Credibility: Norwegian Students Evaluate Media Studies Web Sites

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Abstract. This paper addresses determination of Web site credibility by comparing Norwegian university students' evaluations of Web site credibility and site authors' vested interests in relationship to earlier credibility studies. Two Web sites were used for this study; a text-based academic site and an informational site with commercial support. Findings confirm that characteristics typically associated with credibility: unbiased, objective, references, and author identification were used to rate the academic site more highly than the informational site, even though the latter was rated more highly in presentation design and currency. Author's vested interests for the informational site were identified as commercial, personal opinion and bias, leading to its lower credibility rating. Additionally, *negative* correlations emerged between academic level and confidence in deciding Web site credibility and in detecting misrepresentations. The association between higher academic levels with less confidence in aspects of credibility determinations is explained in terms of Kruger and Dunning's (1999) previous research.

1 Introduction

Why do people accept or believe information that they read on the World Wide Web? Upon what basis do Web users make determinations that some information is acceptable or believable and some is not? These questions are especially important as students, educators and the general public rely more and more upon Web-based information.

In this paper, we address these questions by comparing our present study using Norwegian graduate students in social science with previous research on determination of Web Site credibility using United States high school, university students and faculty members as well as community college students in Singapore.

To provide background, in an initial study in this area, we examined credibility judgments of university level elementary and secondary pre-service teachers (i.e., teachers in training) and practicing scientists (Klemm, Iding & Speitel, 2001). The focus of this study was on science information sources in general, not specifically on Web-based information. In that study, participants rated a list of 31 information sources on information credibility, including information from the Internet. There were differences between ratings of the pre-service teachers and scientists, with elementary pre-service teachers rating information sources like popular newsmagazines as high in credibility and scientists not rating popular news media highly. Scientists did, however, rate a scientist working on a specific research question very highly, which elementary pre-service teachers did not. There were some areas of corroboration between all three groups, which was encouraging, including providing high ratings for "Resources from a museum, aquarium, or nature center" and "resources from university cooperative extensions (e.g., Sea Grant, Coop. Agriculture, etc."

The study not only pointed out discrepancies between ratings of teachers and scientists, but also indicated the need for education in this area – for students at all levels as well as for teachers. This is particularly important since individual Web users act more and more as arbiters of information credibility, a role that has been the responsibility of editorial boards and referees (Iding, Crosby, Auernheimer, & Klemm, 2005).

1.1 Criteria for Web Site Credibility Evaluation

Several subsequent studies investigated the bases upon which university-level students in the U.S. made determinations of Web site credibility in computer science and education (Crosby, Iding, Auernheimer & Klemm, 2002; Iding, Auernheimer, Crosby, & Klemm, 2002; Iding, Crosby, Auernheimer, & Klemm, 2005). The selection of Web sites was varied by providing sites for participants to rate or by asking them to find Web sites that they determined to be credible as well as Web sites that they determined to exemplify misrepresentations of some sort.

In one study education and computer science university students selected Web sites related to specific content being studied in their classes that they determined to be credible and Web sites that they determined to exemplify misrepresentations (Iding, Auernheimer, Crosby, & Klemm, 2002; Iding, Crosby, Auernheimer, & Klemm, 2005). They described their reasons for selecting specific sites, their judgments of vested interests of Web site authors, and their confidence in their own determinations.

Findings indicated that relevance and amount of information were primary reasons for Web site selection. Other categories of reasons that were described

most frequently included an educational focus, as well as a recognizable, familiar name.

Several themes emerged in response to questions about Web site authors' vested interests associated with credible Web sites. For example, students expressed general trust of educational vested interests and mistrust of commercial ones. For example, when asked about vested interests, one group wrote, "None? It's an educational source – ERIC." Similarly, another group wrote about a different site "It appears that the authors' do not have some alterior[sic] motive behind their presentation, but instead are just trying to educate people on the cleanroom software process."

Clearly, it appeared that most students did *not* associate the term "vested interest" with the possibility of educational, non-commercial motives – such as the possibility of political, ideological or other persuasive motives or agendas. Furthermore, some students appeared to have difficulty with the notion of considering vested interests at all. This indicated a need for further education for students in this area as well as for further research about how Web users construe (or do not consider) Web site authors' vested interests.

