Web Literacy for Evaluating Credibility of Web Information: Issues and Considerations

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Abstract

Because of a variety of procedures related to design and presentation of web content and structure, there would be a pressing need to consider issues of quality of web information in upcoming years. It is argued, in the current paper, that evaluation issues related to credibility and quality assessments are of high importance in web environment in comparison with traditional information environments. Some evaluation skills like authority, coverage, currency, objectivity, accuracy, critical thinking and information literacy all of which could be categorized as Web Literacy would be fruitful in doing so. There exists, however, lack of evaluation skills among users caused by their cognitive styles, prior knowledge, information skills and of web resources characteristics as well. Some other solutions like dialectical reading, information ethics and also institutional policymaking will also be taken into account at the end of the paper.

Keywords: web information quality, web literacy, evaluation skills, information literacy, critical thinking.

I. INTRODUCTION

As web increases the potential of gathering information in a variety of contexts and environments and in every walks of life, so does the pressing need to critically evaluate information found in it regarding issues like content and presentation. Evaluation criteria of the information online are remarkably different in comparison with ones in traditional formats [1, 2, 3 4].

Credibility of websites is then an important factor users should bear in mind when searching for information [1, 5]. Aesthetics, navigation tools, interface design, content presentation, graphics and animation are some clues users would pay attention in first glance at websites [6]. Scholarly information like health and business information could be found on the web with varying degrees of quality and characteristics [7]. It is users who should choose what and who to believe. Users in academic environments are dominant users of scholarly information required for completing their assignments or developing their research projects [8].

It is apparent in such a situation that users are leaved alone to evaluate information they found from the web with no defined set of criteria or decision support systems. Teaching programs related to critical thinking, credibility evaluation, or information literacy is not considered to be of high importance for policy makers and authorities in academic and non-academic environments [9].

The growth and the fast-changing nature of information resources on the web has made the evaluation of the quality of information a crucial task, especially when untrustworthy information is being posted to the web [4,7,10, 11]. This problem, along with the fact that web searching is among the most popular activities of internet-based applications [12], are motives for investigation and makes the study of credibility of information a worthwhile field of research and a moot point.

II. CREDIBILITY OF WEB INFORMATION: A GROWING CONCERN

As a communication medium, the web is not only a great but also a questionable source of information [see for example: 6, 4, 1, 13, 14]. Metcalfe points out

that as more people use a given network, its value will be increased [15]. In the case of the web, its value lies in the ways it can open up our questions but there is a choice crisis [5] whenever users are confronted with the wide range of information available.

The availability of different information on the web has made it difficult to determine what and whom to trust [6, 16, 17, 18]. In comparison with traditional print material, the content provision on the Web is no longer a prerequisite [4, 5, 19, 13] so that Warnick calls the web as an "authorless environment" [20]. This has led to the shift of quality assessment from authors and information providers to individual information seekers [7, 4, 21]; a shift situated in a movement so called "information self-sufficiency" [5]. As described by Errami and Garner duplication, co-submission and plagiarism are three weaknesses of modern publication [22]; thus the assessment of credibility is a pressing concern.

Despite the high importance of information credibility on the web, researchers have not given adequate attention to this field [21, 5, 23]. Credibility has long been a major consideration in many areas of research and practice, especially in commerce, health, and politic [1, 13, 15]. The history of credibility dates back to Aristotle's writings on rhetoric and his notions of ethos, pathos and logos [21]. But in new information environments, the users are responsible for credibility judgments about the information that they receive [4, 5, 19, 14]. As such, credibility assessment becomes a task for those who receive the information, not for those who provide it [5, 24]. There is, however, no uniform definition of credibility among scholars [21, 24]. It is usually believed that credibility or believability judgment is a technical, cognitive and iterative process by which information is filtered and selected [1, 19, 13] consisting of two dimensions – trustworthiness and expertise. According to Rieh and Danielson credibility can be accomplished at three levels on the web: evaluation of the web as a medium, evaluation of websites, evaluation of information [1].

