

Improving Digital Publishing of Legal Scholarship

Version 1.0, October 2, 2014

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Abstract

Legal scholarship's main mode of formal communication, the law journal article, is mostly stuck in the print publishing model. By adopting some tools and practices made possible by digital communications, legal scholarship can become more accessible, flexible, and interdisciplinary. Instructive examples can be found in the science, technology, engineering, and medicine (STEM) journals. These practices are publishing in HTML and e-book formats, and adopting persistent identifiers for scholarly works.

Introduction

¶1 Since the first law reviews were published in the late nineteenth century, journals have grown in numbers and influence.¹ Now there are hundreds of law journals, both student-edited and published by commercial publishers.² Law journals serve as a major venue for sharing legal scholarship with academics, practitioners, and non-legal researchers.³

¶2 Both authors and editors of law journal articles--whether student, faculty, or professional--want legal scholarship to reach appropriate audiences in useful formats. They also want to know how their works are being used. Before widespread electronic communications, printing the articles in paper volumes and distributing them to subscribers (mostly libraries) was the best path. Now with digital publishing technologies, journals also post their content online and distribute them through legal research databases. However, most journals hew to the closest digital counterpart to printed paper, the Portable Document Format (PDF) file. Digital legal scholarship is, for the most part, comprised

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¹ Michael I. Swygert & Jon W. Bruce, *The Historical Origins, Founding, and Early Development of Student-Edited Law Reviews*, 36 HASTINGS L.J. 739, 742 (1985).

² John Doyle, *The Law Reviews: Do Their Paths of Glory Lead but to the Grave?*, 10 J. APP. PRAC. & PROCESS 179, 180 (2009).

³ Michael L. Closen & Robert J. Dzielak, *The History and Influence of the Law Review Institution*, 30 AKRON L. REV. 15, 23 (1996).

of black text on a white background with footnotes, typeset and paginated for publication in a print issue.

¶3 To see what is truly possible in scholarly publishing, we can look to science, technology, engineering, and medicine (STEM) journals. They have adopted tools and practices that take better advantage of the capabilities digital communications offers. These practices include publishing in formats other than PDF and using persistent standard identifiers for articles. Legal scholarship can implement these ideas with some modifications and thereby improve its accessibility and usability, both in the short-term and for future generations.

¶4 This paper will describe how major STEM publishers distribute in formats beyond PDF and use persistent identifiers. Then it will discuss how law journals and authors could adapt these practices for legal scholarship.

Publishing Beyond the PDF

¶5 As far as documents go, law review articles have not been very complicated. They have plenty of text and footnotes, but compared to scientific research, there are few images or tables, much less dynamic simulations or video. STEM journals have incorporated these more complex features to display their author's findings. Legal scholarship could be enriched through integrating images, video, and other media if law journals could augment their publishing capacities,

¶6 The key to achieving greater publishing flexibility is to discard the mentality that articles need only be PDF files. Legal scholarship's use of PDF as the virtually exclusive format of choice has prevented journals from experimenting with different media and hindered the exchange of ideas and research between legal scholarship and other fields of study. The attitude that law review articles should be in PDF and closely resemble articles as they were printed in the past is understandable, in the sense that PDF is comfortingly familiar and therefore maintains the printed page's association with scholarly inquiry and professorial authority. PDF files can be copied, searched, and printed, but other formats can do much more. This is not to suggest that PDF should not be used, but rather that it should not be the primary or exclusive distribution format.

¶7 Publishing in HTML and EPUB provides greater flexibility for formatting, more display options

for readers, and deeper computer analysis. This is because PDF is an image-based format. It is very good at presenting content the same way, regardless of the device displaying it. HTML and EPUB, in contrast, are based on markup languages. This means the information is marked, or tagged, with directions that tell devices how to display the text. In a sense, the information is separated from its presentation so that each reader can decide how the text will be shown. Readers wishing for a particular font, larger text size, or a specific contrast level can make these adjustments. HTML is also more likely to be readable by screen reader programs used by visually challenged readers.

¶8 For example, the science journal *PLoS ONE*, published by the Public Library of Science, releases articles in HTML, PDF, and XML. We can look at a recent article⁴. Figure 1 shows the HTML version of a *PLoS ONE* article. It looks like an online webpage rather than a printed page. The table of contents on the left lets readers jump to the desired section.

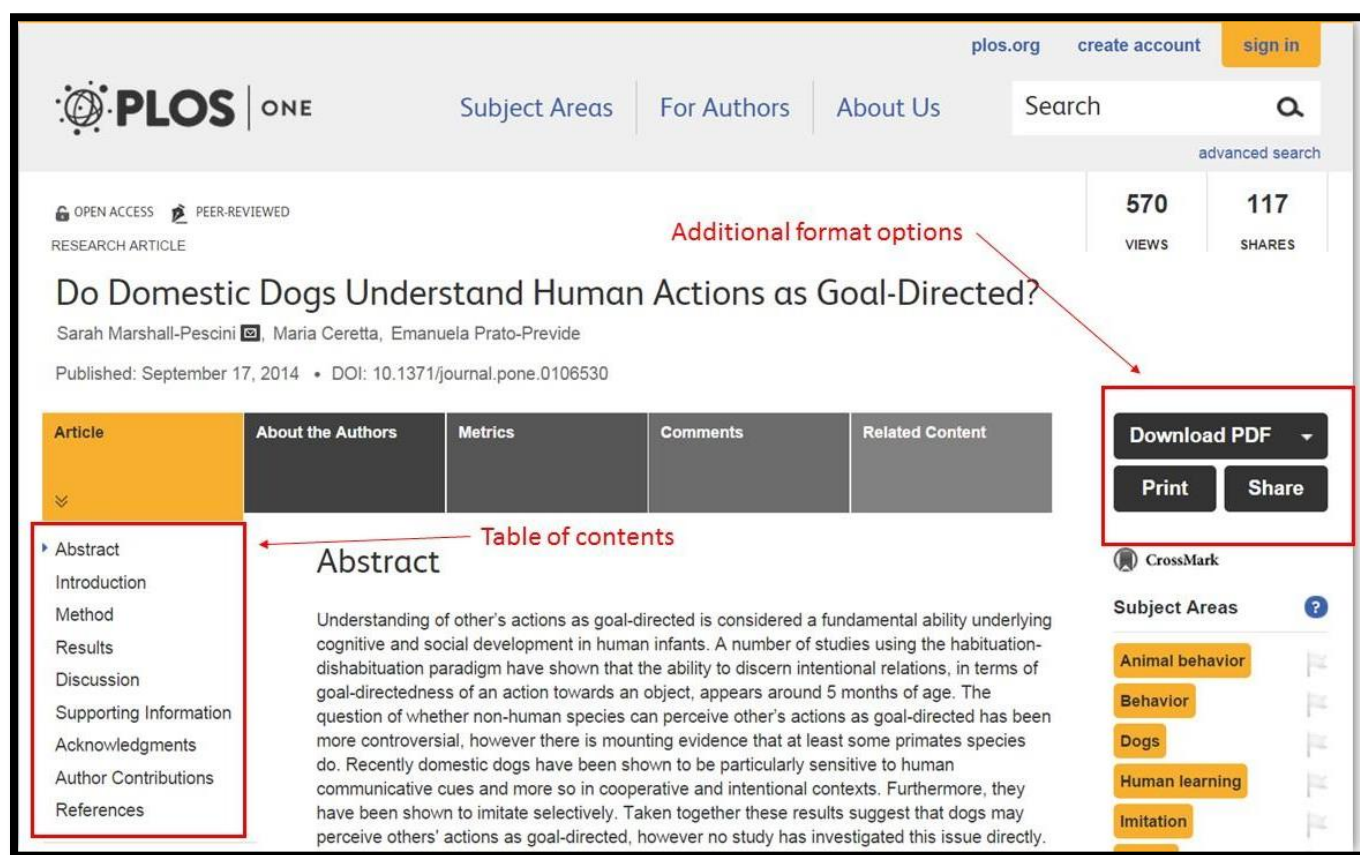


Figure 1

⁴ Sarah Marshall-Pescini, Maria Ceretta, & Emanuela Prato-Previde, *Do Domestic Dogs Understand Human Actions as Goal-Directed?*, 9 PLOS ONE e106580 (2014), <http://doi.org/10.1371/journal.pone.0106530>

