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Law Libraries in Hyperspace: A Citation Analysis of World Wide Web Sites

Robert C. Vreeland

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Mr. Vreeland suggests the use of citation analysis as an appropriate objective standard for measuring and evaluating law library Web sites.

¶ The Web site has become almost as common a fixture as the reference desk or the study carrel in many of today's law libraries. Virtually every academic law library in the United States has a home page,¹ and the Web continues to grow in importance as a resource for legal researchers.² However, there is surprisingly little data on the content, structure, or complexity of these pages. Individual law librarians and professional organizations have made occasional attempts to coordinate Web development efforts,³ to unilaterally dictate peremptory design standards,⁴ or point out common mistakes,⁵ but these efforts are rarely supported by empirical evidence or serious research.⁶ Earlier studies have assessed collections of computer software⁷ and the size of law library computer

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** Unix Administrator/Web Programmer, University of North Carolina Center for Public Television, Research Triangle Park, North Carolina. Formerly Reference/Electronic Services Librarian, University of North Carolina Law Library, Chapel Hill, North Carolina.

1. See Seattle University Law Library, *Law Libraries on the Web* (last modified Mar. 25, 1998) <<http://www.law.seattleu.edu/library/lawlibsweb.htm>> (contains links to law school home pages arranged alphabetically by state).
2. See Robert C. Vreeland & Bert J. Dempsey, *Toward a Truly Seamless Web: Bringing Order to Law on the Internet*, 88 L. LIBR. J. 469, 482 (1996) (describing the impact of the Internet on legal research).
3. See Rosalie Sanderson, *COSELL Corner*, SE. L. LIBR., Fall 1998, at 15 (describing efforts by the members of the Consortium of South Eastern Law Libraries to coordinate the selection of Southeastern legal materials on the Web).
4. See Access to Electronic Legal Info. Comm., Am. Ass'n Law Libraries, *Checklist for Evaluating Websites* (last modified Aug. 9, 1999) <http://www.bc.edu/bc_org/avp/law/lib/aallwg/criteria.htm>.
5. See New England Law Library Consortium, *Web Management—Guidelines For An Effective Infrastructure* (last modified Nov. 20, 1998) <<http://www.nellco.org/Fall98/tsld001.htm>>.
6. This scarcity of data may reflect the legal community's general disdain for empirical research. See Steven L. Schwarz, *Is Law an Autonomous Discipline?* 21 HARV. J.L. & PUB. POL'Y 85, 87 n.7 (1997).
7. The Association of Research Libraries publishes statistics summarizing law library collections of "computer files," defined as "computer-readable disks, tapes, CD-ROMs, and similar machine-readable files comprising data or programs that are locally held as part of the library's collections. . . ." ASS'N RES. LIBRARIES, ARL ACADEMIC LAW & MEDICAL LIBRARY STATISTICS 1992-93 TO 1994-95, at 128 (1996).

support staffs,⁸ but large studies of library Internet resources have rarely been undertaken. “Metrics are needed from a variety of perspectives ranging from system to user, from content to services, from local to highly distributed, from single use to use across a ‘session,’ and so on.”⁹

¶12 The profession’s “voracious appetite for usage data”¹⁰ remains unsatisfied because there are no clear “standards for quantitative measurement of electronic multi-media works or objects. . . . Libraries are creating navigational or finding aids by data-mining activities that establish electronic links to and among digital and print resources, but it is difficult to measure this activity or the effectiveness of these investments.”¹¹ Until such standards are devised, law library webmasters will find it difficult to determine how their home pages compare to those of other law libraries, and individuals seeking legal information on the Internet will have no objective means of deciding where best to begin. The goal of this article is to formulate an objective standard for the measurement and evaluation of law library Web sites.

Quantitative Analysis of Web Sites

¶13 Web sites are commonly measured in terms of the “hits” registered in a server’s log files,¹² but such numbers are inherently problematic. A visit to one Web page may produce many log entries, as each graphic on the page will require a separate request to the server.¹³ Slightly more reliable is the “page view,” which records server contacts only at the document level, ignoring the included graphics.¹⁴ However, page views provide no information about how many different people have used a site, or whether they viewed the page by choice or by chance.

¶14 Ratings services are currently attempting to evaluate Web audiences in a manner comparable to the Nielsen system of counting television viewers,¹⁵ so that a more efficient pricing system for Web-based advertisements can be created.

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8. See Ann Puckett, *Law School Computer Staffing* (last modified Apr. 6, 1999) <<http://www.lawsch.uga.edu/lawlib/stafcomp.html>>.
 9. Barry M. Leiner, *Metrics and the Digital Library*, D-LIB (July/Aug. 1998) <<http://www.dlib.org/dlib/july98/07editorial.html>>.
 10. Christy Hightower et al., *Recommendations for Benchmarking Web Site Usage among Academic Libraries*, 59 C. & RES. LIBR. 61, 61 (1998).
 11. Peter R. Young, *Measurement of Electronic Services in Libraries: Statistics for the Digital Age*, 24 IFLA J. 157, 158–59 (1998).
 12. A log file is “[a] record of actions that have occurred. Servers maintain log files that record the activities of users accessing the system.” OFFICIAL INTERNET DICTIONARY 91 (Russ Bahorsky ed., 1998).
 13. See Joel Riphagen & Alaina Kanfer, *In Search of the Elusive User: Gathering Information on Web Server Access* (last modified June 15, 1999) <<http://www.ncsa.uiuc.edu/edu/trg/webstats/index-r.html>>.
 14. See Web21, *100hot Methodology* (visited Nov. 18, 1999) <<http://www.100hot.com/methodology.html>> (explaining 100hot’s usage of page views to rank Web sites).
 15. In fact, Nielsen Media Research itself has entered the fray. See NetRatings, Inc., *Nielsen Media Research and NetRatings in Strategic Alliance to Deliver New Internet Measurement Service* (last modified Oct. 26, 1998) <<http://www.netratings.com/NMRpressrelease.htm>>.

They have proposed fairly sophisticated measures such as *reach*, meaning “[t]he percent of Web-active individuals that visited a site once in [a] given month. . . . For example, if a site has a 2% reach that means that 2% of Web-active individuals visited that site. . . .”¹⁶ Such measures are arrived at by analyzing the logs of proxy servers¹⁷ which are transmitted to the ratings service via FTP¹⁸ on a regular basis.¹⁹ While these measures do produce accurate counts of traffic, they view the Internet with “standards more suited to TV or radio.”²⁰ This mass-market paradigm undervalues law libraries and other “well-focused sites that collect specific groups of users with shared interests.”²¹

¶15 In addition to the individual limitations already described, all the aforementioned methods share a common weakness. Broad-based analysis using such methods would probably require libraries to engage in widespread sharing of Web server access logs. While at least one such study has been conducted (among science and engineering libraries),²² casual dissemination of server logs should be avoided as a possible violation of state law,²³ professional ethics,²⁴ and “responsible net citizenship.”²⁵