Research findings indicate that the issue of credibility is investigated most thoroughly at website or structural level [1]. In addition, in online environments, structural features are basically as important as content or message features and any assessment should concurrently take them into consideration [24]. It is worth noting that recent research shows that the characteristics of a message are more important than its structure for credibility assessment by users. Hong believes that characteristics of source can determine perceptions of credibility [24]. There exists thus a gap between message and structural features that need to be bridged [1, 7, 24].

III. WEB INFORMATION EVALUATION: A WEB LITERACY APPROACH

Misleading information has been an important subject for many researchers since the beginning of the web [2, 4, 5, 18]. Information may mislead accidentally through error or ignorance, or by intent to deceive. Misinformation and disinformation are subjects of several different fields of research. They are variably discussed in Political Science [for example: 25], Psychology [for example: 26], Information Science [for example: 27], Communication [for example: 28], Education [for example: 29] and so on.

Structural and content features need to be assessed for the credibility evaluation of web information. Characteristics of online environments like share speed; link structure, multimedia and interactivity, lack of referencing and organizational conventions make the evaluation of web information different from the evaluation of traditional information sources [1, 5, 13]. Furthermore, credibility assessment of information sources in areas like health 7, 30, 16, 18], e-commerce [31] and political decisions [32, 33] are very important because of the impact on people's individual and social lives [33].

Moreover, evaluation skills vary among different users regarding to their needs, context and abilities [1]. For example, youth often consider the authority of information instead of its structure while searching in the web [21]. The lack of evaluation skills is a consequence of variables such as experience, age, tasks and so on. How the information is made available also influences the assessment of credibility. For example, researchers found out that
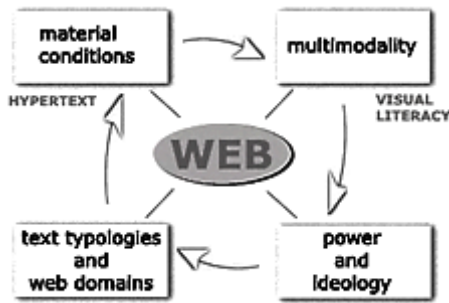
Figure1. Web literacy as content knowledge [34]

fee-based information tends to be perceived as more credible; a situation to which limited number of people have access [see 1. 19).

Increase in the number of resources on the web together with the multidimensional construct of the credibility concept; have made it a real concern [21]. However, as Metzger pointed out, willingness of users to evaluate online information needs to be also taken into account when discussing credibility[4]. Credibility will be of the least importance when the user is not motivated to carefully examine the content in searches, for example in entertainment information.

Content evaluation is more associated with credibility assessment [7, 24] and an extensive body of literature considers content credibility as the primary indicator of quality information [see 35]. In fact, many users lack prior knowledge about the structure of web information and in its absence, evaluation of content alone predicts credibility [24]. Credibility assessment of content could be characterized when people are asked to evaluate information [1]. A variety of criteria has been put forward regarding the web environment, of which the following five criteria are foremost:

. Authority
. Accuracy
. Objectivity
. Currency
. Coverage or scope [36, 37, 38, 39, 40].

Other criteria like relevancy [41], durability [42], accessibility [43], privacy [44], tailored to

information needs [41] and workability [45] are also proposed by different researchers. Application of such criteria is often through checklists which could be prepared by information professionals ahead of the users' search process. However, the checklist approach has limitations [5, 8]. In this approach, people are not instructed how to evaluate information but are provided with a list of criteria that may be hard to apply. These criteria are often time consuming and require effort so that users do not regard them as the basic evaluation criteria [4, 39]. However, there is not a set of criteria for information evaluation among researchers [46, 47].