¶9 Figure 2 shows images that have been embedded in the article. Note that they can be downloaded in several formats for closer examination. The images are displayed in the PDF version, but cannot be readily downloaded or enlarged.

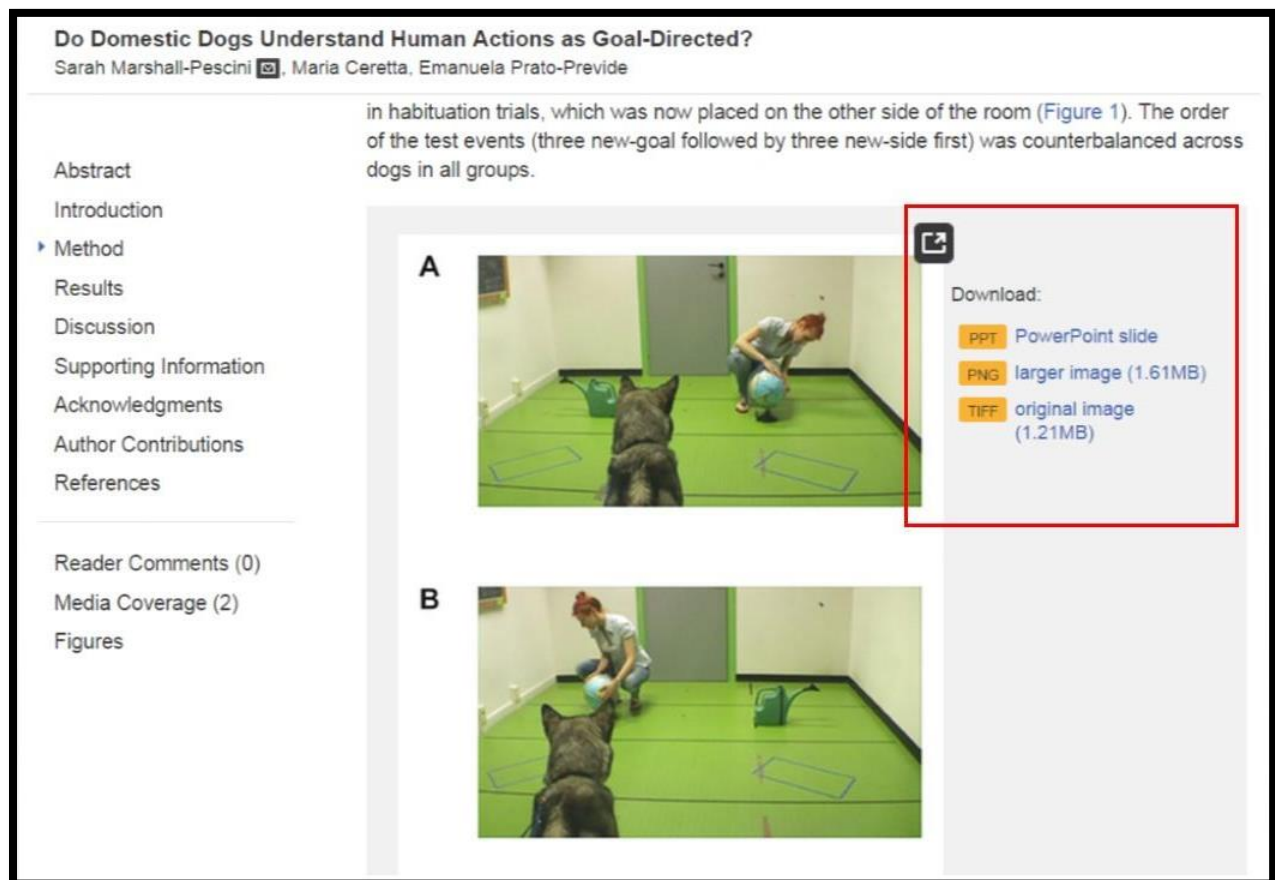


Figure 2

¶10 For readers preferring PDF or wishing to print an article, the PDF version of the *PLoS ONE* article (Figure 3) contains all the information that can be included in a PDF file. For PDFs, the text can be laid out optimally for reading in print. Some PDF articles in STEM journals are set in two columns of text, for instance; this is great for reading on paper, but cumbersome to read on a screen.