Usability, Information Architecture, and Other Obsolete Notions

¶16 Interface design is one of the few aspects of library Web sites that has been studied in detail.²⁶ One sign of the field’s popularity is that guidelines for use in evaluating site design are abundant.²⁷ In fact, they are too abundant; so many exist

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16. Media Metrix, Inc., *Top Rankings* (last modified Aug. 24, 1999) <<http://www.mediametrix.com/TopRankings/TopRankings.html>>.
 17. A proxy server is “[a]n intermediate server that attempts to fulfill client requests from data stored in memory before passing requests on to an actual server.” OFFICIAL INTERNET DICTIONARY, *supra* note 12, at 130–31.
 18. FTP (File Transfer Protocol) is used to transfer files from one computer to another. ED KROL, THE WHOLE INTERNET: USER’S GUIDE & CATALOG 65 (1994).
 19. See Steven R. Coffey et al., *Computer Use Meter and Analyzer*, U.S. Patent No. 5,675,510 (Oct. 7, 1997) (describing the PC Meter product used by Media Metrix, Inc. to analyze Web site traffic).
 20. Scott Rosenberg, *Reach for the Hits: Why Is It So Hard to Find a Valid Yardstick for Measuring Web Traffic?* SALON (Feb. 5, 1999) <<http://www.salonmagazine.com/21st/rose/1999/02/05straight.html>>.
 21. *Id.*
 22. Hightower et al., *supra* note 10.
 23. Most states have laws that forbid libraries from sharing records that reveal the identity of patrons. See, e.g., N.C. GEN. STAT. § 125-19(a) (1991).
 24. No professional organization has specifically addressed the issue of access to server logs, but the need to protect records which might reveal the information-seeking preferences of patrons is well established. See, e.g., Am. Library Ass’n, *Policy on Confidentiality of Library Records* (visited Sept. 14, 1999) <http://www.ala.org/alaorg/oif/pol_conf.html>.
 25. Lincoln D. Stein, *The World Wide Web Security FAQ* (last modified Sept. 13, 1999) <<http://www.w3.org/Security/faq/wwwsf6.html>>.
 26. See David L. King, *Library Home Page Design: A Comparison of Page Layout for Front-ends to ARL Library Web Sites*, 59 C. & RES. LIBR. 458 (1998).
 27. See John D’Angelo & Sherry K. Little, *Successful Web Pages: What Are They and Do They Exist?* 17 INFO. TECH. & LIBR. 71, 73–75 (1998) (reviewing and summarizing Web design guidelines from many sources).

that contradictions between them are not uncommon. A review of the literature reveals the following rules:

1. Scrolling is bad, except when it is not.²⁸
2. Users do not like to click on multiple links.²⁹ Or perhaps they do.³⁰
3. Animation is good.³¹ No, it isn't.³²

¶17 Such contradictions are not surprising given the highly subjective nature of many of the rules. Even more rigorous studies of usability are hampered by changes in user preferences over time.³³ Sites that are well received today may be despised tomorrow as increasingly large portions of the previously unconnected populace begin to use the Internet.³⁴

¶18 Interface design is becoming less relevant, despite the recent enthusiasm that law librarians have shown for it. As innovative, customized services³⁵ become available, many design decisions will be delegated to the end user.

Citation Analysis and the World Wide Web

¶19 Citation analysis is a familiar technique in both law and information science. The use of citators to locate references to cases, statutes, and other legal materials is an essential part of the practice of law.³⁶ Citation analysis has been used to assess the influence and visibility of legal publications,³⁷ and libraries have used it in

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28. See Jakob Nielsen, *Changes in Web Usability Since 1994* (last modified Nov. 24, 1998) <<http://www.useit.com/alertbox/9712a.html>> (announcing that users in a 1997 study had a greater tolerance for long scrolling pages than users in 1994).
 29. See D. Bachiochi et al., *Usability Studies and Designing Navigational Aids for the World Wide Web*, SIXTH INT'L WORLD WIDE WEB CONF. PROC. 180 (1997) (last modified Mar. 29, 1997) <<http://decweb.ethz.ch/WWW6/Technical/Paper180/Paper180.html>>.
 30. See User Interface Engineering, *Surprises on the Web: Results from Usability Testing* (last modified May 26, 1999) <<http://world.std.com/~uiweb/surprise.htm>>.
 31. See D. Scott Brandt, *Tutorial, or Not Tutorial, That Is the Question*, COMPUTERS IN LIBR., May 1997, at 44, 45–46.
 32. See User Interface Engineering, *supra* note 30.
 33. See Nielsen, *supra* note 28.
 34. See Jakob Nielsen, *Give Me Your Billions: Internet Stock Valuation and Future User Characteristics* (last modified Sept. 11, 1999) <<http://www.useit.com/alertbox/990117.html>>.
 35. Commercial services with user-configurable menus have been available for some time. See, e.g., Deja.com, Inc., *My Deja* (visited Sept. 14, 1999) <http://www.deja.com/mydn_forums.xp>; Yahoo!, Inc., *My Yahoo!* (visited Sept. 12, 1999) <<http://my.yahoo.com>>. See generally Mick O'Leary, *Web Personalization Does It Your Way*, ONLINE, Mar./Apr. 1999, at 79. Experimental versions of such services are now appearing in libraries. See, e.g., *MyLibrary* (visited Sept. 13, 1999) <<http://my.lib.ncsu.edu>>; *My Library* (visited Sept. 13, 1999) <<http://www.library.vcu.edu/mylibrary/>>. See generally Eric Lease Morgan, *Mylibrary in Your Library Could Make for Satisfied Patrons*, COMPUTERS IN LIBR., May 1998, at 40.
 36. See generally Patti Ogden, *Mastering the Lawless Science of Our Law: A Story of Legal Citation Indexes*, 85 L. LIBR. J. 1 (1993).
 37. The best-known work in the field of legal citation analysis is Fred R. Shapiro, *The Most-Cited Law Review Articles*, 73 CAL. L. REV. 1540 (1985). For a discussion of citation analysis and its influence among legal scholars, see Paul M. Barrett, *Citology, the Study of Footnotes, Sweeps the Law Schools*, WALL ST. J., Jan. 22, 1997, at 1.

making collection development decisions.³⁸ The same methods used to compare the footnotes in print documents can be used to analyze the links in Web pages.³⁹ Indeed, citation analysis should be even more relevant in the Internet context, because hyperlinks are an essential part of the Internet, providing the high degree of interconnection⁴⁰ that makes the World Wide Web a genuine Web despite its enormous size.⁴¹ “Electronic information is not revised in stages or in editions, as occurs with printed works, but continuously changes. Hypertext provides the links to such information, and in an electronic environment, the links may be worth more than the information itself.”⁴²

¶10 Recent studies in information science have revealed that the hyperlinks found on a Web page reveal more about the content of a Web page than the rest of the page’s text.⁴³ Google, a new entry in the crowded search engine market, has made a name for itself⁴⁴ by implementing a search algorithm based on hyperlinks.⁴⁵

¶11 Hyperlinks also differ from print citations in that they are much more likely to be followed.⁴⁶ Footnotes and endnotes tell the reader where he can find an item by expending time and effort, but hyperlinks provide instantaneous and seamless access to the cited information.

