

December 2003

Some Determinants of User Perceptions of Information Quality on the World Wide Web

Barbara Klein

University of Michigan-Dearborn

Follow this and additional works at: <http://aisel.aisnet.org/amcis2003>

Recommended Citation

Klein, Barbara, "Some Determinants of User Perceptions of Information Quality on the World Wide Web" (2003). *AMCIS 2003 Proceedings*. 295.

<http://aisel.aisnet.org/amcis2003/295>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2003 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

SOME DETERMINANTS OF USER PERCEPTIONS OF INFORMATION QUALITY ON THE WORLD WIDE WEB

Barbara D. Klein
University of Michigan, Dearborn
bdklein@umd.umich.edu

Abstract

Information quality problems may occur because of the ease with which information can be published on the Internet. The study proposed here examines the effect of a simple training intervention designed to sensitize users to potential problems with the quality of Internet-based information. A survey based on a framework identifying fifteen dimensions of information quality is being administered to 300 students. Preliminary results suggest that training designed to sensitize users to possible information quality problems and to help them assess the quality of Internet-based information has the potential to lead to more favorable perceptions of this information, at least in the case of perceptions of information accessed to perform some specific tasks. The results of the study have the potential to inform the design of training programs aimed at improving users' understanding of the quality of Internet-based information.

Keywords: Information quality, data quality, World Wide Web

Introduction

The Internet has enabled people around the world to access a tremendous amount of information on a plethora of topics. However, because of the ease with which information can be published on the Internet, information quality problems may arise. When information is published on the Internet, quality control processes such as editorial processes and peer review are frequently missing. This can lead to information quality problems (Pack 1999; Hawkins 1999; Fuld 1998). Prescriptive advice for evaluating the quality of information published on the Internet is available (e.g., Alexander and Tate 1999; Hawkins 1999); however, little is known about how this type of advice affects users' perceptions of Internet-based information.

This study examines the effect of a simple training intervention designed to sensitize users to potential problems with the quality of information published on the Internet. The effects of this training on general perceptions of the quality of Internet-based information as well as on the quality of Internet-based information used to complete a specific task are examined. Prior research examining the dimensions of information quality provides the foundation for this study. The remaining sections of the paper (1) discuss the literature on information quality that provides the foundation for the study, (2) discuss the research questions and the methodology of the study, and (3) discuss preliminary results of the research.

Background Literature on Information Quality

Early literature on information quality tended to focus on identifying the dimensions of information quality. From the beginning of this work, information quality was viewed as a multi-dimensional concept. Dimensions of information quality such as accuracy, completeness, consistency, and currency were identified in early taxonomies (e.g., Zmud 1978; Davis and Olson 1985; Huh et al. 1990; Madnick and Wang 1992; Fox et al. 1993; and Wand and Wang 1996).

Wang and Strong (1996) developed a comprehensive taxonomy of the dimensions of information quality through a large-scale study in which users of information were surveyed. The objective of the study was to generate a comprehensive set of attributes

of data and to organize these data attributes into dimensions of information quality. Fifteen dimensions (encompassing 50 data attributes) were found. The dimensions are believability, accuracy, objectivity, reputation, value-added, relevancy, timeliness, completeness, appropriate amount of data, interpretability, ease of understanding, representational consistency, concise representation, accessibility, and access security.

This study uses the Wang and Strong (1996) framework as a tool for measuring users' perceptions of information quality. The framework was selected because (1) it provides a comprehensive look at information quality from the perspective of users of information, (2) it was developed using a well-established methodology that has been used to understand the quality of various products, (3) it provides a validated instrument for assessing information quality, and (4) it has been used successfully in applications aimed at identifying and solving organizational information quality problems.

The Wang and Strong (1996) framework was previously applied to an examination of differences in user perceptions of Internet-based information and information from traditional text sources such as books, journals, magazines, and newspapers. Traditional text sources of information were rated as more accurate and more objective than Internet-based sources of information. Users viewed the reputation of traditional text sources more favorably than Internet-based sources and found traditional text sources to be formatted more consistently. On the other hand, Internet-based sources were rated as more timely and as providing a better amount of information than traditional-text sources (Klein 2001).

Research Questions

The study discussed in this paper examines two research questions.

