suggests two additions to Tseng and Fogg’s (1999) types of source credibility: verifiable credibility, meaning that documents that are referenced and contain references are considered more

credible, and cost-effort credibility, meaning that documents that cost money are considered more credible (Liu, 2003, p. 1036).

Fogg et al. (2001) later completed a large-scale study (n=1,410) on user evaluations of Web credibility. In the literature review, the researchers provide a useful summary of the two key components of credibility, namely trustworthiness and expertise. Trustworthiness is associated with the terms “well intentioned,” “truthful,” and “unbiased,” and expertise is associated with “knowledgeable,” “experienced,” and “competent” (Fogg et al., 2001, p. 62). I anticipate that the notion of trustworthiness will play an important role in evaluating online information about abortion, which lends itself to bias even while maintaining good intentions.

Quality and authority

In one of their earlier pieces, Rieh and Belkin (1998) began to establish the framework for studying Web credibility that they would continue to employ in studies to come. They examined scholars’ information seeking habits in order to assess credibility judgments, which they evaluated through the lenses of information quality and cognitive authority. Information quality is aligned with attributes such as accuracy, currency, reliability, and validity, while cognitive authority suggests authority of a text as a result of the author, publisher, document type, or context of text (Rieh & Belkin, 1998, pp. 280-281). Taking the field of information retrieval in a new direction, they began to suggest that retrieval results might be evaluated not just based on relevance, but on quality and authority. In fact, their study revealed that users were already using these criteria to assess information credibility.

In their 2000 study, Rieh and Belkin continued their work, this time collecting data by observing scholars' actual search behaviors, rather than by asking for retrospective accounts of information seeking. While their conceptual framework was very similar, the difference in method actually changes the study significantly. Rather than examining how people think they look at information, the researchers actually watched their actions and recorded their thoughts in real time, thus eliminating the potential forgetfulness or revision that may occur with recollection. Also notable in this study is the observation of two kinds of judgments in information seeking. The researchers observed that people made predictive judgments about what they expected to happen upon visiting a page, and later evaluative judgment about preferences on the page itself (Rieh & Belkin, 2000, pp. 29-30). By examining evaluations made in both of these stages of judgment, the researchers were able to study participants' conceptions of information quality more completely.

Rieh (2002) performed another study with these updated frameworks, again looking at how scholars judge information quality and cognitive authority in online information seeking. The findings suggest further implications of quality and authority, including that earlier models did not represent the diverse facets of the terms, that searchers differentiate between characteristics of information objects and characteristics of sources, and that interaction context and search result ranking factor into quality judgments (Rieh, 2002, p. 157). Furthermore, while suggesting future research, Rieh (2002) identifies that limiting the participants of research to scholars has not provided representative analysis of searchers at large.

Future directions and new populations

While much of the existing literature focused on scholars' information needs, Liu (2003) extended research to focus on student's perceptions of scholarly information. While scholars themselves were assumed to be better prepared to discern facets of credibility within scholarly work, students must also engage with Web-based information to do coursework and research, and Liu emphasizes that their credibility assessments are thus just as important (Liu, 2003, p. 1028). Liu applies existing research to a new perspective, seeking to study how students make credibility judgments and what factors affect their perception of credibility of online scholarly information.

Rieh and Hilligoss (2008) later followed this trend by extending their research on credibility judgments of scholarly information to college students. In their conclusions, they state, "our study findings imply that young people, or at least college students, may not be as naïve in assessing credibility in digital media as some prior work suggests" (Rieh & Hilligoss, 2008, p. 64). Indeed, students were able to evaluate information using some of the well-formed notions employed by scholars, and were aware of when to seek help with identifying authoritative sources. Furthermore, the participants reported engaging in a wide variety of information seeking behaviors, suggesting their awareness that the Internet is not necessarily the ultimate source in every situation. While most had been online for almost their entire lives, they were still aware of credibility issues associated with digital media, and had innovative strategies for dealing with them.

Hilligoss and Rieh (2008) later advocated for a more unifying framework for credibility assessment, taking into account the different media and contexts employed in information seeking. By instructing students to keep diaries of their information

activities, Hilligoss and Rieh (2008) hoped to collect detailed data that appeared within the context of an original information seeking event, complete with information need, resources used, process, plans, and goals. In analyzing their data, the researchers observed that credibility assessment could be divided into three levels, which the authors consider one of the most significant findings of their research. The three levels are construct, which refers to the more traditional abstract notions of credibility (among them truthfulness, trustworthiness, and objectivity), heuristics, which refers to general guidelines for determining credibility, and context, which refers to credibility cues from the source and medium themselves (Hilligoss & Rieh, 2008, p. 1473). Notably, Hilligoss and Rieh (2008) include believability as just one part of the construct facet of credibility, thus rejecting Tseng and Fogg's notion that the two are synonymous. The researchers imply their disregard of that simplified definition earlier in the text, too, when they suggest that "there is as yet no clear definition of credibility" (Hilligoss & Rieh, 2008, p. 1468).