¶12 The Internet’s growth rate is too great⁴⁷ for any one institution to maintain a comprehensive list of links.⁴⁸ Even Yahoo!, a well-funded site that exists only to make links, continues to fall behind.⁴⁹ Therefore, it would be eminently sensible for each law library to construct individualized pages in which “[a] small core of predictable links to the major resources exists, but the majority of them are individualized, showing critical thought and evaluation. . . .”⁵⁰

38. See SHARON L. BAKER & F. WILFRID LANCASTER, *THE MEASUREMENT & EVALUATION OF LIBRARY SERVICES* 47–54 (1991).

39. See Marcy Neth, *Citation Analysis and the Web*, *ART DOCUMENTATION*, Spring 1998, at 29.

40. The “diameter” of the Web, or average distance between any two randomly chosen Web pages, is nineteen links. This figure will only increase to twenty-one links if the Web increases 1,000 percent in size. See Réka Albert et al., *Diameter of the World-Wide Web*, *NATURE*, Sept. 9, 1999, at 130, 130.

41. The number of pages on the “publicly indexable Web” has recently been estimated at 800 million. See Steve Lawrence & C. Lee Giles, *Accessibility of Information on the Web*, *NATURE*, July 8, 1999, at 107, 107.

42. ETHAN KATSH, *LAW IN A DIGITAL WORLD* 210 (1995).

43. See Heting Chu, *Hyperlinks: How Well Do They Represent the Intellectual Content of Digital Collections?* 1997 *PROC. AM. SOC’Y INFO. SCI.* 361.

44. See Adrienne Mand, *Unlaunched Site Making Digerati Google-Eyed*, *MEDIAWEEK*, July 12, 1999, at 34.

45. See Google, Inc., *Why Use Google?* (last modified Sept. 15, 1999) <http://www.google.com/why_use.html>.

46. Users may even follow hypertext links too often, thereby losing their way and becoming disoriented. See Vreeland & Dempsey, *supra* note 2, at 482.

47. See Robert H. Zakon, *Hobbes’ Internet Timeline* (visited Sept. 12, 1999) <<http://info.isoc.org/guest/zakon/Internet/History/HIT.html>>.

48. See generally Laura B. Cohen, *What’s New on the Internet? A Challenge for Library Webmasters*, *REFERENCE SERVICES REV.*, Spring 1998, at 7.

49. See Anne Callery & Deb Tracy-Proulx, *Yahoo! Cataloging the Web*, *J. INTERNET CATALOGING*, no. 1, 1997, at 57, 61.

50. Neth, *supra* note 39, at 32.

¶13 One would expect law library pages to have many links in common, just as ABA-accredited libraries have the same core collections.⁵¹ In addition, some webmasters may choose to copy the links from other law library or legal research sites.⁵² However, each site must offer some unique links in order to justify its existence. Information is most useful if it is both relevant and novel.⁵³ There may be some value in reducing network congestion by making the same links accessible on multiple servers, but this could be achieved by simply mirroring⁵⁴ the best sites. Collections of Internet links should comply with the same guidelines as print bibliographies:

The bibliography should fill a significant need in order to justify its compilation.

The subject should fit into the general scheme of available bibliographical resources without unnecessary duplication. If similar bibliographies exist, they should be reviewed, and the unique contribution of this new one should be stated explicitly.⁵⁵

Methodology⁵⁶

¶14 Two online directories of law libraries⁵⁷ and an online list of all ABA-accredited⁵⁸ law schools⁵⁹ were used as starting points to locate all of the Web sites for this study. Of the 182 ABA-accredited institutions, 156 had home pages with at least one external link, eighteen had no external links, and eight had no home page.⁶⁰ During the beginning of the fall 1999 semester, a shareware program

51. See AM. BAR ASS'N, STANDARDS FOR APPROVAL OF LAW SCHOOLS AND INTERPRETATIONS 64–65 (1998) (enumerating the materials required for a law library core collection).

52. See Neth, *supra* note 39, at 29.

53. See generally Ravi J. Sodha & Therese Van Amelsvoort, *Multi-Database Searches in Biomedicine: Citation Duplication and Novelty Assessment Using Carbamazepine as an Example*, 20 J. INFO. SCI. 139, 140 (1994).

54. A mirror site is “[a] subsidiary duplicate of an FTP site used to distribute the demand for Web sites that are frequently inaccessible because of congestion.” OFFICIAL INTERNET DICTIONARY, *supra* note 12, at 100.

55. Bibliography Comm., Am. Library Ass’n, *Guidelines for the Preparation of a Bibliography*, 32 REFERENCE Q. 194 (1992).

56. Because of the large size of the data set examined in this project, much of the author’s supporting documentation cannot be included in this paper. The list of external links, for example, would be well over 1,000 pages in length if produced in hard copy. However, the list of links and other materials are available online at Robert C. Vreeland, *Web Site Research: Supporting Materials* (last modified July 5, 1999) <<http://library.law.unc.edu/staff/rcv/research/>>.

57. Seattle University Law Library, *supra* note 1; Academic Law Libraries Special Interest Section, Am. Ass’n Law Libraries, *Academic Law Libraries* (last modified Aug. 17, 1999) <<http://www.aallnet.org/sis/allsis/libraries.html>>.

58. Nonaccredited institutions were excluded simply because the list of accredited law schools was more than long enough to provide a sufficient data set.

59. Section of Legal Educ. & Admissions to the Bar, Am. Bar Ass’n, *Alphabetical List of ABA-Approved Law Schools* (last modified July 28, 1999) <<http://www.abanet.org/legaled/approved.html>>.

60. The eight law libraries for which no Web site could be found were Hawaii, the Judge Advocate General’s School, Inter-American, Mercer, Pontifical Catholic of Puerto Rico, University of Puerto Rico, Southern, and St. Mary’s.

called HTTrack⁶¹ was used to download almost all of the Web sites in their entirety. A few of the Web sites could not be downloaded, either because the sites are database-driven⁶² or because of commands in their robots.txt files. Those sites were downloaded by hand. It was necessary to download the sites for local analysis because search engines cannot be trusted to give an accurate representation of a Web site's entire contents,⁶⁴ and because it was desirable to have "frozen" copies of the sites so that data would not change once the study was under way.

¶15 After the sites were downloaded, a list of hyperlinks was extracted from each site using a shareware utility called Web Address Extractor.⁶⁵ This process produced 156 text files, each consisting of a list of URLs.⁶⁶ Each list was edited to remove all links to the site's own domain.⁶⁷ For example, all links in the unc.edu domain were removed from the University of North Carolina Law Library's list of links. Although self-citations are considered "real" citations when they appear in print,⁶⁸ on the Internet they are likely to be "organizational links" which provide navigation information,⁶⁹ or politically mandated links to the parent institution.⁷⁰ Together, the 156 sites contained 71,851 external links.⁷¹

¶16 The collections of links from each site were compared and the sites were ranked according to luminosity.⁷² These results are presented in figure 1.