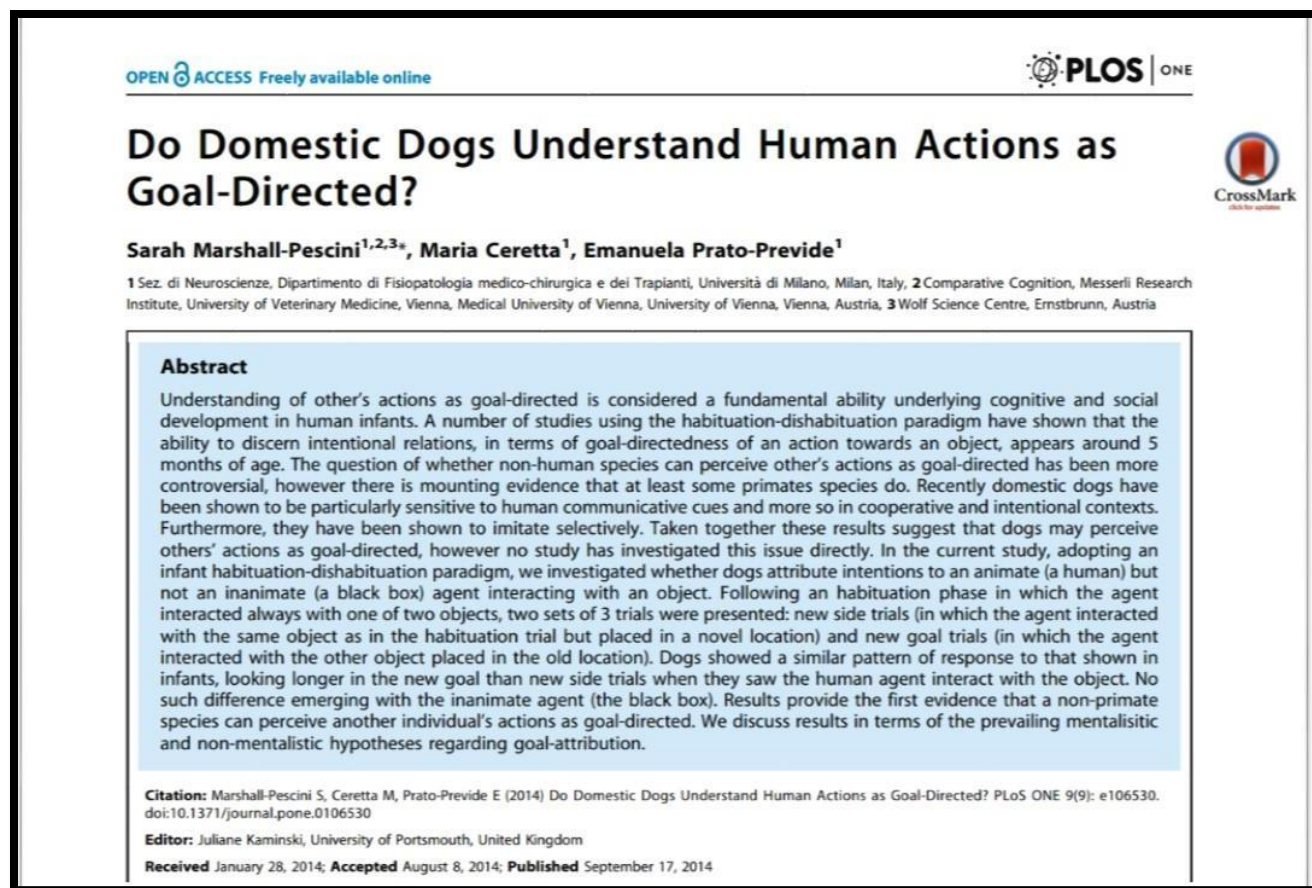


Figure 3

¶11 In 2013 Cambridge University Press began publishing some journal articles in EPUB format for e-book reader devices.⁵ Looking at an article from *Parasitology*,⁶ we see how a scholarly article can appear as HTML, PDF, or EPUB. Figure 4 shows the HTML and PDF versions. Note that the PDF looks like a very traditional academic paper.

⁵ Danny Davies, *Introducing EPUB for Journals*, CAMBRIDGE JOURNALS BLOG (Nov. 11, 2013), <http://blog.journals.cambridge.org/2013/11/introducing-epub-for-journals/>

⁶ Robert Poulin & Haseeb S. Randhawa, *Evolution of Parasitism Along Convergent Lines: From Ecology to Genomics*, PARASITOLOGY, <http://dx.doi.org/10.1017/S0031182013001674>

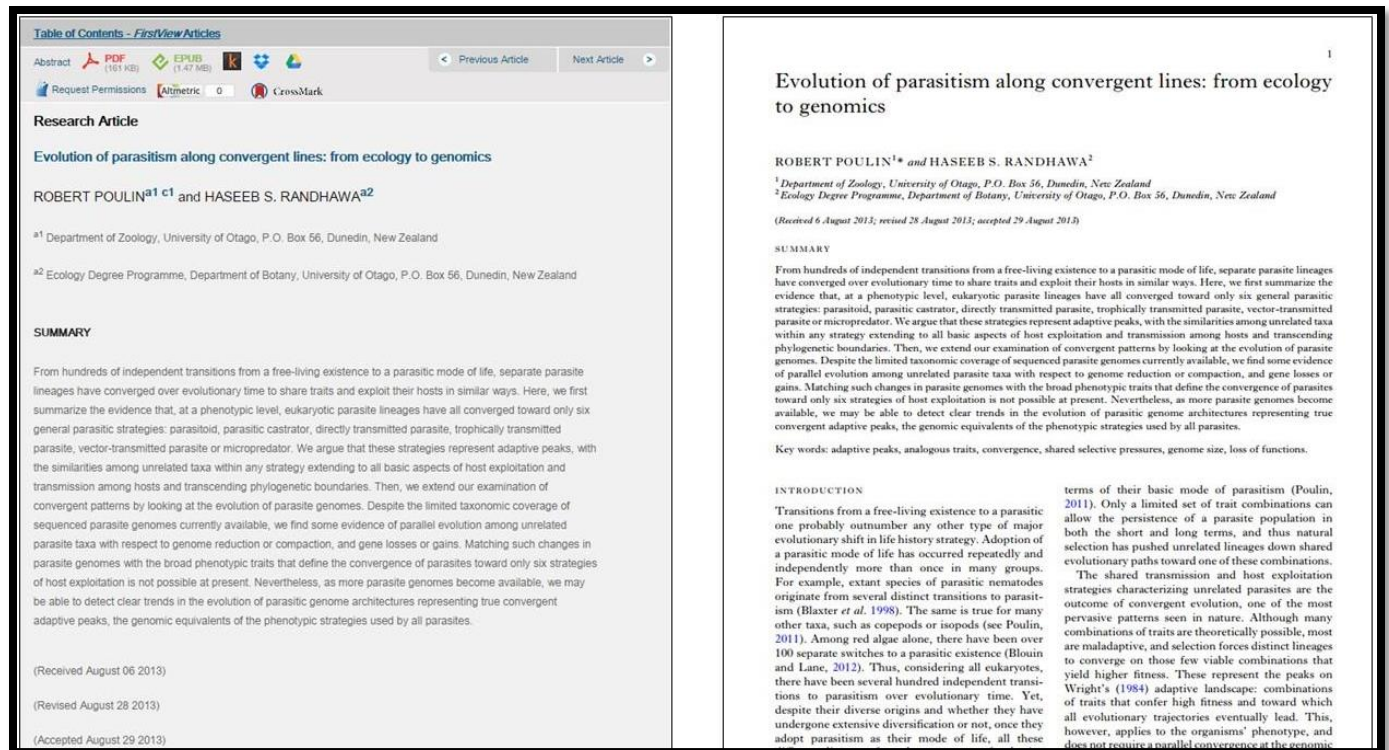


Figure 4

Figure 5 shows the EPUB version in Adobe Digital Editions.

