

2010

# What if Law Journal Citations Included Digital Object Identifiers?: A Snapshot of Major Law Journals

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#### Abstract

Prevailing citation practice in law journals is to use uniform resource locators (URLs) when citing electronic sources. Digital object identifiers (DOI) provide a more reliable and robust mechanism for citing digital, scholarly articles. This study examines to what extent DOI names exist but are not used in law journal citations. Citations to scholarly articles from twenty-five randomly-selected articles appearing in the 2007-2008 volumes of four major law journals (*Harvard Law Review*, *Columbia Law Review*, *Yale Law Journal*, and *University of Pennsylvania Law Review*) were checked for existing DOI names using CrossRef's Simple Text Query form. This resulted in 394 citations that could have had DOI names, but did not. This number suggests that law journal editors and librarians should consider adding DOI names to citations. For journals that publish exclusively online or are interdisciplinary, assigning DOI names to their own articles may be a prudent measure to better ensure long-term digital access and citation by scholars in other fields.

Keywords: digital object identifier, link rot, legal citation

### Introduction

Citation practice in law journals has a long, venerated history. A key function of a citation is enabling researchers to locate the unique resource that is being cited. The traditional rules for citing scholarly articles have performed this function pretty well—120 HARV. L. REV. 393 points to the one article that starts on page 393 of the Harvard Law Review's 120<sup>th</sup> volume. In addition to being a unique identifier for articles, the volume-title-page citation is persistent—it is highly unlikely that the hard copy journals would ever be re-paginated such that the identifier would no longer reliably represent the cited article.

However, like many things, digital communications have rendered long-standing practices less useful than they used to be. Journals now routinely reference electronic sources, including electronic versions of scholarly articles, and some journals even publish exclusively online. The traditional citation system based on paper does not seamlessly map onto digital articles. When articles are not initially published in paper or PDF format, then traditional page numbers do not make much sense. Even when originally paper articles are digitized and posted online, the most common means of pointing to these documents, the

Uniform Resource Locator (URL) is unreliable due to “link rot.”<sup>1</sup>

Persistent digital identifiers have been created to help ameliorate this problem, and one device, the digital object identifier (DOI), has been generally adopted by many scholarly publishers.<sup>2</sup> While many publishers in non-legal disciplines assign DOI names, law journals have not made much use of DOI names in footnotes or as identifiers for their articles. This study looks at a snapshot of a selection of articles published in 2007 and 2008 in the law journals that edit the *Bluebook*, the dominant legal citation guide.

To decide whether legal scholarship should join other disciplines in assigning and citing with DOI names, it would be useful to have some idea of the extent to which articles cited in law journals have DOI names that could be, but are not, included in the footnotes. If enough articles cited in law journals have DOI names, then journal editors, law librarians, and producers of legal citation guides will have evidence to support using DOI names in citations.

### Literature Review

Proper citation is important in all serious scholarship, but for legal scholarship precise and accurate citation is particularly emphasized. As Rumsey

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<sup>1</sup> Posting of Sarah Rhodes to VoxPopuLII, <http://blog.law.cornell.edu/voxpath/2010/01/10/preserving-born-digital-legal-materials/> (Jan 10, 2010); Mary Rumsey, *Runaway Train: Problems of Permanence, Accessibility, and Stability in the Use of Web Sources in Law Review Citations*, 94 LAW LIB. J. 27 (2002).

<sup>2</sup> CrossRef, 40 Million CrossRef DOI names Preserve the Record of Scholarship (Feb. 5, 2010), <http://www.crossref.org/01company/pr/news020210.html>.

has noted, “Access to the authority underlying (and cited in) the author's work is crucial for scholarship.”<sup>3</sup> Due to their extensive background discussions and research documentation, many law journal articles become references for their niche areas of law. Accurate and reliable retrieval of cited resources is thus crucial to one of law journals' core functions.

While traditional citation of paper resources somewhat satisfies this need, it fails to permit adequate citation of exclusively digital articles. Some non-legal (such as *D-Lib Magazine* and *First Monday*) and legal (like the *Duke Law & Technology Review*) digital journals do not use conventional pagination, and while many online law review supplements do provide articles in PDF with pagination, they are never widely printed, and complete citations require some sort of digital identifier (at present, generally a URL). For articles that are published both in print and online, providing parallel citations to both media increases accessibility. Electronic links, most commonly as URLs, are necessary for effective citations in law journals, no matter whether the journal is published in print or digital format.