Burbules (2001) extends the notion of information credibility to encompass ethical decisions that are indicators of a person's values. Burbules suggests that judgment of information cannot so easily be divorced from Tseng and Fogg (1999)'s notion of presumptive credibility. That is, Burbules suggests that when a user makes a judgment about information, they are also judging what they interpret as the values of that information, as well as their own values about an issue. Burbules argues that the Web enables searchers to more easily find information to confirm their already existing beliefs than information to challenge them (Burbules, 2001, p. 443). Moreover, actively participating online creates credibility; as we move around the Web, our choices to go to

certain sites rather than others affect analytics and search rankings. When even seemingly factual information (like the boiling point of radium, which Burbules uses as an example), can differ from site to site, it does seem plausible that some would just be content to keep their current values and never seek other perspectives (Burbules, 2001, p. 451). And when the content or intent of the information is different, Burbules continues:

for information with a stronger social or political dimension, it is clear that variations in empirical claims will be inevitably wrapped up with social or political values or assumptions, and where these claims conflict, as they inevitably will in a vast, networked, information environment, how could normative values and commitments *not* be a factor in deciding what/who will be believed? (p. 452)

This has particular resonance for the study of abortion information, which is subject to change based on a range of social and political values. In this way, as Burbules (2001) suggests, information credibility may take on an ethical dimension.

Applications for this study

It was interesting to note that while earlier research about credibility focused on scholars' perceptions, I found that later studies looked more at students. In my study, I intend to focus on university students, because as Hilligoss and Rieh (2008) point out, the lives of students "involve a wide variety of information seeking activities across work, school, and personal pursuits" (Hilligoss & Rieh, 2008, p. 1471). Understanding how students look at a politicized issue will help researchers gain better understanding of how abortion is portrayed in online information, and what effects those portrayals have on participants in American culture and political discourse. While the controversial nature of this issue may render my results somewhat different from previous literature, I hope to provide some insight about how young people establish trust in sources that may prove

important to their lives. Burbules (2001) described credibility as “tied together with the epistemic problem of how information becomes knowledge” (Burbules, 2001, p. 448).

While research on credibility continues to examine students’ assessment criteria for various types of information, researchers have devoted little attention to Web documents about controversial topics. Issues that incite strong opinions may present unique challenges to information evaluation, as online sources will likely reflect those opinions. In this study, I focus on abortion as a much-debated topic, in the hopes that my work will illuminate some of the implications for credibility assessment that may arise when considering online information about a contentious issue.

Abortion issues have a complicated history on the Web. Title 18 of the criminal and penal code of the United States government includes a section on importation or transportation of obscene matters which states:

Whoever brings into the United States, or any place subject to the jurisdiction thereof, or knowingly uses any express company or other common carrier or interactive computer service...any drug, medicine, article, or thing designed, adapted, or intended for producing abortion, or for any indecent or immoral use...Shall be fined under this title or imprisoned not more than five years, or both, for the first such offense and shall be fined under this title or imprisoned not more than ten years, or both, for each such offense thereafter. (Crimes and Criminal Procedure, 2007)

This legislation suggests that users of “interactive computer service[s]” may be subject to legal ramifications for purveying certain types of abortion-related information. While no major legal issues have arisen as a result of this particular chapter, this legislation demonstrates the contentious position of abortion information online.

In another example, in September 2008 Google amended its policies to begin including ads for religious organizations under the keyword “abortion” (Heussner, 2008). This action forever altered the search engine’s results for the controversial topic. As the

status of abortion information online continues to change, it will likely be on the minds of researchers and university students. Understanding more about students' criteria for evaluating abortion information will provide information professionals with valuable data about how credibility assessment operates differently when the topic under scrutiny is controversial.

Method

I conducted my research using an experimental study, which consisted of evaluation tasks measured by questionnaires, followed by an interview. By combining qualitative and quantitative methods, I hoped to closely examine how participants classify and evaluate information on surface and in-depth levels.

Definitions and measures

As suggested in the literature review, the concept of credibility is multi-faceted, and potentially confusing. For the purposes of this study, rather than asking participants to evaluate Web pages using the terminology of "credibility," I have provided a measurement instrument based on the Stanford Guidelines for Web Credibility (Fogg, 2002). Established by three years of research in the Stanford Persuasive Technology Lab, these guidelines include aspects of credibility established in the literature, namely accuracy, association with an organization, expertise, honesty and trustworthiness, ease of contact, professionalism, usability, recent updates, limited promotional content, and absence of errors (Fogg, 2002). In this way, I hoped to make a more holistic assessment of participants' perceptions of credibility without using terms that may be unclear to them.

