Users' Confidence Levels and Strategies for Determining Web Site Veracity

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ABSTRACT
It appears that accuracy judgments for web site veracity are influenced by factors such as levels of perceived expertise as well by degrees of credibility that users associate with web-based information. Therefore, in this pilot study, we investigate the web evaluation strategies of university computer science and education students as they select content appropriate credible and non-credible websites. Their evaluation strategies include relevance judgments and assessment of amount of information, and their characterizations of authors' vested interests appear limited. Self-assessments of competence about evaluating the validity of information were higher for educational psychology than computer science students, although the reverse was true of self-assessments about competence of evaluating the validity of information on the Web.

Keywords: web navigation, strategies, web evaluation, education

1. INTRODUCTION

In their article "Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments," Kruger and Dunning [2] describe the tendencies of people to overestimate their competence, especially in areas where their competence levels are sorely lacking. Interesting, the more "expert" subjects in their experiments tended to underestimate their own competence, partly due to their tendencies to mistakenly inflate the competence levels of their peers.

Although Kruger and Dunning investigated the competence of college students in areas like humor, grammar, and logic, it appears that this overestimation of competence could also play an important role in students' self-estimations of their competence in evaluating content on web sites. This issue becomes particularly interesting when considered in conjunction with students' levels of expertise or experience, both as college students and as initiates into content-specific domains. A number of questions can be raised: How confident are college students about their abilities to judge the accuracy of information on web sites? What reasons are used for selecting web sites? Can students determine vested interests of web site creators? Can they detect inaccuracies?

Clearly, accuracy judgments for web site veracity are influenced by levels of expertise (or perceived expertise) in particular content areas, but also by degrees of credibility that users associate with web-based information. It is

generally accepted that people are aware that web site information can span the whole range of the accuracy-inaccuracy continuum from outright quackery to highly accurate. However, it is clear to teachers and instructors that students can appear uncritical of web based information. Also, teachers frequently assume that it was someone else's responsibility to teach students to adequately assess web-based information [3].

In related research, Iding, Landsman and Nguyen [1] worked with high school biology students on a sequence of instruction in which the students were given instruction on web site evaluation, developed lists of criteria for evaluating scientific web sites and the scientific information contained in them, and evaluated sample web sites. After instruction, they reported that they would take more time to evaluate scientific information on the web. As one student wrote, "A nice looking website does not mean it's credible. There are many more ways of determining if a Website is good enough for use or consideration. My view is that evaluating scientific information is a little more important than I thought" [1, p. 9].

This research demonstrates the need for instructional interventions aimed at increasing students' critical evaluation skills. However, how necessary are these interventions at the university level? In this presentation, university professors in computer science, science education, and educational psychology collaborated to collect pilot data from their students to determine how proficient they would be in determining web site veracity. Below, we describe several themes that emerged during preliminary examination of the pilot data. In the actual poster, we will describe our findings in more detail.

2. METHODS

Participants
    Students in three university classes were participants in the pilot study: an undergraduate educational psychology class, a science methods class, and a computer science class.

Procedure and Materials
    An exercise for the computer science class was developed by the second author and modified for use in the education classes. Students worked in small groups during single class sessions to find web sites related to topics covered in class. For example, in the educational psychology class, the written instructions were "Your task is to find information about the topic that your group has selected for the in-class cooperative teaching project. I want you to find WWW sites related to your group's topic and evaluate their content." Students then selected the most objective and accurate web site about their topic, explained why they selected it, and described what the authors' vested interests were. They also selected web sites that their groups determined to illustrate misrepresentations about their topics, explained why the selected pages exemplified misrepresentations, and speculated about authors' vested interests. They also addressed a general question about how they know when web site content is wrong. Finally, students individually provided self-ratings of their levels of competence about evaluating the validity of information on their topic and about their levels of competence about evaluating the validity of information on the Web in general.

Instructions for the science methods and computer science classes were designed to be content-appropriate, and focused on STS (science technology and society) and cleanroom software engineering, respectively.

3. RESULTS

Educational Psychology
        Preliminary examination of the pilot data for the educational psychology class indicated some interesting findings:

• When asked to explain why they selected a particular web site as the most accurate and objective for their group, reasons included: topic relevance, presence of hyperlinks, amount of information, and organizational and motivational aspects. For example, one group wrote, "Because it looks organized and easy to read. It has lots of definitions, has lots of info." Another group wrote, "The information is new, exciting, useful and educationally appropriate." At this level, the only reference that could be considered related to credibility was a mention of a "university web site on teaching effectiveness."

• When addressing the issue of vested interests, some groups mentioned author interests, for example "for educators to improve teaching." Another group mentioned, "They are commercial." However, one group appeared to be rather unquestioning about vested interests and responded, "none? It's an educational source – ERIC."

• When selecting a web site that exemplified a misrepresentation, two groups mentioned "opinionated" as the reason why this website was selected. One group explained that they did not know who carried out the study that was described and questioned the validity of the study.

• Students described ways that they could tell when a web site's content is wrong. These included lack of resources, bibliography, research, data, notable scientists/researchers. They also mentioned "When it contradicts info you already know," and "You happen to know the correct info." Finally, they mentioned the presence of "stereotypes of cultures."

• Educational psychology students' self-ratings of levels of competence about evaluating the validity of information on group topics on a scale of 1 (no competence) to 5 (complete competence), indicated self-perceptions of reasonably high levels of competence ($\underline{M}$=3.95). In contrast, self-ratings about competence of evaluating the validity of information on the Web generally was lower ($\underline{M}$ = 3.0).

Computer Science
        Preliminary examination of the computer science class results also indicated interesting findings:

• Reasons for selecting particular websites as accurate and objective included amount of information, presence of references, and content organization. One group explained, "it is provided by an educational institution- Carnegie Mellon Software Engineering Institute. We expect that educational institution [sic] would provide the most appropriate information." Another group stated, "It is made by IBM and we figured that since they are such a successful company that they would be a creditable[sic] source."

• Students included a number of ways to tell whether a website's information is wrong, including several mentions of disagreements with other credible information sources.

• Computer science students self-ratings of competence about evaluating the validity of information on group topics were high ($\underline{M}$=3.3), though not as high as the educational psychology students ($\underline{M}$=3.95). In contrast, self-ratings about competence of evaluating the validity of information on the Web was higher for computer science ($\underline{M}$=3.5) than educational psychology students ($\underline{M}$=3).

4. DISCUSSION

These preliminary findings indicate that college students possess an interesting range of competencies with evaluating information on web sites. Although they appear to select objective and accurate web sites according to characteristics like relevance and amount of information, considerations of authors' vested interests seem to be somewhat unfamiliar for many. However, students do seem to be much more critical of web sites that they determine to be obviously representing misconceptions, mentioning factors like questionable authorship, questionable research, and information contrary to general knowledge. Although students' awareness of these factors is promising, it is limited, clearly indicating needs for further instruction at the university level.

In the actual presentation, we compare findings between education and computer science classes, and discuss our outcomes in terms of future research. We are particularly interested in looking at the possible relationships between content expertise and website information veracity judgments. Finally, we believe that dialogue among instructors in various disciplines and at various levels will enrich our understanding of how students determine web site veracity, and how our instruction should optimally facilitate that process.

5. REFERENCES

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