However, several studies have raised serious concerns about URLs' long-term reliability. In 2002 Rumsey studied citations containing URLs from 1997 to 2001. She found that only 61% of links from 2001 still worked, and that

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<sup>3</sup> Rumsey, *supra* note 1, at 28.

percentage dropped to 30% for links made in 1997.<sup>4</sup> Most of the references using URLs were probably not to law journal articles, but instead news stories, government documents and organizational publications. Rumsey recommended that journals include parallel citations to more stable print and commercial database sources in case links break. She also advocated for journals or libraries retaining print copies of cited online sources.<sup>5</sup>

Two other studies provided further evidence that link rot is a problem in law journals. Neacsu examined twenty articles that cited to URLs and found that twelve of the articles had broken links.<sup>6</sup> Canick compared the persistence of references using URLs and references to commercial databases. He found that resources in commercial databases generally fared better in terms of retrievability than sources on the World Wide Web.<sup>7</sup> In 2006 Davis studied a narrower range of URLs in Washington state law journals. She found that roughly 40% of links were broken and that most URLs were from the .com, .org and .gov domains.<sup>8</sup> Since

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<sup>4</sup> *Id.* at 35.

<sup>5</sup> *Id.* at 39

<sup>6</sup> E. Dana Neacsu, *Legal Scholarship and Digital Publishing: Has Anything Changed in the Way We Do Legal Research?*, 21 LEGAL REFERENCE SERVS. Q. 105 (2002) [doi: 10.1300/J113v21n02\_06].

<sup>7</sup> Simon Canick, *Availability of Works Cited in Recent Law Review Articles on LEXIS, Westlaw, the Internet, and Other Databases*, 21 LEGAL REFERENCE SERVS. Q. 55 (2002) [doi: 10.1300/J113v21n02\_03].

<sup>8</sup> Helane Davis, *Keeping Validity in Cite: Web Resources Cited in Select Washington Law Reviews, 2001-03*, 98 LAW LIBR. J. 639 (2006).

most law journals are based at law schools and thus would be in the .edu domain, it is likely very few of these URLs pointed to law journal articles. While no articles were found studying the longevity of URLs for law journal articles, given the frequent turnover of journal staff and inevitable revision of law school and journal websites, there is little reason to think that article URLs can remain functional for the long term without some effort. This is especially bothersome for law journals, which, according to a 2006 study, cite other law journal articles in almost 60% of their citations.<sup>9</sup>

Given this troubling evidence for link rot in law journals, solutions needed to be developed. Proposals to maintain print copies, provide parallel cites to print resources in case the URLs break, and citing to commercial databases have been mentioned. Lyons suggested adopting persistent digital identifiers to combat link rot. These identifiers point to a specific digital document instead of the location on a server that is hosting it. Thus, if the document is moved to another server due to a website redesign or because a journal is taken over by another publisher, the persistent identifier would still allow the document to be retrieved. After reviewing the various models for persistent digital identification, she urged librarians to assist journals in adding digital object identifiers and persistent URLs

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<sup>9</sup> Vincent Larivière et al., *The Place of Serials in Referencing Practices: Comparing Natural Sciences and Engineering with Social Sciences and Humanities*, 57 J. AM. SOC'Y INFO. SCI. & TECH. 997, 1002 (2006) [doi: 10.1002/asi.20349].

to footnotes when possible.<sup>10</sup>

There are several models of persistent digital identifiers, but the digital object identifier model<sup>11</sup> is most relevant to law journals because it is the system used most commonly by scholarly journals. A typical DOI looks like this: 10.5555/journal2005.4. The “10.” simply marks the string of characters as a DOI, and the “5555” is a prefix assigned to a particular publisher. The suffix that appears after the forward slash points to a specific scholarly work and can be any arbitrary set of characters. Some publishers simply use a string of numbers, while others use a combination of numbers, letters, and punctuation marks. When a DOI is resolved by adding it to the end of <http://dx.doi.org> in a web browser or entering it into a resolver form, the researcher is sent to the most current location of the official version of the scholarly work. The publisher can decide whether the article is open access or requires a subscription or fee. Even if a publisher rearranges its website, changes names, or is absorbed by another publisher, the DOI system maintains a central and current index that enables researchers to find articles online, while normal URLs would be broken by such changes. When accessed through computers of libraries that subscribe to databases containing articles with DOI names, those DOI names, along with an OpenURL resolver program, will send researchers to the versions of articles in accessible databases.