Continuing to look at definitions, in the debate surrounding abortion, even the names used to refer to opinion groups become controversial. Supporters and opponents of legal abortion use certain terms to refer to themselves, and their own set of terms to refer to the opposing side. For this reason, my choice of words to ask participants about their personal affiliations may have been a point of contention. Previous researchers within the field of library and information science have delineated between advocates and opponents of legal abortion by using the names by which these groups self-identify: “pro-life” and “pro-choice” (Quinn, 1996; Veeh, 2007). I have attempted to eliminate confusion by following their example and using those widely accepted terms. When asking participants how they identify themselves, I included those options, as well as undecided or neutral, and also a text field for them to elaborate if they consider their viewpoint to fall outside those boundaries (demographic questionnaire appears in Appendix C).

Sampling

My sample was drawn from students at the School of Information and Library Science (SILS) at the University of North Carolina – Chapel Hill (UNC-CH). These students are experienced Web users, and offer expert insight into the evaluation of information. In order to recruit participants, I sent emails to the undergraduate and graduate listservs at SILS (Appendix A). I chose to emphasize the study’s focus on abortion information in my recruitment email, in order to better avoid recruiting participants who may be sensitive about the topic. As incentive for participation, I offered to enter participants’ names in a drawing to win a \$25 gift certificate to the UNC-CH

campus coffee shop. Within one week, ten interested parties responded, and were recruited as a convenience sample.

Pages were also sampled using a convenience method. I examined the Web resources sections of one large website from each perspective, looking at the sites for the National Abortion Federation (pro-choice), Pro-Life America (pro-life), and the US National Library of Medicine and National Institutes of Health project MedlinePlus (neutral). I then selected pages that were short enough to be examined within a few minutes, picking eight from each perspective (page titles appear in Appendix D). By selecting pages that were vetted by established organizations from each perspective, I hoped to ensure that each page would have some level of credibility. When considering pages, the only exclusion criterion I employed was related to the length of the page. I did not take into account any other aspect of the content. I examined the pages in the order they were presented on the referring site, and finished viewing them when I had selected eight acceptable pages from each perspective.

Procedures

The experiments themselves took place during March of 2009. Each experiment was conducted in a private research lab on the campus of UNC-CH, or similarly private environment. Participants used the Mozilla Firefox browser. The study was conducted with one participant at a time.

Before the participant entered the lab I saved each of the selected pages as a bookmark in the browser. I created a legend of pages (see Appendix D) and assigned a page ID number to each. I randomly sorted the list using a tool on the random.org website, to eliminate any grouping that may have resulted from my manual entry of the

pages into the legend. Then I created a set of randomly sorted bookmarks for each participant, so that participants would not view pages in the same order. Within the browser's bookmarks folder, I created folders named "pro-life," "pro-choice," and "neutral," where I would later ask participants to place a page after viewing and evaluating it. I had confidence that this would not pose difficulty to the participants, as previous research suggests that skilled Internet users are familiar with browsers' bookmarking functions (Joho & Jose, 2008). After each participant completed the study, the browser bookmarks were deleted and replaced with a new set of bookmarks for the next participant.

When the participant entered the lab, I first had them read an information sheet to inform them of the nature of the study, to ensure their agreement with the potentially sensitive participant materials, and to assure them of the anonymity of their data both for this study and in the future (Appendix B). This information sheet served in lieu of a signed consent form, in order to limit identifiable data. I attempted to make special effort to make participants feel comfortable, even in the potentially unfamiliar lab setting, as having their questionnaire and interview responses recorded may make some participants feel ill at ease. After reviewing the information sheet and assuring that the participant had no questions, I explained to the participant the bookmarking system.

I told each participant that they could view each page for an unlimited amount of time, although if they wanted the study to take under 60 minutes they should average around 2 minutes per page. Participants took anywhere from 45 to 100 minutes to complete the study. After viewing each page, I had the participant fill out a twelve-item paper questionnaire (shown in Figure 1) about the credibility of the page. The

questionnaire attempted to document their assessment of credibility using the Stanford Guidelines for Web Credibility (Fogg, 2002). I adapted their ten guidelines for boosting a Web page's credibility into a ten-item Likert-type scale, and added questions to address assessments of the overall quality of a page, and the subject's level of confidence with their assessment. I elected to use paper questionnaires so that participants could look at a page and simultaneously complete their assessment, and so that they could take notes on the page that might be used during the interview portion.