61. Xavier Roche & Yann Philippot, *HTTrack: The Web Mirror Utility* (last modified Aug. 3, 1999) <<http://e3000.ensicaen.ismra.fr/~roche/htrack.html>>.
62. A database-driven site creates pages dynamically in response to user queries. Therefore, it does not contain static files of the sort that most indexing software is intended to analyze. See Ying Zhang, *Setting Up Database-Driven Web Sites* (visited Sept. 9, 1999) <http://www.devshed.com/Server_Side/Administration/Database/>.
63. A robots.txt file is a plain text document that limits the files on a Web server to which indexing software can gain access. See Martijn Koster, *A Standard for Robot Exclusion* (last modified May 14, 1999) <<http://info.webcrawler.com/mak/projects/robots/norobots.html>>.
64. See Heather Tunender & Jane Ervin, *How to Succeed in Promoting Your Web Site: The Impact of Search Engine Registration on Retrieval of a World Wide Web Site*, 17 INFO. TECH. & LIBR. 173, 176-78 (1998).
65. GBCS Software, *Web Address Extractor* (last modified Sept. 12, 1999) <<http://www.users.bigpond.com/gbcs/WebAddress.htm>>.
66. A URL is a "Universal Resource Locator. The addressing system used in the World Wide Web and other Internet resources. The URL contains information about the method of access, the server to be accessed, and the path of any file to be accessed." OFFICIAL INTERNET DICTIONARY, *supra* note 12, at 166.
67. A domain is "a part of a naming hierarchy. Syntactically, an Internet domain name consists of a sequence of names (labels) separated by periods (dots), e.g., 'tundra.mpk.ca.us.'" *Id.* at 45.
68. See, e.g., Herbert W. Snyder & Susan Bonzi, *Patterns of Self-Citation Across Disciplines (1980-1989)*, 24 J. INFO. SCI. 431 (1998).
69. See Chu, *supra* note 43, at 362 (explaining the distinction between organizational and content-based links).
70. See generally Deborah Lynne Wiley, *The Organizational Politics of the World Wide Web*, INTERNET REFERENCE SERVICES Q., 1998 no. 2, at 23, 25.
71. This figure excludes duplicate links *within* sites but includes duplicates *among* sites. If one library has several links to the same URL, that URL is only counted once for that library, but if many libraries link to the same URL, then that URL is counted once for each of those libraries.
72. In this context, luminosity is a measure of how many other URLs a site points to, or the extent to which it "casts navigational light off-site." Tim Bray, *Measuring the Web*, FIFTH INT'L WORLD WIDE WEB CONF. PROC. 9 (1996) (last modified June 17, 1996) <<http://www5conf.inria.fr/fich.html/papers/P9/Overview.html>>.

¶17 After assessing the luminosity of the sites, it seemed logical to measure their visibility⁷³ by using Alta Vista⁷⁴ to count the number of links to each site. Figure 2 reveals the results of this exercise. In order to determine if there is a relationship between visibility and luminosity, the values from figures 1 and 2 were plotted on a scatter diagram. This diagram is presented in figure 3.

¶18 Many of the 71,851 external URLs extracted from the law library pages were found to be duplicates, as many URLs were linked to by many different sites. The most visible of these URLs are presented in figure 4.

¶19 Figure 4 illustrates that many URLs exist on the same host. There are 15,484 separate hosts⁷⁵ in the list of 71,851 URLs. The most visible hosts are listed in figure 5.

Discussion of Figure 1

¶20 The total luminosity of law library Web sites is listed in figure 1. The number of external links ranges from 1 to 8,769.⁷⁶ Washburn University Law Library, the most luminous site, appears to be following a “two power standard” like that of the Royal Navy during the nineteenth century⁷⁷—its collection of links is larger than the second and third largest collections combined.⁷⁸ In part this is accomplished by creating “deep links”⁷⁹ to remote sites in order to provide direct access to specific resources.⁸⁰ For example, Washburn has sixteen links to resources at FindLaw.⁸¹

¶21 From figure 1, it is apparent that 20 percent of the sites account for almost 80 percent of all the links.⁸² The “Trueswell distribution,” which appears repeatedly in information and library science, would appear to have some application to

73. Visibility measures “the number of other sites that have pointers to” a site. *Id.*

74. Alta Vista Co., *Alta Vista* (visited Sept. 13, 1999) <<http://www.altavista.com>>.

75. Note that the 15,484 hosts are not 15,484 separate servers. For example, findlaw.com and www.findlaw.com are two separate host names, but they refer to the same physical server.

76. Sites with no external links and libraries without home pages are not represented in figure 1.

77. See Memorandum probably from Reginald McKenna to Prime Minister Asquith (May 1909), in *BRITISH NAVAL DOCUMENTS 1204–1960*, at 754 (John B. Hattendorf et al. eds., 1993).

78. Washburn’s site also contains approximately 4,000 more external references than the most heavily footnoted law review article ever written, which contained 4,824 footnotes. See Kris Oser, *Numerous Notes No Shot in Foot*, *NAT’L L.J.*, Jan. 16, 1989, at 35 (discussing previous record holders and awarding the title to Arnold S. Jacobs, *An Analysis of Section 16 of the Securities Exchange Act of 1934*, 32 *N.Y.L. SCH. L. REV.* 209 (1987)).

79. See generally Brian D. Wassom, Note, *Copyright Implications of “Unconventional Linking” on the World Wide Web: Framing, Deep Linking and Inlining*, 49 *CASE W. RES. L. REV.* 181, 192–93, 214–19 (1998) (describing the practice of deep linking and discussing its legal implications).

80. See Phillip A. McAfee, *Confessions of a Deep Linker: Advanced Techniques for Linking to Government Documents & Databases*, *LAW LIBR. RESOURCE EXCHANGE* (June 15, 1998) <<http://www.llrx.com/features/confessions.htm>>.

81. FindLaw, *FindLaw* (visited Sept. 11, 1999) <<http://findlaw.com>>.

82. This figure was arrived at by adding the total links for the thirty-one (20 percent of the 182 ABA-accredited law libraries) most luminous sites. Together these sites have 53,887 links, or 74.9 percent of the 71,851 links contained on all law library Web sites.