There are some solutions suggested for misleading information on the web to be filtered out including quality certification of information sources, limiting monopolies controlling information resources, and greater information literacy among web users [46]. For quality certification, some institutions such as universities ought to exercise some measure of testing and certification of information without becoming censors. Otherwise, reducing the great monopolies controlling information resources may increase plurality of information and finally, information literacy will make receivers more aware of the potential for incredible information, and more able to identify it. A useful first step in dealing with potential or actual incredible information is to gather as much data as possible and to critically examine that data. In the case of web searching, every web page or system is unique and should be evaluated along with its related ones. As a result, users are advised to search the web on a case by case basis [47] and consequently, corroboration of related websites is a critical step in credibility assessment [1, 4]

Critical thinking and information literacy are two basic skills of which users should be aware. The terms are related and are often used interchangeably, to the point that Elmborg coined the term "critical information literacy" [48]. In fact, they are the most prescribed strategies to access quality information from the web [44, 49]. The skills required for credibility assessment can be achieved by developing critical thinking and information literacy, which are necessary in both the evaluation and effective use of information.

There is not universal agreement about the definition of information literacy and critical thinking in the relevant literature. Users are frequently advised to deal critically with information they found. Critical thinking has long been discussed in many fields of study and has been regarded as a key evaluation skill to the point that Gilster regards it as the core competency demanded from internet users [50]. On the other hand, information literacy is well described by Sundin and Francke as a "socio-technical practice, incorporating knowledge of the epistemological aspects of the information sources as well as of the technology and systems that make up their material dimension"[51]. It is found that users do not care about the information literacy and critical thinking in actual information seeking [51]. As a result, some critical views are starting to emerge among researchers about the accurate definition and dimensions of information literacy [51] and critical thinking [51].

There seems to be a pressing need to develop a "web literacy" approach especially with the emergence of technologies like social software, wikis, blogs, open source systems and what is known as the Web 2.0 movement. Web literacy, a term first coined by Sorapure, Inglesby and Yatchisin, has been defined as "an ability to recognize and assess a wide range of rhetorical situations and an attentiveness conveyed in a source's non-textual features. Teaching such a literacy means supplementing the evaluative criteria traditionally applied to print sources with new strategies for making sense of diverse kinds of texts presented in hyper textual and multimedia formats" [47].

Kuiper, Volman and Terwel derived three major components for web literacy from the literature: web searching skills, web reading skills and web evaluating skills [52]. Some university programs [see 52, 53] regard web literacy as a course in the academic literacy curriculum.

Dialectical reading as first proposed by Kaufmann [54] and then refined by Bruce [14] to be applied on the web could be a solution for users to achieve web literacy. It is not only related to the skills like

searching and evaluating but to a "deep experience" captured from critically reading. Dialectical reading develops a relationship between reader and an information resource in the web to make meaning from reading. Meaning making is not a static process but an evolving one composed of repeatedly thinking and doing as well as exploring other related resources from the broader web. In dialectical reading, users should not consider search results as an arrival but a first step into a journey to make meaning from reading a matrix of related web resources.
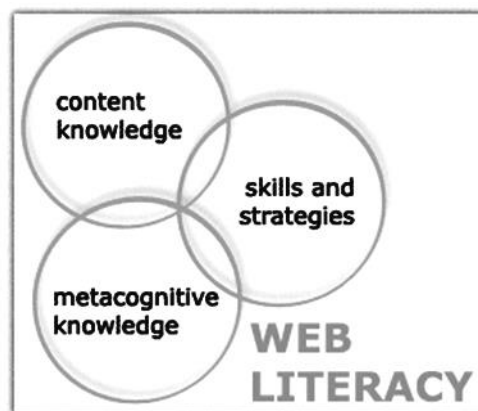

Figure3. The three interrelated fields of web literacy [34]

Last but not least, evaluation judgments on the web should not be considered merely from a general point of view. For example, motives for information seeking [4], and the characteristics of the web as a media and means of social interaction provide such evaluations with new and greater dimensions. Limits of time for information seeking, inability of users to gather as many online resources as possible, and the rapid growth and changing nature of the web pose serious challenges for users to evaluate credibility of online resources perfectly and independently. As a result, an important ethical dimension can be considered in emerging evaluation judgments.

Ethical dimension to web information evaluation should be thought of as a subject area in information ethics [55] and media ethics [56]. Specifically, freedom to produce, or access to information, both of which triggered the advent of information ethics in digital environments [57] could be taken as issues in evaluation and credibility judgments. Evaluation issues in the context of information ethics are not just

user-related but are also related to producers and communities.