Figure 1.
Credibility assessment instrument

Please indicate your agreement/disagreement with the following statements by marking the appropriate box.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
It is easy to verify the accuracy of information on this page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is an organization associated with this page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are experts quoted or referenced on this page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I believe that the creators of this page are honest and trustworthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is easy to contact the people responsible for this page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This page looks professional.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This page is easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content on this page has been updated recently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This page has limited advertising or other promotional content.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are limited spelling, grammar, or other types of errors on this page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall, I would describe this page as a quality resource.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this page to a friend who was searching for information about this topic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

After participants viewed and assessed all pages, I asked them a few questions about the credibility assessment criteria, any additional criteria they used, and the conditions that led them to designate a page as pro-life, pro-choice, or neutral. Participants were allowed to refer back to pages during the interview. After completing

the interview, I had participants fill out a brief questionnaire to determine demographic and personal opinion information (Appendix C). The last step was to offer participants a chance to win the \$25 gift card. I collected email addresses on paper forms, entered them into an Excel workbook, and randomly selected gift card recipients.

Results

Data analysis

I entered all data from the credibility assessment instruments into an Excel spreadsheet, and imported that data into SPSS to perform statistical analysis. I then analyzed recordings of the interviews, noting themes and marking salient quotations until saturation was reached. Last, I created a report of demographic information using Qualtrics software.

Respondent demographics

Of the 10 participants, 6 were women and 4 were men. Ages ranged from 23 to 45. Eight participants identified themselves as pro-choice, while one responded that, “it depends.” The participant who did not respond later identified as pro-choice in the interview portion of the study. Due to the consistency of participant perspectives, the pro-choice perspective was a constant in my data analysis, rather than a variable.

Designation of sites as pro-life, pro-choice, or neutral

I first considered how participants classified pages as pro-life, pro-choice, or neutral, as compared to how the pages were originally classified based on the source from which they were sampled. If participants had very different ideas about the perspectives

of each page, it would have been necessary to perform data analysis based on both the original classification and theirs. However, as demonstrated in Table 1 and Figure 2, I found that study participants classified pages similarly to the way I originally classified them. The most common difference between the original assessment and that of the participants was to put a page originally classified as pro-choice into the neutral category. Rarely did participants place pages I classified as pro-life in the neutral category. This suggests that content on the pro-choice pages may have appeared to the participants to be more neutral than content on the pro-life pages.

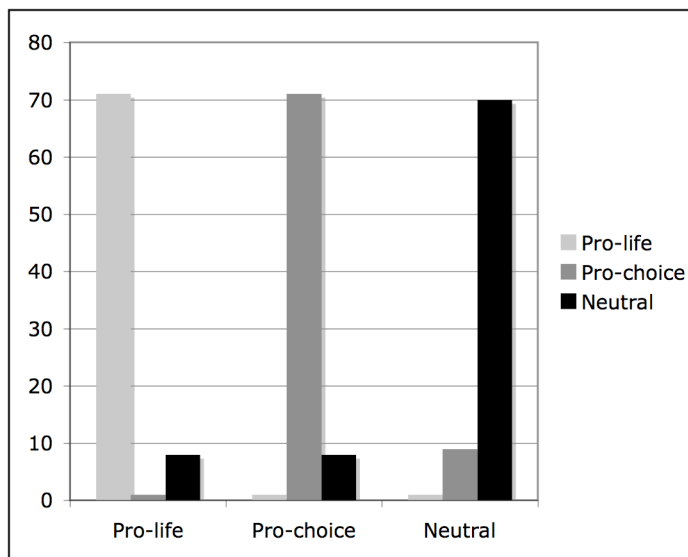
Table 1.

Researcher classifications compared to participant classifications

Participant classification	Researcher classification			
		Pro-life	Pro-choice	Neutral
	Pro-life	71	1	1
	Pro-choice	1	71	9
	Neutral	8	8	70
	Total	80	80	80
	Total	80	80	240

Figure 2.

Comparison of researcher and participant classifications



Credibility assessment statistics

Participant evaluations of pages were consistent from one participant to another. These results are illustrated graphically in Figure 3. Overall, the pro-life pages received lower evaluations than pro-choice or neutral pages. Neutral pages received the highest overall evaluations. All of the pages, regardless of perspective, received the highest evaluations on the associated organization criterion. Pro-life pages received the lowest evaluations on the recommendation criterion, while pro-choice pages received the lowest marks in the experts quoted criterion. Neutral pages were given lowest evaluations for the updated recently criterion.

Figure 3.