Washburn	8769	George Washington	289	Georgia State	90
Emory	4426	Maryland	276	Tulsa	87
Georgetown	4179	Wisconsin	261	Loyola-Marymount	85
Texas	3060	California-Hastings	248	Louisville	83
Regent	2521	Marquette	248	Boston College	82
Chicago	2517	Howard	238	Stanford	81
Cornell	1956	Wayne State	233	St. Thomas	81
Southern California	1910	George Mason	221	Willamette	80
Notre Dame	1852	San Francisco	219	Tennessee	79
Nebraska	1522	North Dakota	216	Rutgers-Newark	78
Montana	1456	Suffolk	216	Columbia	75
Florida State	1303	Oklahoma	215	Idaho	71
Gonzaga	1291	Boston University	210	Illinois	70
New England	1178	Yeshiva	210	Akron	68
Colorado	1176	San Diego	208	Roger Williams	67
Nova	1169	St. Louis	202	California Western	65
NYU	1119	Ohio State	195	Arizona	61
Seattle	1086	California-Berkeley	193	Depaul	56
Penn	970	Chapman	184	Connecticut	55
Louisiana State	920	Missouri	180	Toledo	54
Virginia	892	Washington and Lee	180	Chicago-Kent	46
Wake Forest	888	Richmond	174	Missouri-Kansas City	43
Yale	819	North Carolina Central	173	Hofstra	40
South Carolina	814	Golden Gate	172	Oklahoma City	39
Kansas	771	Campbell	170	Thomas Jefferson	38
American	736	Southern Illinois	169	Alabama	36
Rutgers-Camden	715	Northeastern	167	Case Western Reserve	34
Minnesota	705	Loyola-Chicago	154	Maine	32
Stetson	634	Indiana	150	William and Mary	32
Cleveland State	585	Iowa	146	Temple	30
Southern Methodist	552	Washington (St. Louis)	145	Southwestern	28
Drake	533	Widener	145	UCLA	27
Albany	503	Detroit	144	Catholic	21
Indiana at Indianapolis	495	Northern Kentucky	135	District of Columbia	20
Arizona State	492	Northwestern	135	Texas Southern	19
Dayton	492	Pittsburgh	132	Wyoming	19
Villanova	491	Baltimore	131	Houston	18
Vanderbilt	464	Brooklyn	131	Detroit Mercy	16
North Carolina	457	Syracuse	130	Dickinson/Penn State	14
Lewis and Clark	435	Oregon	126	Vermont	13
South Texas	409	Western State	123	Capital	12
Harvard	401	Baylor	121	Duquesne	11
William Mitchell	399	Northern Illinois	119	Franklin Pierce	11
Mississippi	392	West Virginia	118	Ohio Northern	11
Arkansas	377	Creighton	108	John Marshall	9
Denver	343	Pepperdine	108	Western New England	9
Washington	304	Texas Tech	105	Brigham Young	8
Hamline	300	Georgia	103	Quinnipiac	7
Duke	299	Miami	103	Cincinnati	5
State Univ. of NY	297	Florida	101	South Dakota	4
Kentucky	294	Utah	97	Michigan	2
City Univ. of NY	289	Arkansas-Little Rock	94	St. Johns	1

Figure 1. Law Library Web Sites Ranked by Luminosity

Web sites as well as print materials.⁸³ Previous studies have shown that it is not uncommon for Web sites to conform to bibliometric laws.⁸⁴

¶122 The tacit premise of figure 1, that better sites have more links, is consistent with the general assumption that recall is more important than precision in conducting legal research.⁸⁵ Reviews of case citators typically discuss which services find more cases,⁸⁶ and many law review writers attempt to pack as many footnotes as possible into their articles.⁸⁷

Discussion of Figure 2

¶123 These numbers are frankly the least reliable of any in this study, given that the Alta Vista search engine only indexes about 15.5 percent of the publicly accessible Internet⁸⁸ and does not always index sites very thoroughly.⁸⁹ However, Alta Vista is probably the most reliable of any search engine for tasks of this nature.⁹⁰ Indexing of library Web sites is complicated by the rapidity with which URLs change.⁹¹ In cases where an out-of-date URL could be found for a site, the links to that URL were added to the site's total. Therefore, representation of sites in figure 2 is somewhat dependent on the author's ability to locate alternative URLs.

¶124 Visibility is an increasingly important measure of a site's influence. "[E]ach link [is] an implicit endorsement of the location to which it points. . . . [I]n aggregate—that is, when a large enough number is considered—Web links do confer authority."⁹² As the Internet grows and more unreliable sites appear,⁹³ the collective approbation inherent in high visibility could prove useful in identifying superior sites.

83. For an overview of the "80/20 rule," see Richard W. Trueswell, *Growing Libraries: Who Needs Them? A Statistical Basis for the No-Growth Collection*, in *FAREWELL TO ALEXANDRIA* 72, 73–77 (Daniel Gore ed., 1975).

84. See, e.g., Ronald Rousseau, *Sitations: An Exploratory Study*, 1 *CYBERMETRICS* 1 (Nov. 20, 1997) <<http://www.cindoc.csic.es/cybermetrics/articles/v1i1p1.html>>.

85. See Daniel P. Dabney, *The Curse of Thamus: An Analysis of Full-Text Document Retrieval*, 78 *L. LIBR. J.* 5, 16 (1986); but see Scott F. Burson, *A Reconstruction of Thamus: Comments on the Evaluation of Legal Information Retrieval Systems*, 79 *L. LIBR. J.* 133, 139 (1987) (rejecting Dabney's claims about the importance of recall and emphasizing the need for precision).

86. See, e.g., Fred R. Shapiro, *KeyCite and Shepard's—Coverage and Currency of Citations to Recent Cases: A Comparative Study*, *LEGAL INFO. ALERT*, April 1998, at 1, 3.

87. See Arthur Austin, *The Reliability of Citation Counts in Judgments of Promotion, Tenure, and Status*, 35 *ARIZ. L. REV.* 829, 832 (1993).

88. See Lawrence & Giles, *supra* note 41, at 108.

89. See Tunender & Ervin, *supra* note 64, at 175–77.

90. See Stacy Kimmel, *WWW Search Tools in Reference Services*, 57 *REFERENCE LIBR.* 5, 7–11 (1997) (comparing features of World Wide Web search engines).

91. See Brewster Kahle, *Preserving the Internet*, *SCI. AM.*, Mar. 1997, at 82–83 (estimating the average lifetime of a URL at forty-four days).

92. Soumen Charkrabarti et al., *Hypersearching the Web*, *SCI. AM.*, June 1999, at 54, 57–58.

93. See generally J. Sybil Biermann et al., *Evaluation of Cancer Information of the Internet*, 86 *CANCER* 381 (1999) (describing a study that discovered erroneous or poorly documented medical information on many Web sites).