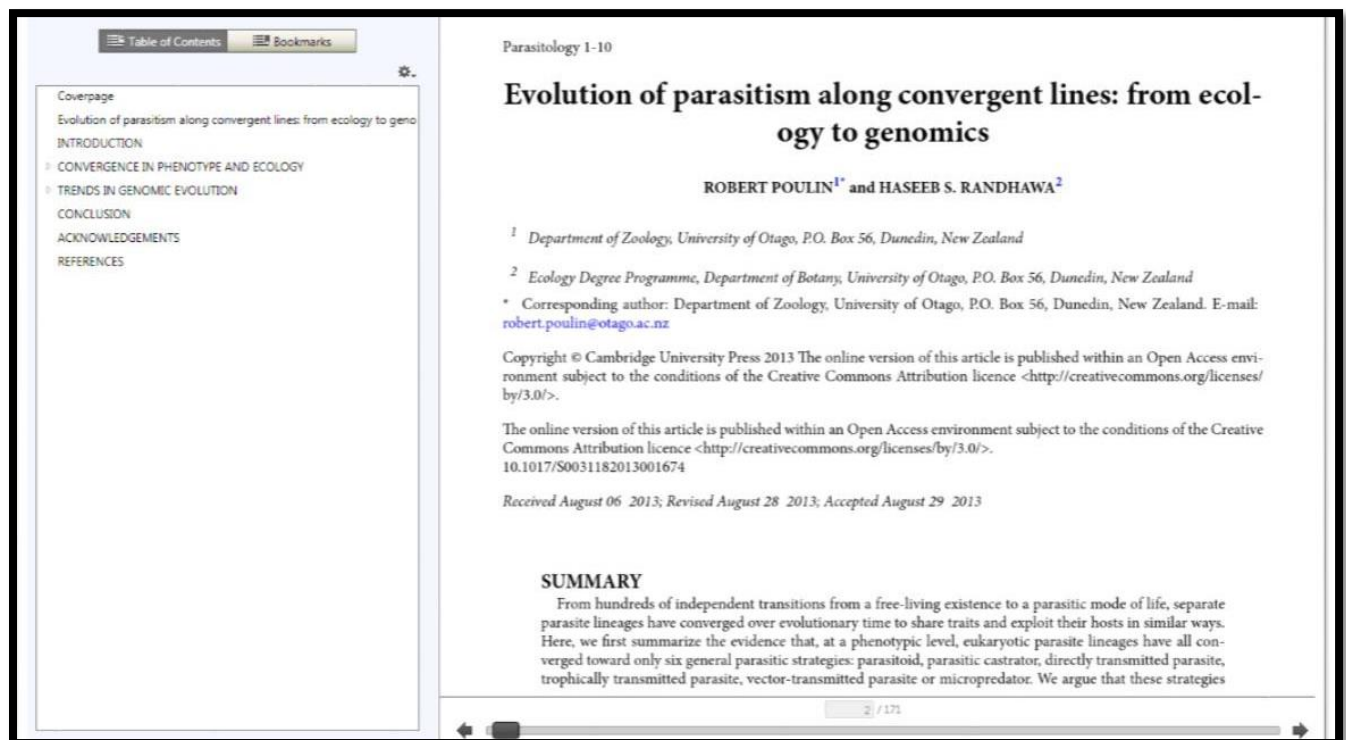


Figure 5

¶12 A great advantage of the EPUB format for e-reader devices is that the text can be reflowed and resized to fit the screen of most mobile devices. The article in Figure 5 has a table of contents for navigation. EPUB also allows embedded media.

¶13 To my knowledge, very few law journals regularly publish in formats other than PDF. The *Yale Law Journal*, *Stanford Law Review Online* supplement, and *Richmond Journal of Law and Technology* publish in both HTML and PDF. Through a publisher, Quid Pro Quo Books, the *Yale Law Journal*, *Harvard Law Review*, *Stanford Law Review*, and *University of Chicago Law Review* publish e-book versions, including EPUB and MOBI (the format used by the Amazon Kindle) formats. While the HTML and PDF versions are generally free to access on the journals' web sites, Quid Pro Quo Books sells the e-book versions.

¶14 Law reviews wishing to publish in HTML or EPUB may encounter a few challenges. Editors or support staff would have to acquire some tools and knowledge. Assuming the Microsoft Word document will continue to be predominant format for submissions and editing, the conversions from Word to HTML or EPUB should occur, as it does for PDFs, at the end of the editorial pipeline.

¶15 Converting a Word document to HTML or EPUB is not as easy as simply Save As, but it is hardly onerous. A number of conversion tools are available, ranging from open source (pandoc) to proprietary (Word Cleaner) products. The conversion will probably not be perfect, and some level of manual inspection and editing will be necessary. Also, both HTML and EPUB allow additional metadata that will help make articles easier to find in search engines; adding this metadata in the proper way will also require some additional work.

¶16 Likewise, Word files can be converted to EPUB format, or the HTML file can be used. Either way, there are open source (Calibre) and paid (oXygen Author) tools available to handle these tasks. There is likely to be a considerable learning curve to test out conversion tools, establish templates and style sheets, and become familiar with the programs. Once these procedures for conversion and quality checks are finalized, the resources needed thereafter should go down.

¶17 This work could be performed by support staff the journal may have or library staff as part of the law library's support of legal scholarship. Conversion services could be hired to convert and format files. Finally, journal editors could prepare the files as part of their duties. The main downside to this approach is that editors change very year, so some resources will have to be committed to training. A journal considering publishing in more formats should also weigh the benefits of increased accessibility and flexibility for readers against the resources that would be expended.

¶18 Some cultural norms in legal scholarship will also have to change. Page numbers may no longer be the obvious choice for pinpoint citations. STEM journal PDFs have page numbers, but they start at page 1 and often note that the pagination is not for citation purposes. One option would be designate the PDF with pagination as the canonical version that should be cited. Another option more attuned to web publishing is to use paragraph numbers. This approach has a couple advantages. First, the article is equally amenable to pinpoint citation, no matter the format, and second, a citation to a paragraph is more precise than one to a page.

¶19 Paragraph numbers have been adopted by a few law journals, among them the Richmond Journal of Law and Technology (Figure 6), the early issues of the Journal of Legal Analysis (Figure 7), and Law Library Journal (Figure 8).