Generally speaking, characteristics of the web as a medium and information environment on the one hand, and users' situations regarding their tasks, contexts, limits of time, knowledge and energy on the other hand, will overwhelmingly change how to evaluate the credibility and trustworthiness of web information. It is exactly where ethical issues related to users' credibility judgments come to surface. How values and worth are assigned to a piece of information found on the web is a matter beyond merely checking information against some undefined or predefined set of criteria frequently used to judge the credibility. It is up to users to keep in mind that information evaluation can be looked at as an ethical undertaking rather than one of mechanically cross-checking information against evaluation criteria at hand.

IV. CONCLUSION

The worldwide web, as the world's largest information gold mine, plays simultaneously the roles of source, message, and media in which a variety of credibility features exist. Furthermore, with the prevalence of web resources in research and education, traditional skills of information evaluation are no longer fully effective in responding to this credibility crisis. There need to be new information skills developed in such a setting to cope with the daily digital information problems. Different strategies should be implemented by people engaged in design, presentation and evaluation of web resources on one hand, and users on the other hand. Particularly, the user of information has to think critically so as to identify true from untrue information. Training users with critical thinking and information literacy skills are two pressing concerns. In doing so, web literacy is an important strategy in the battle against incredible information.

REFERENCES

[1] Rieh,S.Y and Danielson,D. 2007. "Credibility:A multidisciplinary framework". In B.Cronin(Ed.). *Annual review of information science and technology* (Vol.41,pp: 307– 364). Medford,NJ:InformationToday.

[2] Doyle, T , and John L. Hammond, 2006 "Net cred: evaluating the internet as a research source", *Reference Services Review*, Vol. 34(1), pp: 56 – 70.

[3] Fritch, J. W., and Cromwell, R. L. 2002. "Delving deeper into evaluation: Exploring cognitive authority on the Internet". *Reference Services Review*, 30(3), pp: 242-254.

[4] Metzger, M. J. 2007, "Making sense of credibility on the Web: Models for evaluating online information and recommendations for future research". *Journal of the American Society for Information Science and Technology*, 58, pp: 2078–2091.

[5] Lankes, R. D. 2008 "Credibility on the internet: shifting from authority to reliability", *Journal of Documentation*, Vol. 64 (5), pp: 667 – 686.

[6] Robins, D., and J. Holmes. 2008. "Aesthetics and credibility in web site design." *Information Processing and Management* 44 (1), pp: 386-399.

[7] Robins, D., Holmes, J., and Stansbury, M. 2009. "Consumer health information on the web: The relationship of visual design and perceptions of credibility". *Journal of the American Society for Information Science and Technology*, 61(1), pp: 13-29.

[8] Meola, M. 2004. "Chucking the checklist: A contextual approach to teaching undergraduates Web-site evaluation". portal: *Libraries and the Academy*, 4, pp: 331-344.

[9] Francke, H, Sundin, O, and Limberg,L 2014 "Debating credibility: the shaping of information literacies in upper secondary school", *Journal of Documentation*, Vol. 67(4), pp: 675 – 694.

[10] Ernest, D. J., Level, A. V. & Culbertson, M. 2005. Information Seeking Behavior For Recreational Activities and its Implications for Libraries. Reference Services Review 33(1): 88-103.

[11] Levine, P. 2005. The problem of online Misinformation and the role of schools, Studies in Media and Information Literacy Education, 5(1). [Online] Available at http://www.utpjournals.com/simile/issue17/levine.html (accessed 16 August 2014).

[12] Hsieh-Yee, I. 2001. Research on Web search behavior. Library and Information Science Research 23(2):167-185.

[13] Wathen, C. N. and Burkell, J. (2002), "Believe it or not: Factors influencing credibility on the Web". *Journal of the American Society for Information Science and Technology*, 53, pp:134–144.

[14] Bruce, B.C. 2000. Credibility of the web: Why we need dialectical reading. Journal of Philosophy of Education 34(1):97–109.

[15] Metcalfe, B. 1995. From the Ether: Metcalfe's Law: A network becomes more valuable as it reaches more users, Infoworld, VOL.17 NO. 40.