Washburn	6237	Vermont	36	Arizona	12
Emory	3718	Albany	33	Capital	12
Georgetown	1978	Pepperdine	33	Marquette	12
Southern California	1514	Willamette	33	Missouri-Kansas City	12
Texas at Austin	811	Columbia	32	Northern Kentucky	12
Pennsylvania	507	George Mason	32	Nova Southeastern	12
Gonzaga	381	South Dakota	32	Texas Southern	12
Cornell	372	Connecticut	31	Yeshiva	12
Harvard	372	Pittsburgh	31	Dayton	11
Pace	356	Richmond	30	Drake	11
Regent	315	Loyola Marymount	29	McGeorge	11
Cleveland State	257	Arkansas-Little Rock	28	Mississippi	11
Chicago	243	Oregon	27	Seattle	11
Houston	239	Villanova	27	Depaul	10
Maryland	204	California Western	26	Miami	10
Denver	172	Kentucky	26	Touro	10
Florida State	168	Southwestern	26	Franklin Pierce Law Ctr.	9
Southern Illinois	164	St. Louis	26	Ohio Northern	8
Illinois	155	Oklahoma	24	Washington and Lee	8
Stanford	152	Utah	24	Alabama	7
Wake Forest	151	Vanderbilt	24	Baylor	7
Rutgers-Camden	148	Wyoming	24	Boston University	7
Rutgers-Newark	136	Southern Methodist	23	Duquesne	6
Colorado	130	Missouri-Columbia	22	Loyola-Chicago	6
Washington	128	Tennessee	22	St. Thomas	6
John Marshall	119	Yale	22	Valparaiso	6
Chicago-Kent	108	Cincinnati	21	North Carolina Central	5
Kansas	94	Indiana-Indianapolis	21	Quinnipiac	5
California-Hastings	91	Northern Illinois	21	Boston College	4
Nebraska	87	Baltimore	20	Brigham Young	4
Iowa	82	Notre Dame	20	Detroit	4
California-Berkeley	80	Stetson	20	San Diego	4
Lewis and Clark	78	Georgia State	19	Toledo	4
State Univ. of NY	77	Louisville	19	Chapman	3
Howard	76	Pennsylvania State	19	Golden Gate	3
Case Western Reserve	75	American	18	Mississippi College	3
California-Davis	73	City Univ. of NY	18	Samford	3
Brooklyn	67	Hamline	18	Detroit Mercy	2
New England	67	Northeastern	18	New York Law School	2
South Carolina	64	Idaho	17	Ohio State	2
UCLA	53	Santa Clara	17	Temple	2
New York University	52	Washington (St. Louis)	17	Texas Tech	2
North Carolina	52	Arizona State	16	West Virginia	2
Akron	48	North Dakota	16	Western State	2
San Francisco	48	Oklahoma City	16	Wisconsin	2
Campbell	47	Tulane	16	District of Columbia	1
Duke	45	Tulsa	16	Loyola-New Orleans	1
Georgia	45	Wayne State	16	Texas Wesleyan	1
Michigan	45	Creighton	15	Western New England	1
Syracuse	45	Indiana	15	William and Mary	1
Widener	44	William Mitchell	15	Fordham	0
Florida	43	Arkansas-Fayetteville	14	Hofstra	0
George Washington	43	Catholic	14	Maine	0
Minnesota	40	Memphis	14	New Mexico	0
South Texas	39	Virginia	14	Roger Williams	0
Suffolk	39	Louisiana State	13	Thomas M. Cooley	0
Montana	38	Seton Hall	13	Thomas Jefferson	0
Northwestern	36	St. Johns	13	Whittier	0

Figure 2. Law Library Visibility (According to AltaVista)

Discussion of Figure 3

¶25 Figures 3a and 3b show the relationship between each law library's visibility and luminosity. Figure 3b excludes library sites with very high values so as to present a more detailed picture of the average site. Overall there seems to be no clear correlation between visibility and luminosity. There is a large cluster of sites that are highly luminous but not very visible. In other words, there is no guarantee that large numbers of links alone will increase a site's public profile. Sites that offer primary legal sources⁹⁴ or value-added services⁹⁵ are likely to be linked to regardless of their luminosity. There are also a host of external variables, unrelated to site content and not considered in this study, which could affect a site's visibility. Among these would be the age of the site, the prestige of the sponsoring institution, and the extent of the efforts by those maintaining the site to get it indexed by major search engines.

Discussion of Figure 4

¶26 Figure 4 shows the URLs that were linked at least twenty times from law library sites, ranked in order of visibility. The links reveal an interesting mixture of conventional sources that all law libraries should have on the shelves, such as the *United States Code*, and other materials that are more difficult to locate in print, such as international documents. Linking to materials that have no analogue in the print collection may often be a difficult step for librarians to make, since many organizers of electronic information tend to view online resources as a mere extension of the print library rather than an entirely new medium.⁹⁶

Discussion of Figure 5

¶27 Figure 5 displays all Web servers that were linked at least fifty times from law library Web sites. Many of these host names appeared in figure 4, but some, such as 193.135.156.15 (a United Nations human rights information server), are new. This server is listed among the most visible hosts, but not the most visible URLs, because most of the links to it are "deep links" pointing to specific documents on the server.⁹⁷ No one document on the server was linked to often enough to appear in figure 4, but the cumulative number of links to the host name was very high.

94. See generally David Rampe, *Your Own Law Library (No Shelves Required)*, N.Y. TIMES, May 12, 1997, at D1.

95. See generally Maurice C. York, *Value-Added Reference Service: The North Carolina Periodicals Index*, COMPUTERS IN LIBR., May 1997, at 30.