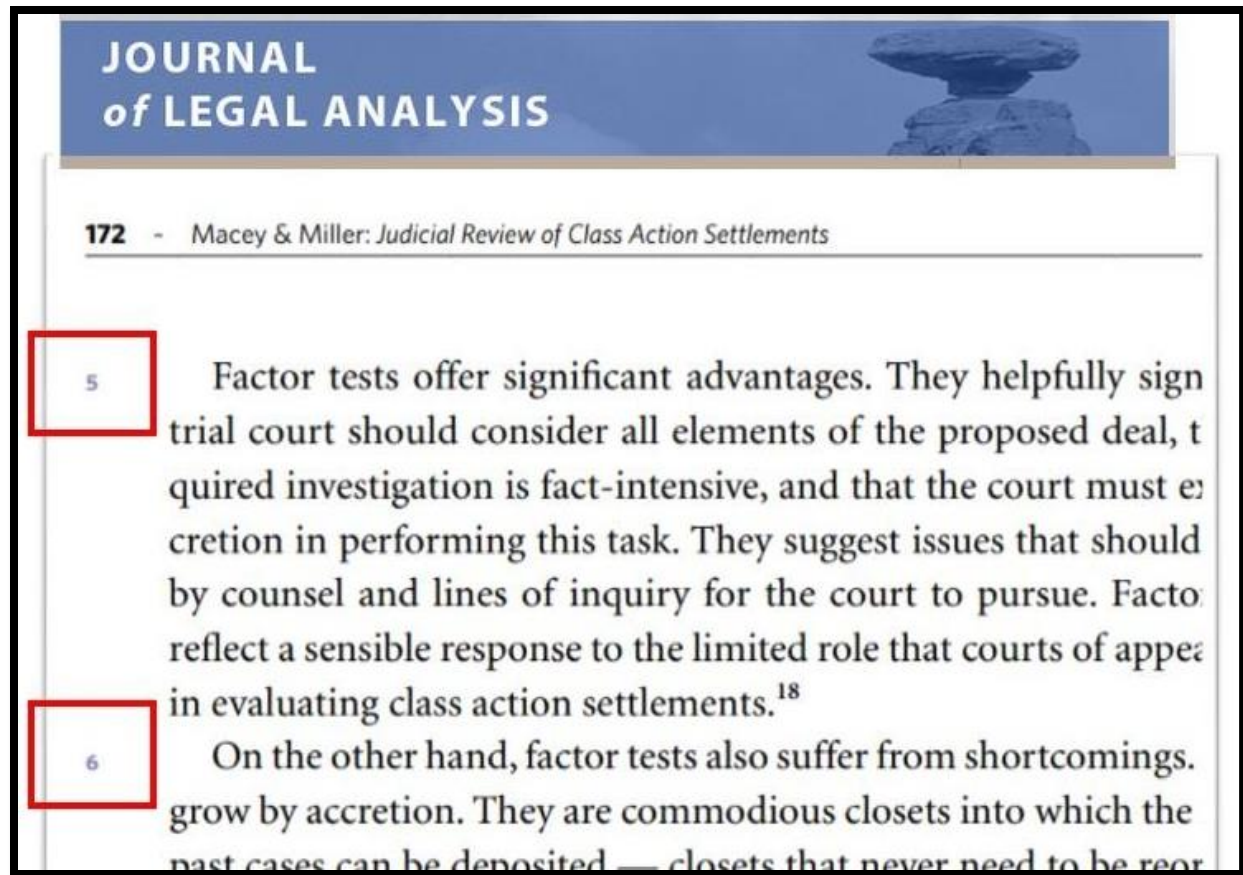


Figure 6



Figure 7

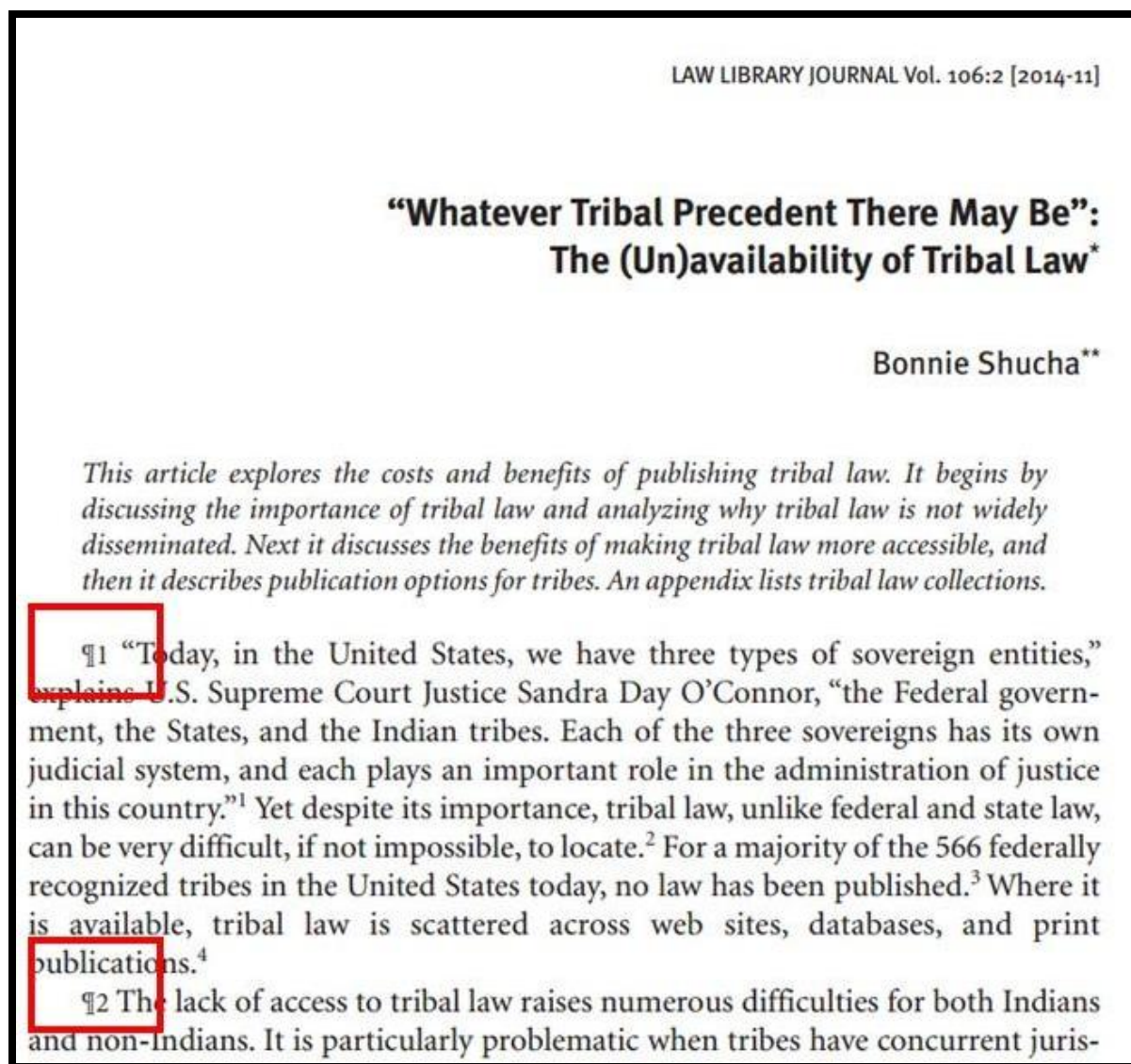


Figure 8

¶20 A number of courts have adopted citation rules that favor paragraph numbers over page numbers in reporter volumes (also called media or vendor neutral citation).⁷ The American Association of Law Libraries's *Uniform Citation Guide* also favors paragraph numbers. Once a policy

⁷ See Ian Gallacher, *Cite Unseen: How Neutral Citation and America's Law Schools Can Cure Our Strange Devotion to Bibliographical Orthodoxy and the Constriction of Open and Equal Access to the Law*, 70 ALB. L. REV. 70 491 (2006); Peter W. Martin, *Neutral Citation, Court Web Sites, and Access to Authoritative Case Law*, 99 LAW LIBR. J. 329 (2007); Michael Umberger, *Checking Up on Court Citation Standards: How Neutral Citation Improves Public Access to Case Law*, 31 LEGAL REFERENCE SERVICES QUARTERLY 312 (2012).

decision is made to change this citation norm, it would not be difficult to add paragraph numbers as the article is edited. Certainly, changes would have to be made, and legal scholars and publishers should consider whether those changes are justified by the possible benefits.

Using Persistent Identifiers

¶21 Law journals have tiptoed into digital publishing and they have already experienced some of its challenges. One major difficulty is dealing with link rot, that is, URLs that no longer work because the linked document has been moved to another location, placed behind a paywall, or deleted. A number of studies have found that link rot is undermining the usefulness of law journal citations of online sources.⁸ This is concerning when formally published scholarship is expected to be stable and reliably accessible. Websites are often reorganized or redesigned (and rightfully so, we certainly would not expect all journal web sites to never update their software or add features), but this means that citations to articles may not always point to the cited source. Broken URLs in footnotes reduce articles' credibility and make life difficult for later researchers who want to double-check an article's claims or further investigate relevant literature.

¶22 Law journals may overhaul their sites more often than other scholarly publications because their leadership changes regularly and, like new homeowners, the new editors may want to make the journal web site their own. If an online renovation results in articles being taken down or moved, any footnotes including the old URLs are likely to break. Redirects are an option, but editors are unlikely to be able to maintain two or three layers of redirects to keep all the URLs functional. Broken links to a journal's articles hurts the citing articles and complicates the task of determining where and how often the journal's content has been cited. Reducing link rot would strengthen the law's scholarly literature.