Comparison of average page evaluations for each criterion

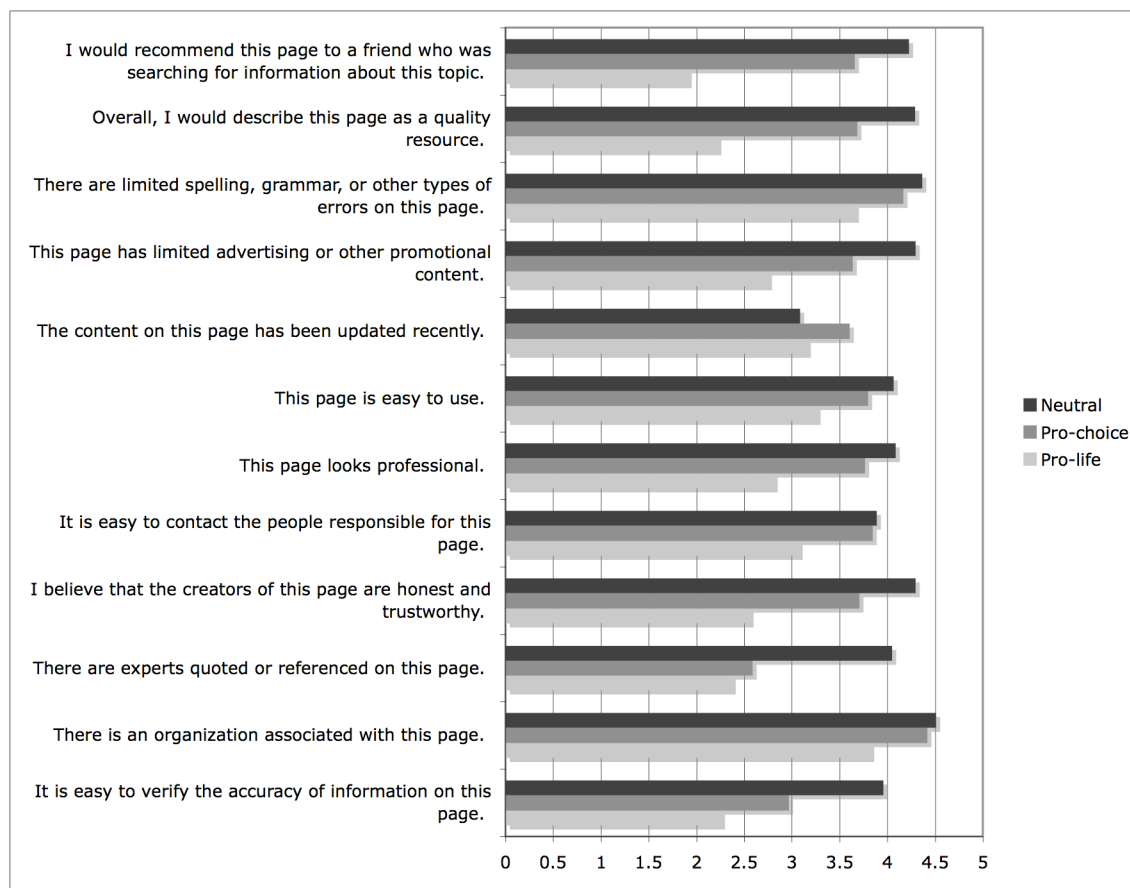


Table 2 illustrates the means and standard deviations of evaluations for each of the criteria. In this table, 1 is the lowest possible assessment (Strongly Disagree) while 5 is the highest (Strongly Agree). As seen in Table 2, the standard deviation from the mean for any given criterion was always less than 1.5, suggesting that assessments exhibited little variance. Standard deviation was smallest on the honesty and trustworthiness criterion for the pro-choice pages, and highest on the limited errors criterion for the pro-life pages.

Table 2.*Credibility assessment averages, standard deviations, and F values*

Criteria	Pro-life	Pro-choice	Neutral	Total	F value
It is easy to verify the accuracy of information on this page.	2.25 (.74)	2.96 (.88)	3.95 (.84)	3.05 (1.08)	86.53* [^]
There is an organization associated with this page.	3.81 (1.05)	4.41 (.77)	4.50 (.60)	4.24 (.88)	16.43* [^]
There are experts quoted or referenced on this page.	2.36 (.88)	2.58 (.93)	4.04 (1.02)	2.99 (1.20)	74.75* [^]
I believe that the creators of this page are honest and trustworthy.	2.55 (.81)	3.70 (.58)	4.29 (.60)	3.52 (.99)	138.42* [^]
It is easy to contact the people responsible for this page.	3.06 (1.19)	3.84 (.97)	3.88 (.99)	3.59 (1.12)	15.08* [†]
This page looks professional.	2.80 (1.07)	3.76 (1.09)	4.08 (.69)	3.54 (1.12)	37.68* [†]
This page is easy to use.	3.25 (1.00)	3.79 (1.04)	4.06 (.72)	3.70 (.99)	15.79* [^]
The content on this page has been updated recently.	3.15 (.94)	3.60 (.95)	3.08 (1.22)	3.28 (1.07)	5.90* [^]
This page has limited advertising or other promotional content.	2.74 (1.31)	3.63 (1.09)	4.29 (.68)	3.55 (1.23)	43.26* [†]
There are limited spelling, grammar, or other types of errors on this page.	3.65 (.89)	4.16 (.63)	4.36 (.56)	4.06 (.76)	21.78* [^]
Overall, I would describe this page as a quality resource.	2.21 (.87)	3.68 (.76)	4.28 (.75)	3.39 (1.17)	143.32* [^]
I would recommend this page to a friend who was searching for information about this topic.	1.90 (.92)	3.65 (.75)	4.22 (.78)	3.26 (1.28)	174.48* [^]