[16] Fisher, J., Burstein, F., Lynch, K., Lazarenko, K. 2008. Usability + usefulness=trust: an exploratory study of Australian health websites. Internet Research 18 (5): 477-498.

[17] Golbeck , C, Jennifer. 2008. Weaving a Web of Trust. Science 19: 1640-1641.

[18] Huntington P, Nicholas D, Gunter B, Russell C, Withey R. & Polydoratou P. 2004. Consumer trust in health information on the web. Aslib Proceedings 56(6): 373–382.

[19] Liu, Z. 2004. Perceptions of credibility of scholarly information on the Web', Information Processing and Management, VOL.40 NO.6, pp. 1027-1038.

[20] Warnick, B. 2004. Online ethos: Source credibility in an authorless environment, American Behavioral Scientist 48(2): 256-265.

[21] Flanagin, Andrew J., & Miriam Metzger. 2008. Digital Media and Youth: Unparalleled Opportunity and Unprecedented Responsibility.Digital Media, Youth, and Credibility. Edited by Miriam J. Metzger & Andrew J. Flanagin. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press, 5–28.

[22] Errami, M., and H. Garner. 2008. "A tale of two citations". Nature 451:397–399.

[23] Rieh, S. & Hilligoss, B. 2008. College Students' Credibility Judgments in the InformationSeeking Process. Digital Media, Youth, and Credibility. Edited by Miriam J. Metzger and Andrew J.

[24] Hong, T. 2006. The influence of structural and message features on Website credibility', Journal of the American Society for Information Science and Technology 57(1):114-127.

[25] Rothkopf, D.J. 1999, The Disinformation age, Foreign Policy 114:82–96.

[26] Abeles, P. and Morton, J. 1999. Avoiding Misinformation: reinstating target modality. Quarterly Journal of Experimental Psychology 52:581 – 592.

[27] Capurro, R. 2003. Foundations of Information Science: Review and Perspectives. http://www.capurro.de/tampere91.htm(accessed 16 August 2014).

[28] Wang, H. & Lu, X. 2007. Cyberdating: Misinformation and (Dis)trust in Online Interaction, Informing Science Journal, VOL 10, pp. 1-15. http://inform.nu/Articles/Vol10/ISJv10p001-015Wang66.pdf (accessed 13 June 2014)

[29] Calvert, P.J. 2001. Scholarly misconduct and Misinformation on the World Wide Web .The Electronic Library, 19(4): 332-340.

[30] Eysenbach, Gunther. 2008. Credibility of Health Information and Digital Media: New Perspectives and Implications for Youth. Digital Media, Youth, and Credibility. Edited by Miriam J. Metzger and Andrew J.

[31] Clewley, N., Chen, S. Y. & Liu, X. 2009. Evaluation of the credibility of internet shopping in the UK. Online Information Review, 33(4): 805-826.

[32] Gunter, B., Campbell, V., Touri, M. & Gibson, R. 2009. Blogs, news and credibility. Aslib Proceedings: New Information Perspectives 61(2): 185-204.

[33] Weingarten, Fred W. 2008. Credibility, Politics, and Public Policy. Digital Media, Youth, and Credibility. Edited by Miriam J. Metzger and Andrew J. Flanagin. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press, pp. 181–202.

[34] Ahtikari. J. and Eronen. S. 2004. On a Journay Towards Web Literacy: The Electronic Learning Space Netro. A Pro Gradu Thesis, Department of Languages. Available at: https://kielikompassi.jyu.fi/resurssikartta/netro/gradu/gradu.pdf , accessed 13/1/2015.

[35] Fallis, D. 2004. On verifying the accuracy of information: philosophical perspectives. Library Trends 52(3): 463-87.

[36] Tate, M.A. 2009. Web wisdom: How to evaluate and create information quality on the Web. 2nd ed. Hillsdale, NJ: Erlbaum.

[37] Tudjman, M. & Mikelic, N. 2003. Information Science: Science about Information, Misinformation and Disinformation. In Proceedings of Informing Science and Information Technology Education Joint Conference,Pori,Finland. http://proceedings.informingscience.org/IS2003Proceedings/docs/204Tudjm.pdf (accessed 16 August 2014).