¶23 The primary tool used by STEM publishers to address this problem is digital object identifiers (DOIs). DOIs have been established as an International Standards Organization standard and are

⁸ Mary Rumsey, *Runaway Train: Problems of Permanence, Accessibility, and Stability in the Use of Web Sources in Law Review Citations*, 94 LAW LIBR. J. 27 (2002); Susan Lyons, *Persistent Identification of Electronic Documents and the Future of Footnotes*, 97 LAW LIBR. J. 681 (2005); Raizel Liebler and June Liebert, *Something Rotten in the State of Legal Citation: The Life Span of a United States Supreme Court Citation Containing an Internet Link (1996-2010)*, 15 YALE J.L. & TECH. 273 (2012); Jonathan Zittrain, Kendra Albert, and Lawrence Lessig, *Perma: Scoping and Addressing the Problem of Link and Reference Rot in Legal Citations*, 127 HARV. L. REV. F. 176 (2014).

often used like URLs. However, a DOI is assigned to an intellectual object and then matched with an URL for its current online location with a registry. If an article's URL changes, the publisher provides an update to the registry. When a researcher enters a DOI in a browser URL bar, the DOI is resolved to the current URL. Thus, DOIs provide a persistent way for publishers to point readers to articles. DOIs are useful for addressing link rot in citations of scholarly works; for other types of online resources, other web archiving services, such as Perma, the Internet Archive's Wayback Machine, and WebCite, should be used.

¶24 CrossRef is the DOI registration agency for scholarly communications purposes. Membership fees are required, but academic law journals could join through an affiliated university press or university library, which may reduce the cost. The California Digital Library offers a service called EZID for assigning and maintaining DOIs for research products.

¶25 A DOI is written "10.(publisher prefix)/(publisher-assigned identifier)." For example, the DOI 10.2307/1372820 is expressed as a URL by adding "doi.org/" in front, so doi.org/10.2307/1372820 resolves to <http://www.jstor.org/stable/1372820>. This is a Duke Law Journal article in JSTOR. Even if JSTOR changes its web site or transitions to new ownership, if it fulfills its duty and updates the CrossRef registry, that DOI will lead to that article. Each DOI points to one copy of a work. The same article is available in Duke's repository but that DOI will not point to that copy. Also, a DOI may lead to a copy that requires payment or subscription. Like a normal URL, a DOI does not distinguish between business models.

¶26 DOIs can be used like serial numbers for article such that a citation network can be established and researchers can know what articles cite to and are cited by other works. CrossRef provides a service called cited-by linking. This is a database of citation connections between articles in CrossRef's registry. This is an optional service that is available once a journal begins assigning DOIs to its articles.

¶27 Figure 9 shows an article from *Advances in Bioinformatics*. The article has a DOI in its citation information, and the first entry of its bibliography has a "View at Publisher" link. This link uses the cited article's DOI and shows that CrossRef's system has connected the two articles.

<p>Advances in Bioinformatics Volume 2014 (2014), Article ID 797013, 8 pages http://dx.doi.org/10.1155/2014/797013</p> <p>Research Article</p> <p>Breast Cancer Nodes Detection Using Ultrasonic Microscale Subarrayed MIMO RADAR</p> <p>Attaphongse Taparugssanagorn,¹ Siwaruk Siwamogsatham,¹ and Carlos Pomalaza-Ráez²</p> <p>¹Wireless Information Security and Eco-Electronics Research Unit, National Electronics and Computer Technology Center, 112 Phahon Yothin Road, Klong 1, Klong Luang, Pathum Thani 12120, Thailand ²College of Engineering, Technology, and Computer Science, Department of Engineering, Purdue University, Fort Wayne, IN 46805, USA</p> <p>Received 28 May 2014; Revised 3 September 2014; Accepted 4 September 2014; Published 15 September 2014</p> <p>Academic Editor: Alexander Zelikovsky</p> <p>Copyright © 2014 Attaphongse Taparugssanagorn et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.</p> <p>Linked References</p> <ol style="list-style-type: none"> 1. E. C. Fear, S. C. Hagness, P. M. Meaney, M. Okoniewski, and M. A. Stuchly, "Enhancing breast tumor detection with near-field imaging," <i>IEEE Microwave Magazine</i>, vol. 3, no. 1, pp. 48–56, 2002. View at Publisher · View at Google Scholar · View at Scopus 	<p> Abstract</p> <p> Full-Text PDF</p> <p> Full-Text HTML</p> <p> Full-Text ePUB</p> <p> Linked References</p> <p> How to Cite this Article</p>
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Figure 9

¶28 Figure 10 shows the other side of this linking. This article from *Science* has a sizable list of works that cite to it. This list is generated from CrossRef's database of citation connections.