(* p < .01) (^ df = 2, 239) († df = 2, 238)

Table 2 also contains statistical test results. A one-way analysis of variance (ANOVA) was performed to evaluate the relationship between the participants' average evaluations of pages and each criterion of the credibility assessment. The independent variable (the perspective of the page) included three levels: pro-life, pro-choice, and neutral. The dependent variable was the average score each page received for each of the assessment criteria. As evidenced in Table 2, the ANOVA for each of the criteria was statistically significant, as the p value for each criterion was always less than .01. The F

value was highest for the recommendation criterion, and lowest for the recently updated content criterion.

I then performed a post-hoc Scheffe's test to examine the differences in means illustrated in the ANOVA test results. Table 3 shows these results. In this table, perspectives have been ranked according to average assessment, with PL representing pro-life, PC representing pro-choice, and N representing neutral. If the difference between two perspectives was not statistically significant, they were grouped together.

Table 3.
Post-hoc test results

It is easy to verify the accuracy of information on this page.	PL<PC<N
There is an organization associated with this page.	PL<PC, N
There are experts quoted or referenced on this page.	PL, PC<N
I believe that the creators of this page are honest and trustworthy.	PL<PC<N
It is easy to contact the people responsible for this page.	PL<PC, N
This page looks professional.	PL<PC, N
This page is easy to use.	PL<PC, N
The content on this page has been updated recently.	PL, PC<N
This page has limited advertising or other promotional content.	PL<PC<N
There are limited spelling, grammar, or other types of errors on this page.	PL<PC, N
Overall, I would describe this page as a quality resource.	PL<PC<N
I would recommend this page to a friend who was searching for information about this topic.	PL<PC<N

(PL = pro-life, PC = pro-choice, N = neutral)

In the cases of the experts quoted and recently updated content criteria, the pro-life and pro-choice pages were ranked similarly, while neutral pages were ranked significantly higher. For the accuracy, honest and trustworthy, promotional content, overall quality, and recommendation criteria, pro-life pages were ranked lowest, pro-choice pages were ranked in the middle, and neutral pages were ranked highest. For the associated organization, contact, professionalism, ease of use, and limited errors criteria,

pro-life pages were ranked lower, while pro-choice and neutral pages were ranked similarly.

Qualitative data results

After analyzing recorded interviews, I identified five major trends in participant responses:

Expertise and affiliation with an organization are important indicators of credibility. When I asked participants which criterion on the assessment they found most important, most either mentioned explicitly the criteria about experts quoted and organization associated, or eventually implied similar criteria as they elaborated on their assessments. In particular, participants mentioned that they considered information more credible if it came from an organization they were already familiar with, like the National Library of Medicine or Planned Parenthood. This result is particularly interesting because this criterion was also the one that received the highest overall ratings for pages from each perspective.

Design affects credibility. I would consider this assessment to be related to the professionalism criterion of the assessment instrument, but it was interesting to note that even if participants did not explicitly refer to that criterion, they described it as they elaborated on their assessments. Participants stated that they found sites less credible when they looked “unattractive” or “trashy.” One participant related this assessment to the criterion about content being updated recently, stating that outdated design can make a page look as unreliable as outdated textual content.

Language demonstrates perspective. Several participants pointed out that it was easiest to identify the perspective of the page when the name of the organization or the

page header had the words pro-life or pro-choice in it. Additionally, participants identified trends in the words that pages used to discuss abortion, noting that pro-life pages more often used terms that pertained to killing and murder. For instance, one participant noted the difference between the phrases “death of the fetus” on a pro-life page, versus “remove the contents of the uterus” on a neutral page.

A context for information seeking is necessary for assessing credibility. The consensus among participants was that information evaluation is difficult when it is unclear why you may be viewing that information in the first place. Several participants mentioned the Priests for Life page as a source that they did not consider helpful to them personally, but which may be useful to other priests. Participants implied that an information-seeking context complicated the assessment criterion that asked whether or not they would recommend the page to a friend searching for “information about this topic.”