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<sup>10</sup> Susan Lyons, *Persistent Identification of Electronic Documents and the Future of Footnotes*, 97 LAW LIBR. J. 681 (2005).

<sup>11</sup> INT'L DOI FOUND., THE DOI HANDBOOK, (4.4.1 ed. 2006) [doi: 10.1000/186].



Due to these advantages, the DOI has become the standard digital identifier for scholarly publishing, with most hard science and many social science and humanities publishers using DOI names for their articles.<sup>12</sup> The latest edition of the *Publication Manual of the American Psychological Association* recommends including DOI names in citations when possible.<sup>13</sup> Over 40 million DOI names have been registered through CrossRef.<sup>14</sup> Law journals, however, have yet to generally adopt use of DOI names either by assigning DOI names to articles or including DOI names in citations. A recent search of Westlaw's law journal database indicated that only 383 articles in the entire database of thousands of articles contained any mention of DOI names. This could partly be due to the fact that the major citation guides for law journals, the *Bluebook*<sup>15</sup> and the *ALWD Citation Manual*<sup>16</sup> do not mention DOI names, although both give citation examples that use Westlaw and Lexis's unique database identifiers, indicating that the editors recognize the importance of unique digital identifiers.

Law journal citations that only use URLs and commercial database identifiers may generally lead researchers to the desired sources. But journals are giving up significant benefits by not using DOI names, including more persistent

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<sup>12</sup> Amy Brand, *CROSSREF: From Linking to Cross-Provider Search*, 50 SERIALS LIBRARIAN 119 (2006) [doi: 10.1300/J123v50n01\_11].

<sup>13</sup> AM. PSYCH. ASS'N, PUBLICATION MANUAL OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, (6th ed. 2010).

<sup>14</sup> CrossRef, *supra* note 2.

<sup>15</sup> THE BLUEBOOK: A UNIFORM SYSTEM OF CITATION (Columbia Law Review et al., eds. 18<sup>th</sup> ed. 2005).

<sup>16</sup> ASS'N OF LEGAL WRITING DIRECTORS & DARBY DICKERSON, ALWD CITATION MANUAL: A PROFESSIONAL SYSTEM OF CITATION, (3rd ed. 2006).

access and links to citing articles. This study seeks to examine how many scholarly articles cited in law journals have existing DOI names that could have been, but were not, included in the citation.

### Methods

The *Bluebook* is edited by four major law journals, the *Harvard Law Review*, *Yale Law Journal*, *Columbia Law Review*, and *University of Pennsylvania Law Review*. Since these journals have long been leaders in legal citation practice, this study will examine to what extent scholarly articles are cited in their pages that could have had DOI names included in their citations. A search was performed of Westlaw's database for each journal for "doi /2 10." ("doi" within two words of "10.") A common form of citing a DOI looks like this: "DOI: 10.5555/article," so this search would retrieve articles that included DOI names in their footnotes. All four searches retrieved no documents, so none of the four *Bluebook*-editing journals appear to have included DOI names in their citations.

All 87 scholarly articles written by non-students from the 2007-2008 volumes of the *Harvard Law Review* (volume 121), *Yale Law Journal* (volume 117), *Columbia Law Review* (volume 108), and *University of Pennsylvania Law Review* (volume 156) were downloaded from Westlaw. Non-student works were identified by excluding any piece whose author was anonymous or identified as a

student or JD candidate. Each article had a unique identifier made by abbreviating its *Bluebook* citation (121HLR394, for example). Twenty-two (25.3%) of the 87 scholarly articles were selected by a random number generator (<http://www.randomizer.org/form.htm>). This study focuses on articles, essays, and book reviews by professors, jurists, or practitioners because they constitute the most common category of article published in law journals. Student-written pieces, memorials, or administrative writings that might have different citation practices were excluded. The footnotes in each of the selected articles were manually examined, and any citations to scholarly articles were copied to an Excel spreadsheet. Scholarly articles were identified by being cited as being in a consecutively-paginated journal (e.g., 121 Yale L.J. 42, as opposed The Ledger May 2006, at 58, the citation form for a non-consecutively-paginated magazine). The extracted citations were sorted alphabetically and duplicate citations were deleted to prevent frequently cited articles from making the sample appear to have more cited articles with DOI names than there were, resulting in 1,041 citations from the 22 selected articles.