Participants also provided self-ratings of confidence in their determinations. Findings indicated that students in different content areas were equally confident about their abilities to evaluate information on the Web in general or to detect misrepresentations associated with Web-based information. However, in this particular experiment, education students were more confident about evaluating information on their group's topic and about detecting misrepresentations on the less credible Web site that they had chosen for the activity, than were computer science students. It would be difficult to determine whether this was due to higher levels of confidence about specific content selected for this exercise, or due to general higher levels of confidence among students in different content areas.

In another study, these notions of credibility and confidence were examined further, in conjunction with expertise (Crosby, Iding, Auernheimer, & Klemm, 2002; Iding, Crosby, Auernheimer, & Klemm, 2005). In this study, participants – computer science students and computer science and education faculty members and graduate students – critically examined 3 Web sites with varying degrees of commercial and educational elements. They rated the Web sites on several dimensions of credibility, including vested interests, and provided reasons for their ratings.

Findings indicated that there were some discrepancies in Web site ratings, with some rating a site as credible and others rating the same site as not credible. Experts rated themselves as more confident of their judgments, although there were not significant differences in the determinations of experts and novices. However, experts in different fields provided different reasons for arriving at their conclusions, a finding that corroborates the work of Stanford, Tauber, Fogg and Marable (2002), in which experts in different fields provided different reasons for credibility determinations.

Derived from these studies (Crosby, et al., 2002; Iding et al., 2002; Iding et al., 2005, Iding et al., 2006) and the work of Fogg et al., (2002), Table 1 presents

examples of some general criteria that may be used to determine Web site credibility.

Table 1. General Credibility Evaluation Criteria

Criteria for Evaluating Web Site Credibility in General	Objective, Accurate*, Relevant, Current, Reputable, Complete, Concise, Clear*, Design/Layout*
Criteria for Evaluating Information in Web Sites	Corroboration (with other/known information) References, Links, Supporting Data, Bias*
Criteria for Evaluating Information Sources	Author Identification, Vested Interest, Bias/Political/Other Agenda

*Indicates categories adapted from Fogg et al. (2002)

Finally, we were also interested in cultural differences in credibility determinations. We carried out a study of Singaporean junior college students' determinations of Web credibility in social studies areas (Iding, Singh, & Crosby, 2005). Findings indicated that participants made determinations about Web site authors' vested interests, at least in part, by information that was left out of Web sites to support different political agendas of Web site authors. Participants commented on ethnic and other kinds of biases exhibited by Web site authors. These findings suggest that cultural and social-political factors may play an important role in credibility determinations, and examining credibility determinations in other cultural contexts should be an important consideration in this emerging line of research.

In summary, the following major points emerged from this line of research:

• Educational levels affect credibility determinations, with those more highly educated in a field (e.g., scientists) particular content rating popular media sources less highly than do less educational preparation in the field.

• Instructional interventions can positively impact high school students' credibility determination processes.

• University-level students have limited understandings of the concept of "vested interests," particularly as it relates to Web site authors' non-commercial/educational interests.

• It appears that cultural and socio-political contexts can affect credibility determinations, a finding that should be explored in further research in other cultural contexts.

In response to these points, particularly the latter, the present study examines the credibility judgments of university students in Norway. Of particular interest are cross-cultural dimensions and determinations of students in different content areas, information science and media studies. A question that guided this research was whether they might have considered credibility aspects of Web site information and vested interests of Web site authors or information sources to a greater extent than students in other fields who may focus less on information sources.

2 Method

2.1 Participants

Participants consisted of 45 students (25 females and 20 males) from a university in Norway. The mean age was 26.27. The students were in the following fields: 27 in information science, 16 in media studies, and 2 in other fields. Fourteen were in B.A. programs, 22 in M.A. programs, and 5 in Ph.D. programs.

2.2 Materials

Materials consisted of a 3-page survey that elicited demographic information, then presented 2 Web sites for rating. The survey was based upon a survey used in previous research (Crosby, Iding, Auernheimer, & Klemm, 2002), and was developed by Singh and Iding (2005).

Participants were provided with two Web sites and were asked to rate them on a number of dimensions related to credibility. The Web sites were related to media studies.

The first Web site focuses on audience studies. A professor in media studies selected this site for our use. It consists of an article written by an academic and published in a refereed on-line journal. The journal is affiliated with a well-known ivy-league university in the United States. The article contains no graphics, but contains links to other articles and journals and to the author's C.V., with a photograph of the author. The faculty member who selected it considered it to be moderately high in credibility.