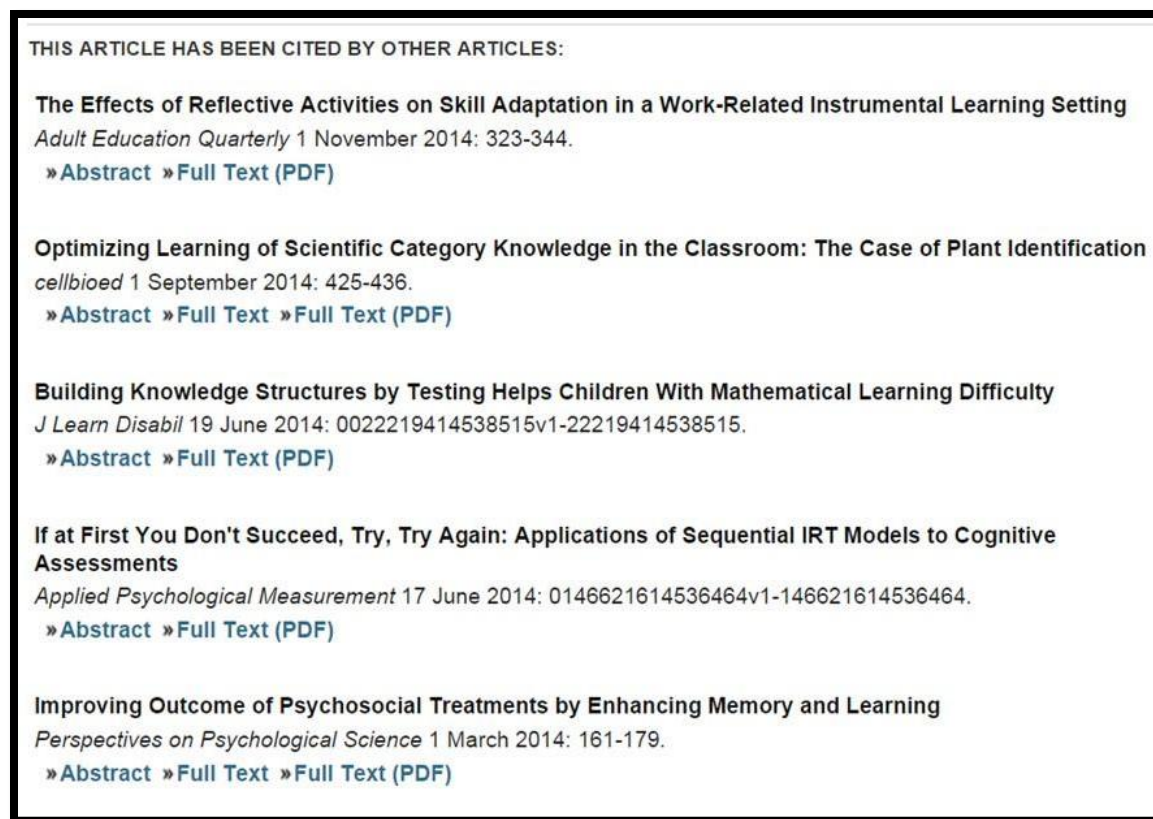


Figure 10

¶29 Cited-by linking serves a similar function to Westlaw's KeyCite, Lexis's Shepard's, and HeinOnline's ScholarCheck, but with some remarkable improvements. First, the citation network is more open--a reader does not need to subscribe to the proprietary database to see the citations to and from the article (the full text of the article can be kept behind a paywall). It is also open in another sense. DOIs are used by journals in many other fields of study, so citations to legal scholarship from non-legal authors could be recorded through the DOIs, even if the non-legal articles would never be added to a legal research database. Google Scholar captures some of these non-legal citations, but thus far I have noticed a number of errors in the citation counts and irregular determinations as to whether one article actually cites another. The DOI data is vetted by the publisher and CrossRef, so it is more likely to be accurate.

¶30 Cited-by linking is optional, so any list of citations cannot be known to be complete. However, it is another useful way to ascertain how legal scholarship connects to other disciplines, and the citation network would become stronger if more law journals joined and added their citation data.

¶31 There have been a few suggestions that law journals adopt DOIs as part of their citations and metadata.⁹ Some law journals that are published in the journal databases JSTOR and Project MUSE have DOIs assigned to the copies in the databases, and journals by major academic publishers also generally use DOIs. SSRN now assigns DOIs to working papers uploaded to their database. While very few student-edited law journals have implemented DOIs, a one notable exception is the University of Pittsburgh Law Review, shown in Figure 11.

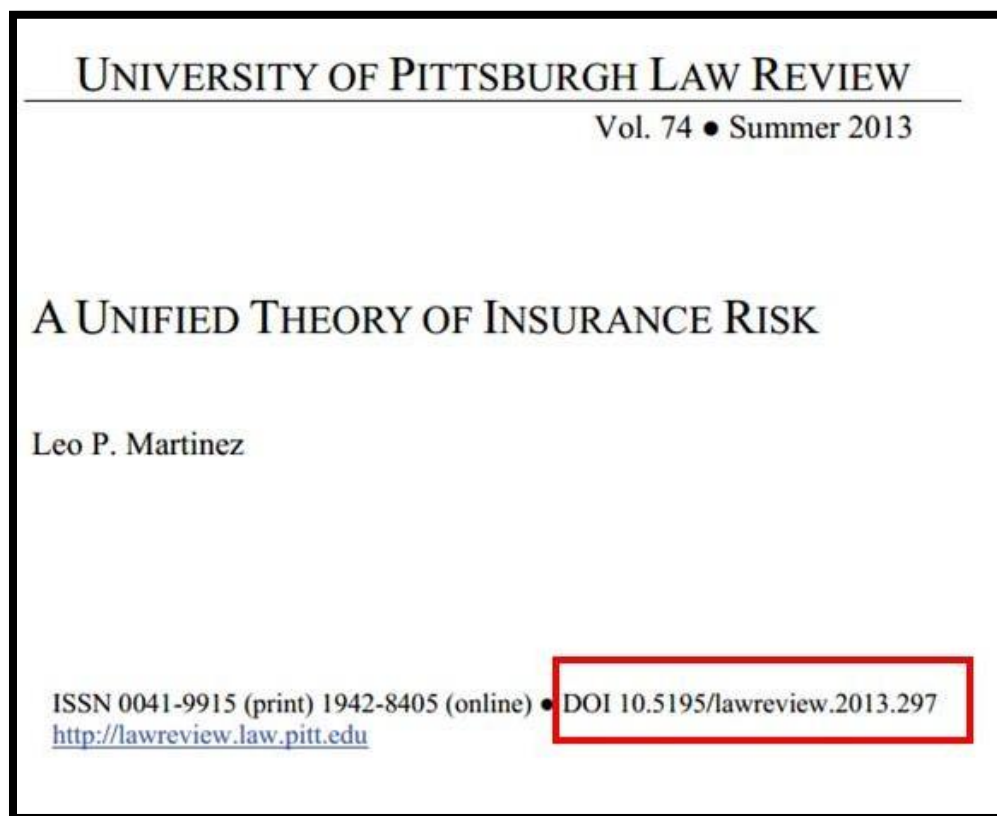


Figure 11

Published by the University of Pittsburgh University Library System, the law review's articles since 2003 have DOIs. The University of Pittsburgh Law Review has not yet joined the cited-by linking network, but with DOIs it at least has that option.

¶32 In addition to joining CrossRef and assigning DOIs for its articles, journals that participate in

⁹ Lyons, *supra* note 8, at 687; John Doyle, *The Business of Law Reviews*, 39 CONN. L. REV. CONTEMPORATIONS 30, 33 (2007); Zittrain, et al, *supra* note 8, at 189.

cited-by linking provide citation metadata in accordance with CrossRef's XML (another kind of markup language) standards. While this may seem technically intimidating, CrossRef has ample documentation that would help journal editors or support staff establish workflows to collect and supply necessary information to CrossRef.

¶33 In addition to facilitating reliable online access and establishing citation networks, using DOIs also enables journals to collect information on other, less traditional ways its content is being used. These altmetrics (from alternative metrics) include counting mentions of articles on blogs, Twitter feeds, and other less formal, venues of communication. Since DOIs are a relatively stable and open way of pointing to a specific article, tools can compile those mentions into scholarly impact profiles. This article (Figure 12) from STEM journal PeerJ shows how altmetrics can be used.