These citations were then checked for existing DOI names. CrossRef, the DOI registration agency for scholarly publishing, provides an online form that examines citations and retrieves DOI names if they exist.<sup>17</sup> The form is a large text box into which lists of references can be entered. While a specific citation

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<sup>17</sup> CrossRef, Simple Text Query Version 1.3, <http://www.crossref.org/SimpleTextQuery/>.

style is not required by the CrossRef form, testing showed that the form did not recognize the *Bluebook* volume-title-page convention or journal title abbreviations. Thus, each citation had to be modified by adding the full journal title, moving the volume number and starting page number together, and removing any signals and pinpoint citations. So, for example, “John Smith, Article Title, 121 J. of Pol. 934, 950 (2007)” was changed to “John Smith, Article Title, Journal of Politics 121:934 (2007).” These modifications were made to the citations in the spreadsheet and the modified citations were copied and pasted into a numbered list to comply with the CrossRef form's instructions that reference lists either be numbered or in alphabetical order by author's last name. Citations were pasted into the form in groups of forty citations to prevent the system from timing out and failing to complete retrieval of DOI names. While it is impossible to know whether the form failed to retrieve some DOI names that did exist, the citation form was tested by entering citations to articles that had been independently found to have DOI names, and the form correctly retrieved the DOI names. The accuracy of the DOI names retrieved was spot-checked by resolving DOI names to see if the correct article was found. While in a few instances the form retrieved two DOI names for an article and only one DOI name was correct, all the other checked DOI names led to the assigned article. If a DOI was retrieved for a citation, the DOI was copied into the spreadsheet.

### Findings

Of the 1,041 cited articles, 394 (37.8%) had DOI names, and 647 (62.8%) did not. With a few major exceptions, most major law journal articles did not have DOI names assigned to them. Table 1 displays the number of DOI names found that could have been used, broken down by publisher. JSTOR had the most DOI names by far because it is the only source of DOI names for articles appearing in major law journals like the *Harvard Law Review* and *Yale Law Journal*. The University of Chicago Press published the *Journal of Legal Studies*, another major law journal, and several political science journals that were cited in the sample.

Table 1—Number of DOI names, by assigner ( $n=394$ )

| <b>DOI name assigner</b>    | <b>Number of DOI names</b> |
|-----------------------------|----------------------------|
| JSTOR                       | 264                        |
| University of Chicago Press | 35                         |
| Wiley-Blackwell             | 15                         |
| Elsevier                    | 11                         |
| Cambridge University Press  | 10                         |
| Oxford University Press     | 9                          |
| Sage                        | 7                          |

| <b>DOI name assigner</b>                               | <b>Number of DOI names</b> |
|--|----------------------------|
| Annual Reviews   | 6                          |
| University of California Press                         | 6                          |
| Springer   | 4                          |
| Public Library of Science                              | 4                          |
| American Psychological Association                     | 3                          |
| Project MUSE   | 3                          |
| American Association for the<br>Advancement of Science | 3                          |
| Guttmacher Institute                                   | 2                          |
| American Medical Association                           | 1                          |
| Nature Publishing Group                                | 1                          |
| Massachusetts Medical Society                          | 1                          |
| Mary Ann Liebert, Inc.                                 | 1                          |
| BMJ Publishing Group                                   | 1                          |
| Royal College of Psychiatrists                         | 1                          |
| Duke University Press                                  | 1                          |

| <b>DOI name assigner</b>   | <b>Number of DOI names</b> |
|--|----------------------------|
| American Economic Association                                    | 1                          |
| Institute for Operations Research and<br>the Management Sciences | 1                          |
| Routledge  | 1                          |
| Now Publishers   | 1                          |
| World Health Organization  | 1                          |
| J-STAGE  | 1                          |

Table 2 displays the legal journals that had more than ten articles cited in footnotes that omitted existing DOI names. The journals from which many articles with DOI names were cited are, not surprisingly, highly-regarded law journals. More interesting, though, are the most-cited journals that did not have any articles with DOI names.