Personal opinions affect assessment. Every participant except for one mentioned that they thought their own opinions affected their assessments of credibility. Several participants disclosed their pro-choice identification to me during the interview portion, and several stated that they reacted more favorably to pro-choice sites as they completed the assessments. One participant said s/he struggled with differentiating thoughts like, “I don’t think that information is correct” from “That information is definitely not correct.” The participant who did not notice personal bias coming in to play stated that s/he was consciously avoiding relying on past experiences and opinions because of the context of the research study.

Study Limitations

As with any experiment, there are a number of threats to validity that may occur. Considering Campbell and Stanley's (1963) and Cook and Campbell's (1979) sources of internal invalidity, my research poses a few potential problems (cited in Babbie, 2007, p. 230). For instance, in keeping with the threat those researchers referred to as "History," internal validity may have been affected by current events at the time of the study. The newly-elected U.S. President recently made significant changes to legislation related to abortion. As such, individuals may have had particularly passionate views about the issue at the time of my study.

Another threat to validity was the lab setting, which may have felt artificial to participants and impeded them from acting the way they would if they were in a real information evaluation context. However, the lab setting also benefited reliability, as each participant performed evaluation tasks under similar circumstances.

Validity may have been challenged by my study instrument. While the Stanford Guidelines for Web Credibility are effective criteria, they may not have allowed participants to communicate their assessments comprehensively. In particular, as suggested by the interview data, the guidelines do not allow for the context of information seeking that may prove important when evaluating online information. Because of this limitation, the qualitative data portion proved to be an important forum to allow participants to elaborate on their assessments using criteria not specified on the instrument.

Social desirability bias may have affected participants' responses in my study. Participants may have formulated their responses in the interview portion in order to please the researcher, or to say what they thought would be most appropriate. This may have been especially prevalent in this study because abortion is such a controversial topic, and participants may have been wary of saying anything that may appear too inflammatory.

As in any study, sample size was a limitation in my study. My sample of participants was small, and as such my results may not be applicable to a larger population. Notably, my sample was drawn from library and information science students, who may evaluate information differently than other Web users. My small sample size of students within a common academic program may have accounted in part for my consistent results.

Another weakness arises because of the somewhat subjective nature of my page sampling strategy. While I strove to formulate a sample with similar and equal pages from each category, my own biases may have unconsciously come into play in my selections. Also, my small sample size does not come close to the number of pages about this type of information that are available, thus making it difficult to apply these results to the entire Web.

Conclusion

Web publishing provides the means for fast and easy dissemination of information, and as such necessitates new models of evaluation. Controversial topics must be examined with additional scrutiny because they tend to divide people and invoke

strong opinions. Abortion is one such controversial topic, and I hoped to examine the criteria that students use to identify credibility and bias in relevant Web documents.

In this study, I asked participants to evaluate online information related to abortion issues. I had participants evaluate a set of Web pages that discussed abortion and related issues using a twelve-item credibility scale, and group them according to their perceived perspective. I then enriched study data by allowing participants to expound upon their decisions in a brief interview. Last, I asked for information about the participants' own perspectives, in an attempt to examine whether or not their own opinions may have affected their evaluations.

I found that most of my participants valued association with an organization to be a particularly important indicator of credibility, especially if it was an organization with which they were familiar. Overall, they considered neutral pages to be most credible, while pro-life pages were least credible. This may have been related to their own affiliations around the issue, as all participants identified as pro-choice, and most suggested that their own opinions may have influenced their credibility assessments.

My study results suggest that personal opinions may affect credibility assessment to some extent, even with experienced information evaluators. As such, personal bias must be taken into account when considering credibility, especially in the case of controversial topics that inspire strong opinions. My results also reiterate the usefulness of the Stanford Guidelines for Web Credibility, as they suggest that credibility may be increased by making affiliation with organizations and experts prominent, by updating content and design frequently, and by remaining mindful of language used on a page.

Future research should solicit participants from various perspectives, to examine whether people's affiliations as pro-life or neutral may affect their assessments of this type of information in different ways. Future studies would also benefit from a focus on undergraduate students, as abortion and other similar policy issues are popular topics for undergraduates completing research projects. Other types of inexperienced researchers should also be studied, as their evaluations will differ greatly from graduate students studying information and library science. Another important area of inquiry is how students search for this type of information, rather than how they evaluate assigned pages. Last, I hope that this research will prove helpful to researchers exploring online information about other controversial topics.

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Appendix A: Recruitment email

Subject: Invitation to participate in a study of university students

Study title: University students' perceptions of online abortion information

Primary Investigator: Caitlin Shanley (cshanley@unc.edu)

Research Advisor: Dr. Diane Kelly (dianek@email.unc.edu)

Completed as part of a master's project with the UNC School of Information and Library Science

Please consider taking part in a research study about credibility assessment of online abortion information. The study will take about an hour, in which you will be asked to evaluate the credibility of several Web pages and then be interviewed about your decision-making. Specifically, you will be asked to evaluate pages on the Web that are related to abortion. If you find this topic upsetting, then you may not want to participate in this study.