1. Does training on information quality and the Internet affect users' perceptions of the quality of information available through the Internet?
2. Is there a difference between users' general perceptions of the information quality of Internet-based information and users' perceptions of the information quality of Internet-based information used for a specific task?
3. A set of propositions linked to the fifteen information quality dimensions found by Wang and Strong (1996) is used to address the two research questions.

Research Methodology

A survey based on the Wang and Strong (1996) framework will be administered to a total of 300 undergraduate students. To date, surveys have been administered to 220 students. The remaining data collection is underway. Data will be collected from four groups of students as shown in the research design in Figure 1. Data collection is complete in cells marked with an X. Data collection is currently underway in the cell marked with an O.

	Information Quality Training	No Information Quality Training
General Perceptions	O (Group 1)	X (Group 2)
Task-Specific Perceptions	X (Group 3)	X (Group 4)
X = data collection is complete; O = data collection is underway		

Figure 1. Research Design

The objective of the information quality training administered in this study is to sensitize the students to the possibility of information quality problems with Internet-based information. Students participate in a twenty-minute session in which they use cooperative learning methods to address four questions related to information quality and the Internet. The four questions that are addressed during the training are shown in Figure 2.

- Search tools may find a large number of useless, irrelevant sites. Why?
- The quality of information found using search tools may be poor. Why?
- Web sites may not be maintained and may therefore contain old information. Why?
- How can the quality of information found on the Internet be assessed?

Figure 2. Questions Addressed in the Information Quality Training

A research project on a topic related to telecommunications is completed by students in the task-specific perceptions groups. They are required to use Internet-based information as well as traditional sources of information such as books, journals, and magazines as sources of information for the project.

Students taking MIS courses participated in the study. Because the training intervention was administered during class time, all of the students taking a particular course during a semester were assigned to the same cell of the research design.

The survey on perceptions of information quality asks questions about the extent to which the fifty data attributes identified by Wang and Strong (1996) describe Internet-based information. An example survey item completed by students in Groups 3 and 4 (task-specific perceptions) is shown below.

Data used for the course project from Internet sources were accurate
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Students in Groups 1 and 2 (general perceptions) complete a survey asking about their general perceptions of the quality of Internet-based information. An example survey item completed by these students is shown below.

Data from Internet sources are accurate.
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

All of the students respond to fifty survey items corresponding to the fifty data attributes identified by Wang and Strong (1996).

Preliminary Results

Data from 220 subjects in Group 2 (untrained/general), Group 3 (trained/task-specific) and Group 4 (untrained/task-specific) have been collected. Data collection for subjects in Group 1 (trained/general) is currently underway.

ANOVA models were built to test for differences among the groups. Initial results show that Group 3 (the trained/task-specific group) has more favorable perceptions of information quality than Group 2 (the untrained/general group) for ten out of the fifteen dimensions of information quality (significant at $p < .05$ for nine of the dimensions and $p < .10$ for the tenth dimension). The ten dimensions on which Group 3 has more favorable perceptions are believability, accuracy, objectivity, completeness, reputation, relevancy, timeliness, ease of understanding, representational consistency, and concise representation. This is somewhat contrary to the common belief that trained individuals will be more cynical about the quality of Internet-based information than untrained, naïve individuals. There are no significant differences between the two groups for the other five dimensions of information quality.

There are two possible explanations for the observed differences in the perceptions of Group 3 and Group 2. First, training designed to sensitize users to possible information quality problems and help them assess the quality of Internet-based data may improve perceptions of information quality, perhaps by improving the level of sophistication of user interaction with Internet-based information. Second, perceptions of the quality of Internet-based data on at least some specific topics may be higher than perceptions of the quality of Internet-based data in general.

Table 1 shows the perceptions of users in Groups 2, 3, and 4 for these ten information quality dimensions.