[38] Kapoun, J. 1998. Teaching undergrads WEB evaluation: A guide for library instruction, Cand RL News, 59(7). http://www.ala.org/ala/acrl/acrlpubs/crlnews/backissues1998/julyaugust6/teachingundergrads.htm (accessed 16 August 2014).

[39] Scholz-Crane, A. 1998. Evaluating the future: A preliminary study of the process of how undergraduate students evaluate Web sources, Reference Services Review, VOL 26 NO. 3/4, pp. 53–60.

[40] Brandt, D.S. 1996. Evaluating information on the Internet. Computers in Libraries 16:44–46.

[41] Scheeder, D. 2005, Information Quality Standards: Navigating the Seas of Misinformation. In 71th IFLA general conference and council, Oslo. http://www.ifla.org/IV/ifla71/papers/192e-Scheeder.pdf (accessed 16 August 2014).

[42] Zhu, Y & Buchmann, A. 2003. Evaluating and Selecting Web Sources as External Information Resources of a Data Warehouse. www.dvs1.informatik.tu-darmstadt.de/publications/pdf/wise02-zb.pdf (accessed 16 August 2014).

[43] Beck, S. E. 1997. The Good, The Bad and The Ugly, or Why it's a Good Idea to Evaluate Web Sources. Institute for Technology-Assisted Learning. http://lib.nmsu.edu/instruction/eval.html (accessed 16 August 2014)

[44] Mortan-Martin, J. & Anderson, C. D. 2000. Information and Misinformation Online: Recommendations for Facilitating Accurate Mental Health Information Retrieval and Evaluation, Cyberpsychology and Behavior, VOL.3 NO. 5, pp. 731-746.

[45] Smith, A. G. 1997. Testing the surf: criteria for evaluating Internet Information resources, The Public-Access Computer Systems Review 8(3). Available at: http://info.lib.uh.edu/pr/v8/n3/smit8n3.html(accessed 16 August 2014).

[46] Childs, S. 2005. Judging the quality of internet-based health information. Performance Measurement and Metrics 6(2):80-96.

[47] Sorapure, M., Inglesby, P. & Yatchisin, G. 1998. Web Literacy: Challenges and opportunities for research in a new medium. Computers and Composition 15(3):409-424.

[48] Elmborg, J. 2006. Critical Information Literacy: Implications for Instructional Practice. The Journal of Academic Librarianship 32(2):192–199.

[49] Mattus, M. 2007. Finding Credible Information: A Challenge to Students Writing Academic Essays. Human IT VOL.9. NO.2, pp. 1–28.

[50] Gilster, P. 1997. Digital literacy. New York: John Wiley & Sons.

[51] Sundin, O. 2008. Negotiations on information-seeking expertise: A study of web-based tutorials for information literacy. Journal of Documentation 64(1): 24-44.

[52] Kuiper, E., Volman, M. & Terwel, J. 2008. Students' use of Web literacy skills and strategies: searching, reading and evaluating Web information, Information Research, VOL 13 No 1, paper351. Available at http://InformationR.net/ir/13-3/paper351.html.

[53] Walton, M. & Archer, A. 2004. The Web and information literacy: scaffolding the use of web sources in a project-based curriculum British Journal of Educational Technology, 35(2): 173–186.

[54] Kaufmann, W. 1977. The future of the humanities. New York: Reader's Digest Press.

[55] Carbo, T & Smith, M. 2008. Global information ethics: Intercultural perspectives on past and future research. Journal of the American Society for Information Science and Technology 59(7): 1111-1123.

[56] Pavlik, John V. 2012. Media Ethics in the Digital Age. Media Ethics Magazine, Vol. 24, No.1. http://www.mediaethicsmagazine.com/index.php/browsw-back-issues/144-fall-2012/39986.(accessed October 5, 2014).

[57] Capurro, R. 2006. Towards an Ontological Foundation of Information Ethics, Ethics and Information Technology 8(4): 175–186.