After completing the study, you will have an opportunity to submit your email address to be included in a random drawing to win a \$25 gift card to the Daily Grind.

If you are interested, please reply to cshanley@unc.edu and we will set up a time to meet. Thank you!

Appendix B: Information sheet

University of North Carolina – Chapel Hill Information about a Research Study

IRB Study # 09-0243

Information Sheet Version Date: 2/27/2009

Title of Study: University students' assessment of online abortion information

Principal Investigator: Caitlin Shanley (cshanley@unc.edu, 828.280.5162)

UNC-Chapel Hill Department: School of Information and Library Science

Faculty Advisor: Dr. Diane Kelly (dianek@email.unc.edu, 919.962.8065)

What are some general things you should know?

You are being asked to take part in a research study. The study is voluntary, and you may refuse to join, or withdraw your consent to be in the study, for any reason, without penalty.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this information form. You should ask the researcher named above any questions you have about this study at any time.

What is the purpose of this particular study?

This study is designed to examine the criteria that university students use when they evaluate information on the Web that discusses the subject of abortion.

How many people will participate?

If you decide to participate, you will be one of approximately 10 people in this research study.

How long will your part in this study last?

The study will take less than one hour. If you feel uncomfortable, you can choose to stop at any time.

What will happen if you take part in the study?

First, I will provide you with a set of web pages from various perspectives. After you spend some time reviewing each page, you will evaluate it using a twelve-item questionnaire. Then, when you have completed all questionnaires, I will ask you some further questions about your decision-making. Last, you will complete a short demographic survey.

What are the possible benefits from being in this study?

While you may not benefit directly from this study, please know that you will be a part of research that may benefit the field of library and information science.

What are the possible risks or discomforts involved from being in this study?

It is not anticipated that you will experience any discomfort or risk from the interview. However, if you find the topic of abortion upsetting, then you may not want to participate in this study.

How will your privacy be protected?

By participating in this study, you are giving the researcher permission to use your data. Representations of that data will be published in a master's paper at SILS, but the paper *will not contain any information that will identify you*. All the information you provide will be used responsibly and will be protected against release to unauthorized persons. Your name and email will only be used to schedule participation and (if you choose) for participation in a random drawing to win a \$25 gift card to the Daily Grind coffee shop. Your name and email will not be associated with any study data and will be deleted as soon as the drawing is completed.

Will it cost you anything to be in this study?

There are no costs for being in the study.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researcher at cshanley@unc.edu, or 828.280.5162. You can also contact the researcher's advisor at the phone number or email address included at the beginning of this form.

What if you have questions about your rights as a research participant?

A committee that works to protect your rights and welfare reviews all research on human volunteers. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919.966.3113 or by email to IRB_subjects@unc.edu.

Thank you for participating!

Appendix C: Demographic questionnaire



Background information

What is your age?

What is your gender?

☐

Female

☐

Male

I would consider myself to be:

pro-life

☐

pro-choice

☐

don't know/neutral

☐

it depends (please proceed to the next question)

☐

If you answered "it depends," please specify in detail what you mean:

Participant ID #:

Appendix D: Page ID and researcher perspective legend

Page ID	Perspective	Page Title
1	pro-life	Pro-Choice Abortion
2	pro-life	Unplanned Pregnancy
3	pro-life	Help for School Report - Abortion
4	pro-life	Pro-Life America
5	pro-choice	Access to Abortion
6	pro-life	Morning After Pill
7	neutral	Abortion: Does it affect subsequent pregnancies?
8	neutral	ACS: Can Having an Abortion Cause or Contribute to Breast Cancer?
9	pro-life	Stand Up Girl
10	pro-choice	Religious Coalition for Reproductive Choice
11	pro-life	Abort73.com/Abortion Unfiltered
12	neutral	Reproductive Health Technologies Project - Abortion
13	neutral	MedlinePlus Medical Encyclopedia: Abortion
14	neutral	Mifeprex (mifepristone) Information
15	neutral	An Overview of Abortion in the U.S.
16	pro-choice	A Heartbreaking Choice
17	pro-choice	NAF: Abortion Myths
18	pro-life	PFL's Strategy to End Abortion
19	pro-choice	Abortion - Planned Parenthood
20	neutral	Family Doctor: Ending Your Pregnancy
21	pro-choice	Recognizing Abortion Providers as Human Rights Defenders
22	pro-choice	Catholics for Choice - Topics/Issues
23	pro-choice	Abortion Rights - Safe and Unsafe Abortion
24	neutral	ACOG Education Pamphlet