The second Web site was selected by a graduate student, and is related to film history. It provides a time-line, starting in 1902, and reviews major films in each era. The author's name is listed, but no credentials or other identifying information is provided. The site contains graphics related to film history. The presentation or design aspects of the site appear to be superior to the first site, but this site also contains pop-up advertising unrelated to film history.

Participants were provided with three lists of characteristics upon which they rated each site. The characteristics emerged from our coding of respondents' comments about credibility in previous research and from categories we developed to describe aspects of credibility (e.g., Iding, Crosby, Auernheimer & Klemm, 2005).

The first list contained 10 characteristics (i.e., objective, purposely misleading, accurate, unbiased, up-to-date, reputable, complete, concise, clear, mistaken). Participants used a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to rate each site on those characteristics.

The second list contained 7 more dimensions or characteristics. Participants rated these according to *quality*, on another 5-point Likert scale, ranging from 1 (lowest possible or worst quality) to 5 (highest possible or best quality). This list included: information, corroborates/agrees with other information, references, information/presentation design, links, supporting data, author identification.

The last list was of Web Site authors' possible vested interests, and was derived from vested interests identified in the Iding, Singh, and Crosby (2005) study. Eight possible vested interests were listed, including educational, commercial, personal opinion/agenda, unbiased/objective, bias, patriotic, political agenda, other. Participants rated these on the 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

Finally, at the end of the survey, participants provided self-ratings in response to 5 questions about: confidence in deciding that a Web site's information is accurate or truthful, confidence about detecting misrepresentations on the Web in general, confidence in detecting misrepresentations in the Web sites given in this questionnaire, competence in evaluating the validity of information about the topic in the given Web sites and competence about evaluating the validity of information on the Web in general. Response options ranged from 1 (no confidence/competence) to 5 (complete confidence/competence).

2.3 Procedure

Surveys were distributed in several media studies and information science classes and collected at the end of class, or afterward by the instructors or the author. Surveys were also distributed to graduate students in assigned study cubicles.

3. Results and Discussion

3.1 Participants' Ratings of the Two Web Sites

First, in this particular study, we did not select a Web site for evaluation that was as clearly of high credibility as we did in previous research. Instead we selected a site for evaluation (Web site 1) that clearly combined some elements of high credibility (i.e., an academic journal from a well-known university), but also incorporated some aspects frequently associated with lower credibility (i.e., less appealing design, poor presentation). In work by Fogg, et al. (2002), participants made credibility judgments of Web sites based primarily upon "design look" or aspects of presentation. Since this factor appeared, at least to some extent, to outweigh other characteristics, we wondered if less appealing design look would outweigh other considerations in our participants' ratings.

Secondly, Web site 2, while not of academic origin, and with clear commercial motives not tied directly to content, had a much more appealing design or presentation style. Would this factor outweigh others in participants' determinations of different aspects of credibility? An examination of ratings for the two different Web sites revealed interesting differences (See Table 2). First, Web site 1 was rated more highly on many dimensions commonly associated with credibility, including the following characteristics: objective, references, and author identification. We interpret

these findings cautiously, as examination of mean differences is limited. However, it would appear that participants were taking many other aspects into account besides solely design aspects in making determinations about specific aspects of credibility.

In contrast, Web site 2 was rated more highly on design-related elements, including information/presentation design. Also Web site 2 was rated as slightly more clear. It appears that students regarded aspects of design separately from other aspects of credibility.

Web site 2 was also rated as more up-to-date. Web site 2 appeared to be regularly updated.

Table 2. Means for Credibility Ratings for Web Sites 1 and 2

Characteristic	Academic Site	Nonacademic Site
Objective	3.58	2.86
Purposely Misleading	2.27	2.56
Accurate	3.51	3.27
Related to your Topic	2.69	2.48
Unbiased	3.16	2.74
Up-to-Date	3.07	3.59
Reputable	3.02	2.88
Complete	3.11	3.02
Concise	3.53	3.34
Clear	2.91	3.43
Mistaken	2.27	2.49
Information [quality]	3.53	3.51
Corroboration	3.33	3.36
References	3.7	2.16
Presentation/Design	1.82	3.16
Links	2.93	3.19
Supporting Data	3.0	2.68
Author Identification	3.42	2.57

With respect to vested interests, participants rated the first site as more unbiased/objective. The second was rated as more commercial and was also rated more highly on bias, and personal opinion/agenda.