Table 2: Existing DOI names that were not included in footnotes,  
by law journal with more than ten cited articles

| <b>Law Journal</b>        | <b>Number of DOI names</b> |
|---------------------------|----------------------------|
| <i>Harvard Law Review</i> | 46                         |

| <b>Law Journal</b>                           | <b>Number of DOI names</b> |
|--|----------------------------|
| <i>Yale Law Journal</i>                      | 38                         |
| <i>Stanford Law Review</i>                   | 24                         |
| <i>University of Pennsylvania Law Review</i> | 19                         |
| <i>Columbia Law Review</i>                   | 17                         |
| <i>Journal of Legal Studies</i>              | 17                         |
| <i>University of Chicago Law Review</i>      | 17                         |
| <i>Michigan Law Review</i>                   | 15                         |

Table 3 shows the most frequently cited journals, whether or not the journals use DOI names. By comparing Table 2 and Table 3, we can see that several of the most-cited law journals did not use DOI names. *Texas Law Review*, *New York University Law Review*, and *Georgetown Law Journal* are heavily cited journals that have do not use DOI names at all.

Table 3: Ten most cited journals

| <b>Law Journal</b>        | <b>Number of Cited Articles</b> |
|---------------------------|---------------------------------|
| <i>Harvard Law Review</i> | 64                              |



|  |    |
|--|----|
| <i>Yale Law Journal</i>                      | 53 |
| <i>Stanford Law Review</i>                   | 42 |
| <i>University of Pennsylvania Law Review</i> | 34 |
| <i>Columbia Law Review</i>                   | 31 |
| <i>Texas Law Review</i>                      | 28 |
| <i>Michigan Law Review</i>                   | 25 |
| <i>New York University Law Review</i>        | 22 |
| <i>University of Chicago Law Review</i>      | 21 |
| <i>Georgetown Law Journal</i>                | 20 |

While the three most-cited journals (*Harvard Law Review*, *Yale Law Journal*, and *Stanford Law Review*) have some DOI names through JSTOR, the database's moving wall means that the most recent articles will not have DOI names. Many articles are cited when they are most timely, so reliance on JSTOR means the benefits of DOI names are forfeited during a time current articles may be cited. For the *Harvard Law Review*, for example, 64 articles were cited, but 46 had DOI names, so nearly a third of the cited articles from that journal did not have DOI names at the time (though they are forthcoming once the embargo period ends).

The law journal articles that did have DOI names fell largely into two categories: articles published by large academic publishers (such as Oxford

University Press or the University of Chicago Press) and articles hosted on JSTOR. For example, the *Journal of Legal Studies* is published by the University of Chicago Press and thus, along with all of the Press's other journals, has articles with DOI names. Most law journals are not published by academic publishers, but rather by law schools, which reduces the number of DOI-assigning journals. The journal aggregator JSTOR has begun assigning DOI names to articles in its database,<sup>18</sup> and a few major law journals' content, including the four *Bluebook*-editing journals examined in this study, have been archived in JSTOR. Of all the journals in Table 2 that had at least ten DOI names that could have been used in references to their articles, only the *Journal of Legal Studies*' articles had DOI names that did not resolve to JSTOR.

### Discussion

This snapshot of references suggests that a fair number of scholarly (legal and non-legal) articles cited in law journals have DOI names that are not being included in the references. This is unfortunate because DOI names provide benefits that traditional *Bluebook* citations and URLs do not, including greater long-term stability and more robust linking between citing and cited articles. Under current legal citation standards, law journals are not taking full advantage of DOI names. Even if the *Bluebook* editors never chose to follow the American

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<sup>18</sup> Michael Spinella, *JSTOR and the Changing Digital Landscape*, 36 INTERLENDING & DOCUMENT SUPPLY 79 (2008) [doi: 10.1108/02641610810878549].