96. See KATSH, *supra* note 42, at 69-79.

97. See *supra* notes 79-80 and accompanying text.

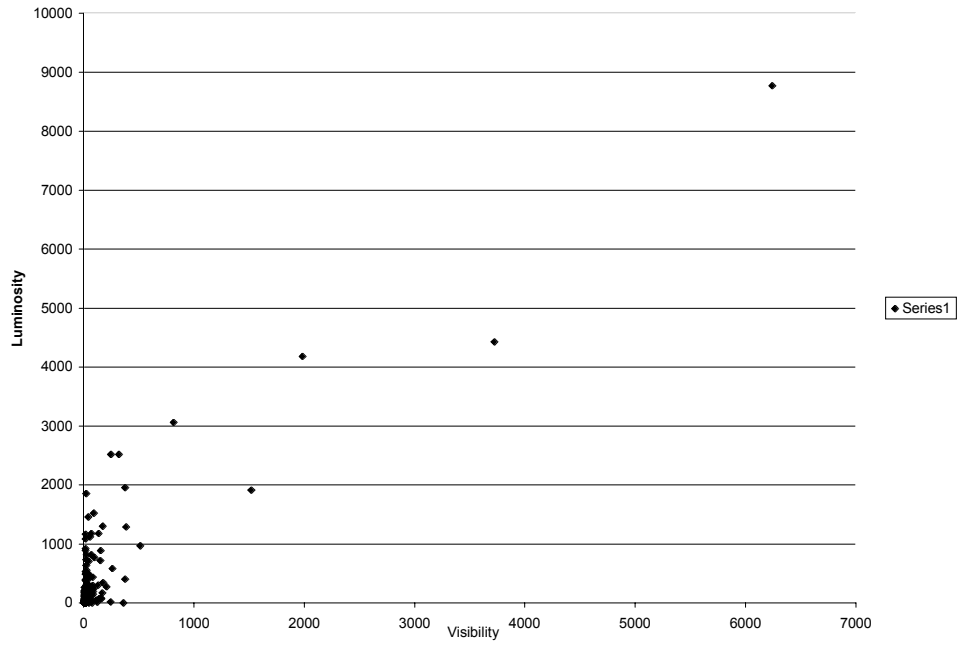


Figure 3a. Visibility v. Luminosity

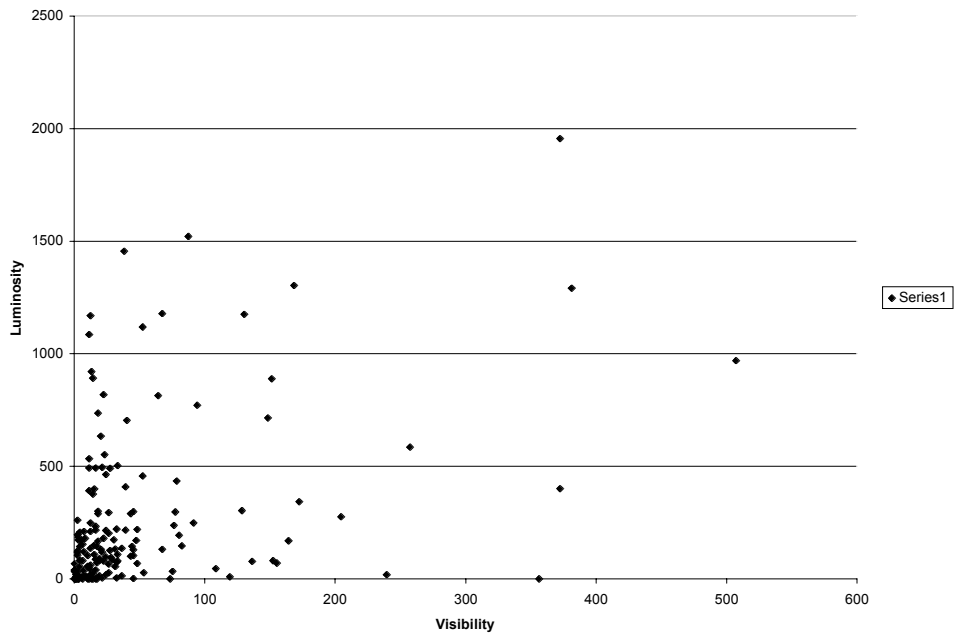


Figure 3b. Visibility v. Luminosity (Magnified)

An analysis of the numbers in this table reveals that they also follow a Trueswell distribution.⁹⁸

¶128 A few of the highest-ranking host names in figure 5 belong to law libraries.⁹⁹ High visibility in this “relevant market”¹⁰⁰ may be more significant than the general visibility depicted in figure 2, since presumably a link from one law library to another constitutes the endorsement of an informed peer.

Summary of Results

¶129 The presence of the 80/20 distribution for library site luminosity, while interesting as a bibliometric phenomenon, is something of a disappointment. It indicates that a small portion of sites are providing most of the labor and thought for the entire community. One author, finding similarly small percentages of highly useful sites, concluded that half of the servers in his subject area “designed, financed, constructed and maintained in all parts of the world could be safely switched off, not only without any loss to anyone, but actually to the great benefit of all serious Net users.”¹⁰¹ Perhaps many of the less impressive pages exist only because of “the ‘gold rush’ mentality, which encourages a sense of false urgency. There appears to be a widespread belief that a presence on the Web (even a poor one) is better than having no presence at all.”¹⁰² However, having a Web site that no one uses is functionally equivalent to having no site at all.

Applications of This Research

¶130 Currently, information of this nature is of use primarily to library webmasters. However, these research methods could increase in importance if, as some have suggested, the ABA elects to pay more attention to electronic services in its evaluations of law libraries.¹⁰³ Although ABA accreditation standards now recognize

98. The 3,096 most visible servers are linked to 55,034 times, meaning that 20 percent of the servers account for 76.6 percent of the links.

99. This is one of many instances where the distinction between law library and law school sites becomes blurred. Often when a law library shares space on a law school server, it is difficult to determine whether resources “belong” to the law school or the library. Of course, the question is probably unimportant to anyone except researchers undertaking studies like this one.

100. See Austin, *supra* note 87, at 829, 836 n.58 (1993) (explaining the relevance of the antitrust relevant market concept to citation analysis).

101. T. Matthew Ciolek, *The Size, Content and Geography of Asian Cyberspace: An Initial Measurement*, J.E. ASIAN LIBR., Oct. 1997, at 1, 12.

102. Mark Stover & Steven D. Zink, *World Wide Web Home Page Design: Patterns and Anomalies of Higher Education Library Home Pages*, REFERENCE SERVICES REV., Fall 1996, at 7, 15 (criticizing library Web pages for poor design practices).

103. See Gail M. Daly, *Law Library Evaluation Standards: How Will We Evaluate the Virtual Library?*, 45 J. LEGAL EDUC. 61, 72–73 (1995) (arguing for an increased emphasis on digital collections in the ABA accreditation process).

thomas.loc.gov	93	www.access.gpo.gov/	
www.findlaw.com	89	su_docs/aces/aces002.htm	38
law.house.gov	78	www.ilrg.com/	36
www.un.org	72	www.spl.org/govpubs/	
www.law.cornell.edu	68	municode.html	36
www.yahoo.com/	64	law.house.gov/89.htm	36
www.abanet.org	63	www.law.cornell.edu/citation/	
www.access.gpo.gov/		citation.table.html	36
su_docs/aces/aces140.html	61	www.law.emory.edu/4circuit	36
www.senate.gov	59	www.cnn.com/	35
www.law.cornell.edu/		www.courtvt.com/	35
uscode	58	www.westlaw.com/	35
www.house.gov	56	lawlib.wuacc.edu/washlaw/	
www.tufts.edu/fletcher/		uslaw/statelaw.html	35
multilaterals.html	55	www.epa.gov/	34
www.excite.com/	54	www.ll.georgetown.edu/	
www.wld.com/	51	Fed-Ct/cadc.html	34
www.lycos.com/	50	www.oas.org/	34
supct.law.cornell.edu/supct	48	www.switchboard.com/	34
www.access.gpo.gov	47	www.fedworld.gov/supcourt/	
www.hotbot.com/	46	index.htm	33
law.house.gov/usc.htm	45	www.infoseek.com/	33
www.lib.uchicago.edu/		www.lawcrawler.com/	33
~llou/lawlists/info.html	43	www.nytimes.com/	33
www.law.emory.edu/		www.state.gov/	33
6circuit	43	www.un.org/Depts/Treaty	33
lawlib.wuacc.edu/forint/		www.whitehouse.gov	33
forintmain.html	42	www.census.gov/	32
www.law.emory.edu/		www.wto.org/	32
FEDCTS	42	www.altavista.digital.com/	31
www.aallnet.org/	41	www.wulaw.wustl.edu/	
www.law.vill.edu/Fed-Ct/		8th.cir/	31
ca03.html	41	www.access.gpo.gov/nara/	
www.law.emory.edu/		cfr/index.html	31
1circuit	41	www.access.gpo.gov/	
www.martindale.com/	40	su_docs/dpos/adpos400.html	31
www.access.gpo.gov/		www.law.emory.edu/fedcircuit	31
su_docs	40	www.law.emory.edu/LAW/	
www.law.cornell.edu/icj	40	refdesk/toc.html	31
altavista.digital.com/	39	www.law.indiana.edu/law/	
www.sec.gov/	39	v-lib/lawindex.html	30
lawlib.wuacc.edu/		www.law.cornell.edu/rules/	
washlaw/washlaw.html	39	frcp/overview.htm	30
www.findlaw.com/		www.law.cornell.edu/rules/	
casecode/supreme.html	39	fre/overview.html	30
europa.eu.int/	38	www.law.emory.edu/10circuit	30
www.uscourts.gov/	38		