Table 3. Means for Vested Interest Ratings for Web Sites 1 and 2

Vested Interest	Academic Site	Nonacademic Site
Educational	3.93	3.47
Patriotic	2.58	3.11
Personal Opinion/Agenda	2.91	3.6
Unbiased/Objective	3.33	2.8
Commercial	1.71	3.39
Bias	2.56	3.02
Political Agenda	2.32	2.29
Other	1.5	1.33

3.2 Confidence and Competence Ratings

Participants provided reasonably high self-ratings for the following: confidence in deciding a Web site's information is accurate or truthful (M = 3.47), confidence in detecting misrepresentations on Web sites in general (M = 3.16), and competence in evaluating the validity of information on the Web in general (M = 3.38). These high ratings would be expected of university students.

However, they rated themselves less highly for the following: confidence in detecting misrepresentations in the Web sites given in this questionnaire (M = 2.80), and competence in evaluating the validity of information about the topic in the given Web sites (M = 2.80). It is possible that students were less familiar with topics like audience studies (although this is a topic covered in the media studies curriculum) or students are less likely to associate credibility determinations with content in this area, or in film studies, or film reviews.

3.3 Culture and gender

We wondered if gender differences would emerge in the confidence ratings. One-way ANOVA's were carried out with gender as the independent variable and confidence or competence ratings as the dependent variables. No significant differences emerged between men and women. This finding is not unexpected, as "in the annual UNDP Human Development Reports Norway receives high marks for gender equality, and has for several consecutive years been ranked as the world's leading nation in…gender equality" (Beijing + 10: Norwegian Annual Report, n.d., p. 1).

It would be interesting to compare this result to other cultures, as our work in Singapore provided some preliminary indication that gender differences may exist in some aspects of this research area (Iding, Singh, & Crosby, 2005).

3.4 Correlations

Pearson product-moment correlations were carried out between demographic variables (i.e., gender, age, field of study, academic level) and confidence and competence ratings. Two interesting *negative* correlations emerged between academic level and confidence in deciding a Web site's information is accurate or truthful $r(39) = -.34$ ($p<.05$), and academic level and confidence in detecting misrepresentations in the Web sites given in this questionnaire $r(39) = -.35$ ($p<.05$). Similarly, a negative correlation between academic level and competence in evaluating the validity of information on the Web in general approached significance $r(39) = -.30$ ($p=.057$). These findings indicate that the higher the academic level, the *less* confidence participants have in deciding a Web site's information is accurate, or in detecting misrepresentations in the Web sites given in the questionnaire. Additionally, it suggests that the higher the academic level, the less competence people feel they have in evaluating the validity of information on the Web in general.

This finding does not support results from our previous research (Iding et al., 2005) in which participants with higher levels of expertise (professors and advanced doctoral students in computer science) rated their confidence more highly in judging Web sites about cleanroom software engineering and about rating Web sites in general than did novices. And the finding at first may appear counterintuitive: Why would more highly educated students have *less* competence in their determinations?

It is very likely that these findings can be explained by considering the work of Kruger and Dunning (1999), who found that less knowledgeable people in certain nonacademic areas tended to over-inflate their confidence in areas where they had the least knowledge. In contrast, experts underestimate confidence in areas where they knew most. Kruger and Dunning attributed this to experts' tendencies to over-estimate the knowledge of their peers in contrast to themselves. While this could apply in the present research, our findings could also be explained at least in part by the well-known truism: The more you know, the more you know what you don't know. This may be especially true in evaluating aspects of credibility in Web-based information: The more expertise that students gain, the more they learn to be critical of information on the Web.

4 Summary and conclusion

In examining university students credibility determinations of two Web sites related to media studies, major findings indicated that students differentiated between presentation/design aspects of Web sites and other aspects generally considered to be more central to credibility, such as objectivity and accuracy. This could be considered to be somewhat different from the findings reported by Fogg et al. (2002).

Additionally, we found that the more educated students were (as determined by academic level) the less confidence they had in certain aspects of credibility determinations, such as detecting a Web site's information is true. Although this could appear counterintuitive, it does support the work of Kruger and Dunning (1999) and suggests that the more knowledgeable one is, the more critical one is likely to be as one uses information from the Web.

Finally, although we carried out this study in Norway, we did not find general evidence of cultural differences in comparison to our previous studies in the U.S., nor did we find evidence of any gender differences. However, asking more general open-ended questions might result in comments that would be more indicative of individuals' aspects of understanding and approaches to the process of credibility determinations. This is a recommended goal for future research in this area.

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