Table 1. Group Differences in Perceptions of Information Quality

	Group 2 (Untrained/ General)	Group 4 (Untrained/ Task-Specific)	Group 3 (Trained/Task- Specific)	Significant - Group 2 versus Group 3?	Significant - Group 2 versus Group 4?	Significant - Group 4 versus Group 3?
Believability	4.3	5.0	5.5	Yes **	Yes **	Yes **
Accuracy	3.5	4.3	4.5	Yes **	Yes **	No
Objectivity	3.5	4.1	4.2	Yes **	Yes **	No
Completeness	4.5	4.8	5.1	Yes **	No	No
Reputation	3.9	4.5	4.7	Yes **	Yes **	No
Relevancy	4.8	4.7	5.2	Yes **	No	Yes **
Timeliness	4.6	4.7	5.1	Yes *	No	No
Ease of Understanding	4.8	4.5	5.2	Yes **	No	Yes **
Representational Consistency	3.8	4.4	4.5	Yes **	Yes **	No
Concise Representation	4.5	4.4	4.8	Yes **	No	Yes **

Notes: All items are measured on a 7-point scale with 7 indicating the most favorable perceptions.
* $p < .10$; ** $p < .05$

Notice, that in general the results for Group 4 (untrained/task-specific) lie between the results for Group 2 (untrained/general) and the results for Group 3 (trained/task-specific).

The preliminary results provide partial answers to the research questions. We can compare the two groups that responded to the task-specific questionnaire (Group 3 and Group 4) to get some insight into the question about the effect of training on perceptions of information quality. The results show that trained users have more favorable ratings on ten of the dimensions of information quality. This comparison shows that the ratings of trained users are higher on all ten dimensions, and that four of these differences are statistically significant. This provides moderate support for the conclusion that information quality training leads to higher ratings of information quality. We can compare the two untrained groups (Group 2 and Group 4) to get some insight into the question about differences between users' general and task-specific perceptions of the information quality of Internet-based information. This comparison shows that the ratings of the task-specific respondents are higher for seven of the dimensions of information quality, and that five of these differences are statistically significant. This provides moderate support for the conclusion that task-specific perceptions are more favorable than general perceptions of the quality of Internet-based information.

Conclusion

Because the data collection effort is incomplete at this point, it is necessary to be very cautious about drawing firm conclusions from the preliminary results discussed above. Nevertheless, the results suggest that training designed to sensitize users to possible information quality problems and to help them assess the quality of Internet-based information has the potential to lead to more favorable perceptions of this information, at least in the case of perceptions of information accessed to perform some specific tasks. The remaining data to be collected in the study and discussed at the conference will examine whether this effect also holds for users' general perceptions of the quality of Internet-based information. Results of the study have the potential to inform the design of training programs aimed at improving users' understanding of the quality of Internet-based information.

References

- Alexander, J.E., and Tate, M.A. *Web Wisdom: How to Evaluate and Create Information Quality on the Web*, Mahwah, NJ: Lawrence Erlbaum Associates, 1999.
- Davis, G.B., and Olson, M.H. *Management Information Systems: Conceptual Foundations, Structure, and Development*, New York, NY: McGraw-Hill Book Company, 1985.

- Fox, C., Levitin, A., and Redman, T. "The Notion of Data and Its Quality Dimensions," *Information Processing & Management* (30), 1993, pp. 9-19.
- Fuld, L.M. "The Danger of Data Slam," *CIO* (11:23), 1998, pp. 28-33.
- Hawkins, D.T. "What is Credible Information?," *Online* (23:5), 1999, pp. 86-89.
- Huh, Y.U., Keller, F.R., Redman, T.C., and Watkins, A.R. "Data Quality," *Information and Software Technology* (32), 1990, pp. 559-565.
- Klein, B.D. "User Perceptions of Data Quality: Internet and Traditional Text Sources," *Journal of Computer Information Systems* (41:4), 2001, pp. 5-15.
- Madnick, S.E., and Wang, R.Y. "Introduction to the TDQM Research Program," Total Data Quality Management Research Program Working Paper #92-01, 1992.
- Pack, T. "Can You Trust Internet Information?," *Link-up* (16:6), 1999, p. 24.
- Wand, Y., and Wang, R.Y. "Anchoring Data Quality Dimensions in Ontological Foundations," *Communications of the ACM* (39:11), 1996, pp. 86-95.
- Wang, R.Y., and Strong, D.M. "Beyond Accuracy: What Data Quality Means to Data Consumers," *Journal of Management Information Systems* (12:4), 1996, pp. 5-34.
- Zmud, R.W. "An Empirical Investigation of the Dimensionality of the Concept of Information," *Decision Sciences* (9), 1978, pp. 187-195.