Figure 4. Most Visible External URLs (URLs Linked at Least Thirty Times Shown)

www.law.cornell.edu	1316	www.census.gov	102	www.state.ar.us	71
www.access.gpo.gov	904	www.georgetown.edu	101	lawlib.slu.edu	70
193.135.156.15	701	www.law.umich.edu	101	www.courts.state.mn.us	68
www.findlaw.com	651	sunsite.unc.edu	100	www.fcc.gov	68
law.house.gov	618	www.ilrg.com	100	www.lrc.state.ky.us	68
www.abanet.org	542	www.courtvt.com	99	www.lycos.com	68
www.law.emory.edu	534	www.icrc.ch	98	www.nolo.com	68
lawlib.wuacc.edu	517	www.geocities.com	96	www.touchngo.com	68
www.house.gov	504	www.lawcrawler.com	94	www.cnn.com	67
www.yahoo.com	422	www.lectlaw.com	93	seamless.com	66
www.hg.org	395	www.washingtonpost.com	93	law.richmond.edu	65
www.law.vill.edu	368	www.adr.org	92	www.usps.gov	65
www.law.indiana.edu	359	www.uchastings.edu	92	www.wto.org	65
www.state.gov	326	www.state.sd.us	91	www.jura.uni-sb.de	64
www.un.org	324	www.tourolaw.edu	90	www.law.utexas.edu	64
www.uni-wuerzburg.de	315	www.wld.com	90	www.lawinfo.com	64
lcweb.loc.gov	298	www.austlii.edu.au	89	law.gonzaga.edu	63
thomas.loc.gov	289	www.epa.gov	89	www.droit.umontreal.ca	63
www.tufts.edu	245	www.law.uc.edu	89	www.fjc.gov	63
www.ljx.com	238	www.fplc.edu	87	www.leginfo.ca.gov	63
europa.eu.int	220	www.state.me.us	87	www.nol.org	63
www.senate.gov	215	www.cali.org	86	www.nyu.edu	63
www.unhcr.ch	188	www.law.duke.edu	86	ourworld.compuserve.com	61
www.lib.uchicago.edu	171	www.columbia.edu	85	www.lawlib.uh.edu	61
www.kentlaw.edu	170	www.harbor.net.com	85	www.nara.gov	61
lcweb2.loc.gov	165	www.law.harvard.edu	85	www.state.sc.us	61
www.whitehouse.gov	165	www.state.de.us	84	www.westlaw.com	61
www.unhchr.ch	160	www.state.nh.us	84	jurist.law.pitt.edu	60
www.usdoj.gov	159	www.law.tulane.edu	83	www.eff.org	60
www.ljextra.com	157	www.ojp.usdoj.gov	81	www.legalethics.com	60
www.umn.edu	155	www.urich.edu	81	www.natlaw.com	60
www.amnesty.org	145	www.embassy.org	80	www.courtinfo.ca.gov	59
supct.law.cornell.edu	141	www.ncsc.dni.us	80	www.law.ukans.edu	59
www.wa.gov	140	www.igc.apc.org	78	www.ssa.gov	59
www.irs.ustreas.gov	135	www.oclc.org	78	www.alaska.net	58
www.usc.edu	135	www.state.co.us	78	www.lcp.com	58
www.oup.co.uk	133	www.martindale.com	77	www.state.nj.us	58
www.aallnet.org	127	www.webcom.com	77	www.westgroup.com	58
www.fedworld.gov	121	www.library.nwu.edu	76	www.dol.gov	57
members.aol.com	120	web.lexis-nexis.com	75	www.ilo.org	57
sedac.ciesin.org	120	www.law.pace.edu	75	www.lawsources.com	57
www.ink.org	119	www.oas.org	75	www.lib.berkeley.edu	57
www.state.id.us	118	www.asil.org	74	www.wulaw.wustl.edu	57
www.lib.umich.edu	115	www.wcl.american.edu	74	assembly.state.ny.us	56
www.ll.georgetown.edu	115	www.law.upenn.edu	73	tarlton.law.utexas.edu	56
www.lexis-nexis.com	114	www.lpittr.state.sc.us	73	www.barbri.com	56
www.yale.edu	113	www.ncjrs.org	73	www.bna.com	56
www.uscourts.gov	110	www.leland.stanford.edu	73	www.constitution.org	56
www.library.vanderbilt.edu	108	www.excite.com	72	www.jmls.edu	56
www.state.il.us	108	www.llrx.com	72	www.mt.gov	56
www.uspto.gov	107	www.law.fsu.edu	71	elsinore.cis.yale.edu	55
www.odci.gov	104	www.lexis.com	71	nersp.nerdc.ufl.edu	55
www.sec.gov	104			www.halcyon.com	55

(continued)

Figure 5. External Hostnames Ranked by Visibility

www.igc.org	55	www.aclu.org	53	www.pitt.edu	51
www.lweekly.com	55	www.law.ucla.edu	53	www.usatoday.com	51
www.nytimes.com	55	www.municode.com	53	leginfo.leg.wa.gov	50
www.wipo.org	55	altavista.digital.com	52	www.ai.org	50
pathfinder.com	54	gsulaw.gsu.edu	52	www.state.ky.us	50
www.law.sc.edu	54	www.state.ga.us	52	www.state.tn.us	50
www.lawguru.com	54	www.state.ma.us	52	www.willamette.edu	50
www.nando.net	54	www.utexas.edu	52		
www.westpub.com	54	www.hawaii.gov	51		

Figure 5. External Hostnames Ranked by Visibility (*continued*)

electronic resources as part of a library collection,¹⁰⁴ no particular provision has been made for the evaluation of Internet resources, except in the context of distance learning.¹⁰⁵ Traditional ABA measures have dealt with the size of library collections,¹⁰⁶ but on the Internet, the marginal cost of increasing “collection” size is very close to zero,¹⁰⁷ so substantial differences in the extent of Web site coverage will not be reflected in traditional economic data. The citation analysis methods proposed in this article provide a more effective tool for evaluating the quality of Web sites.

104. “The word ‘collection’ includes printed sources, microforms, audio-visual works, and access to electronic formats.” AM. BAR ASS’N, *supra* note 51, at 64.

105. See Section of Legal Educ. & Admissions to the Bar, Am. Bar Ass’n, *Memorandum D9697-59: Distance Education* (May 6, 1997) <<http://www.abanet.org/legaled/distance.html>> (contains full text of ABA’s *Temporary Distance Education Guidelines*).

106. See AM. BAR ASS’N, OFFICIAL AMERICAN BAR ASSOCIATION GUIDE TO APPROVED LAW SCHOOLS 84-447 (2000) (providing profiles of all ABA-approved law schools that include volume counts for the schools’ law libraries).

107. See Eric Schlachter, *The Intellectual Property Renaissance in Cyberspace: Why Copyright Law Could Be Unimportant on the Internet*, 12 BERKELEY TECH. L.J. 15, 20 (1997) (explaining the low marginal cost of electronic information).