Psychological Association and recommend DOI names be included in citations, journals could modify their in-house citation style by adding DOI names to their otherwise *Bluebook*-compliant footnotes. This would increase the utility of some footnotes without causing much confusion to researchers. Journals can either ask authors to provide DOI names in their citations or look up the DOI names during the process of verifying cited sources.

Journal staff would have to create reference lists from the footnotes and modify the citations to work with the CrossRef tool. While adding this step to cite-checking procedures would add some work, once a method for modifying *Bluebook* citations into a style the CrossRef form will accept is settled, it should not be too burdensome. Some authors can supply DOI names. Many journals print the DOI name on the first page of the article, so cite-checkers can find it in the normal course of verifying bibliographic information. Finally, CrossRef has a searchable list of journals<sup>19</sup> that use DOI names, enabling staff to reduce the number of references that need to be formatted for the CrossRef form. All of these factors help journals add DOI names without adding an undue amount of time to cite-checking. Journals could also include DOI names while more closely following *Bluebook* style by expressing the DOI name as a URL by adding “dx.doi.org/” before the DOI name. In that case, an article with the URL “http://www.publisher.com/journal/march\_1” and DOI name “10.5555/jrnl1234”

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<sup>19</sup> CrossRef, Title List, <http://www.crossref.org/titleList/>.

would be cited with the URL “<http://dx.doi.org/10.5555/jrn1234>.” This DOI-based URL would be more stable and persistent than the standard URL.

A further step journals can take is joining CrossRef and assigning DOI names to their articles. It has been suggested that DOI fees (an annual CrossRef membership fee and one dollar per DOI)<sup>20</sup> may be an obstacle for small publishers,<sup>21</sup> and journals will have to carefully consider whether the fees are worth the benefits DOI names offer. These identifiers may be particularly used for law journals that publish articles exclusively online and journals that are very interdisciplinary in scope. Online journals could use DOI names to help avoid link rot in article URLs, thereby maintaining more reliable online accessibility over the long term. Interdisciplinary journals may benefit from increased access by researchers in other fields by using DOI names to give non-legal scholars a familiar and convenient means of retrieval. While some legal scholarship is valuable to non-legal researchers, lack of familiarity with or access to legal databases may present obstacles to research.<sup>22</sup> Assigning DOI names to law journal articles can provide non-legal scholars a parallel access method, while legal scholars are likely to continue relying on legal databases such as Lexis, Westlaw and HeinOnline. While JSTOR appears to have begun this process for

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<sup>20</sup> CrossRef, Publisher Fees, [http://www.crossref.org/02publishers/20pub\\_fees.html](http://www.crossref.org/02publishers/20pub_fees.html).

<sup>21</sup> Robert P. Dellavalle, et al., *Going, Going, Gone: Lost Internet References*, 302 SCIENCE 787 (2003) [doi: 10.1126/science.1088234].

<sup>22</sup> Mikhail Koulikov, *Indexing and Full-Text Coverage of Law Review Articles in Nonlegal Databases: An Initial Study*, 102 LAW LIBR. J. 39, 41-42 (2010).

the most elite law journals, journals that are open access, specialized in scope, or outside the highest tier will need to adopt DOI names on their own if it is to happen in the near foreseeable future.

This method of selecting articles and citations and finding DOI names is far from perfect, and this study does not determine what proportion of law journal references generally could include DOI names. Rather, this snapshot simply shows that the number of omitted DOI names is not trivial. It is certainly possible that errors were made when extracting citations to scholarly articles and DOI names, but most mistakes would lead to an existing DOI being missed rather than purporting to find a DOI that does not exist. If anything, then, this study undercounts the number of DOI names that could have been included in citations.

### Conclusion

Traditional legal citation has a long history, but new mechanisms are needed to most effectively cite and link scholarly legal articles. Digital object identifiers provide an established solution that has already been widely accepted in other disciplines. DOI names can be added to footnotes without doing much violence to *Bluebook* style or placing inordinate burdens on journal staff. This is a very preliminary exploration into the suitability of DOI names for law journals, but the non-trivial number of articles cited that had DOI names suggests that journal editors, article authors, and academic librarians who work with legal

materials should consider further investigation of DOI names and their role in further bringing legal citation into the digital age.