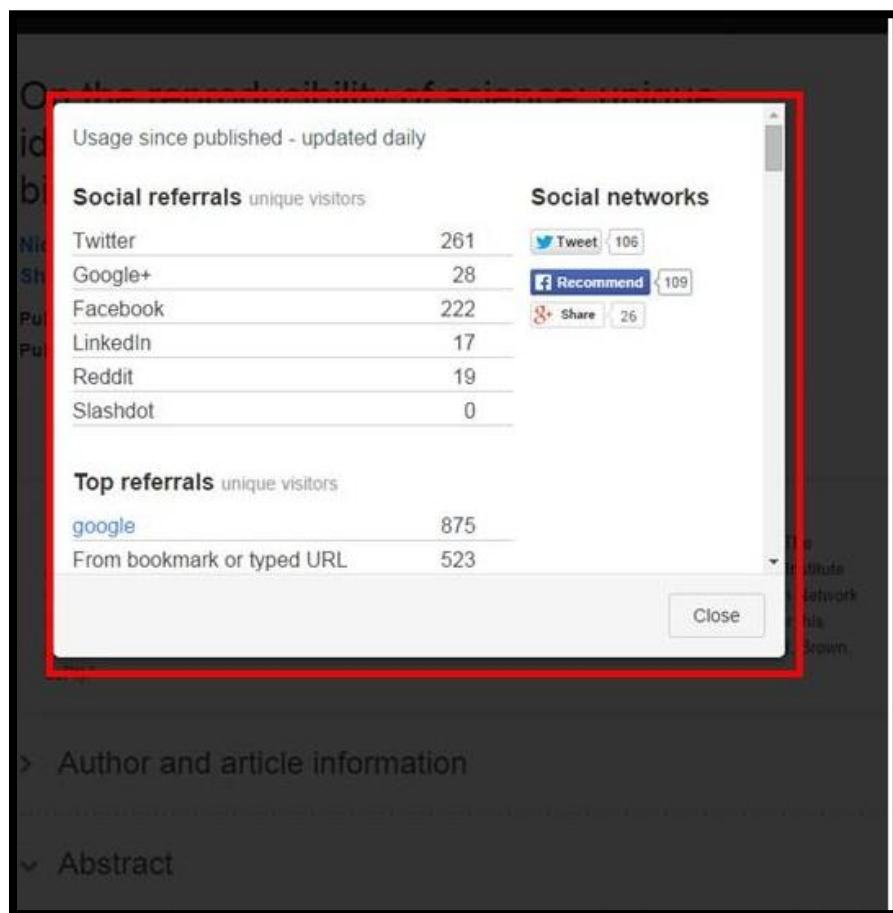


Figure 12

¶34 Another example is ImpactStory, a nonprofit that has developed tools that collect references to author's scholarly work and compile them into a profile that can be used to supplement the author's traditional academic CV (Figure 13).

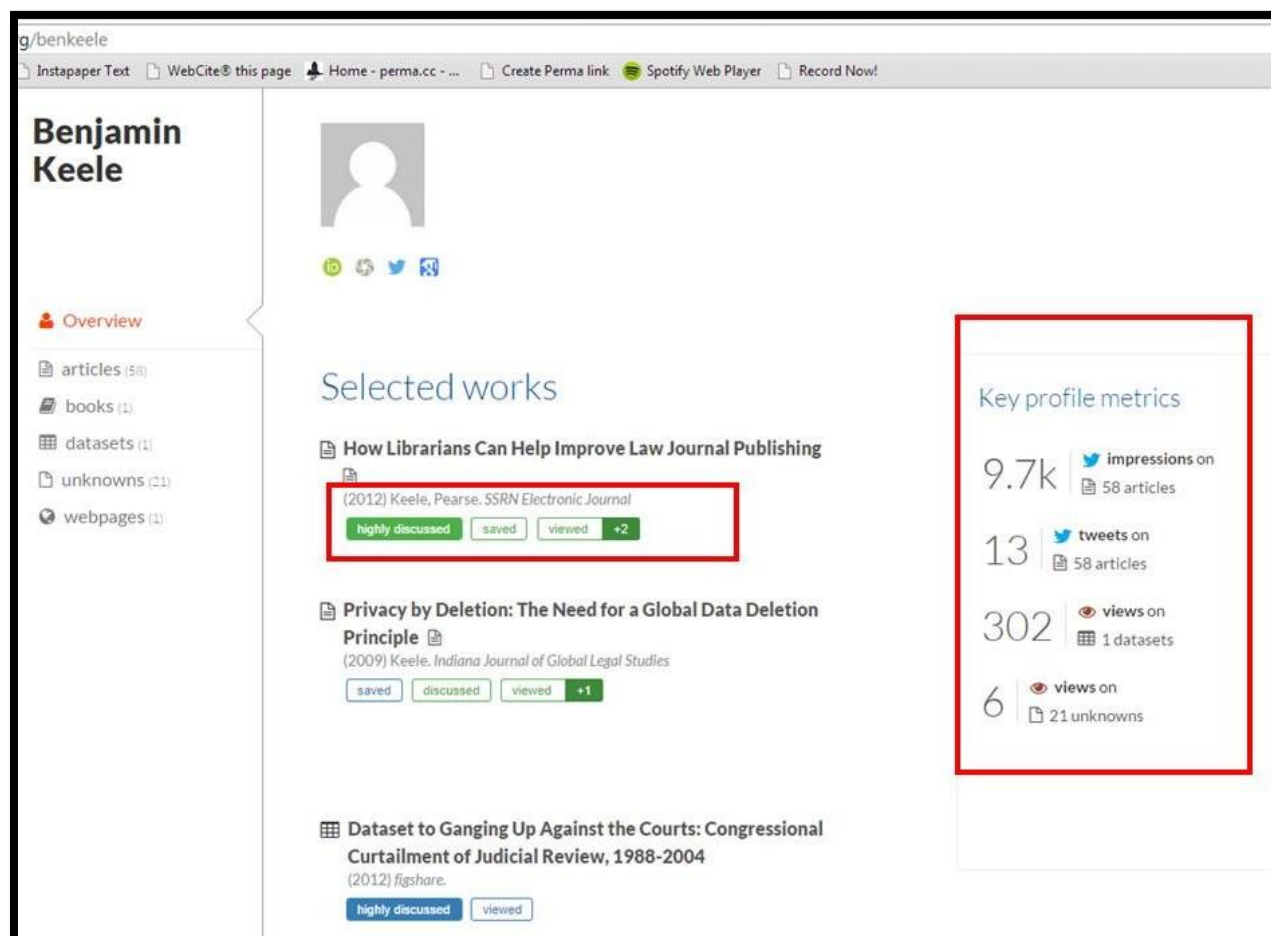


Figure 13

¶35 Many legal academics are active blog authors and Twitter users; if legal scholarship used DOIs as part of citations to articles, we could capture an article's influence in less formal legal and non-legal publications. Adding altmetrics and cited-by linking to the tools we currently use, like Google Scholar, and legal research databases, will let academic authors and their institutions better understand their audience and influence, both within and beyond their discipline. As legal scholarship becomes more interdisciplinary, adopting DOIs, cited-by linking, and altmetrics will help connect legal works with scholarship in related fields.

¶36 In addition to obtaining needed funding and administrative support for joining CrossRef and

participating in its network, there are a few other challenges that should be addressed. Many legal articles have multiple copies existing in different places. It is not difficult to imagine an article being posted on an author's personal website, an institutional repository of her university, the journal's website, and SSRN (whether as a draft or the final published version). A DOI can only point to one of these copies, so it must be understood that while a DOI helps ensure persistent access to at least one copy of the article, there may well be more, equally legitimate copies available.

¶37 An article having a DOI does not mean it must remain online forever, but a persistent identifier does imply an intention that the work be persistently available. Thus, law journals and authors should have an understanding as to when a work final and persistent citation and linking is appropriate. One option is to only assign DOIs to works that have been formally published, however that is defined (acceptance by a journal, or perhaps an author simply declaring it as a completed work). This makes SSRN's practice of assigning DOIs to working papers somewhat of an aberration. Especially confusing is that the same DOI is assigned to a paper regardless of whether a new draft is uploaded. An early draft of a paper may be posted to SSRN and receive a DOI. Later drafts are uploaded and replace the first draft; finally, the published version is posted. The DOI points only to the latest version, raising the possibility that a researcher may cite a working paper with a DOI, and later the content of the paper they have cited may change.

¶39 Another option is to publish each draft as a distinct work, but link all the drafts together as related. This is the approach taken by STEM journal F1000 Research (Figure 14). As a paper progresses from submission, through peer review and revision, to an accepted article, each draft is published and given a different DOI. The researcher can easily see which is the final article, but drafts that may have been referenced earlier are still online, and one can see how a paper changed in response to reviewer comments.

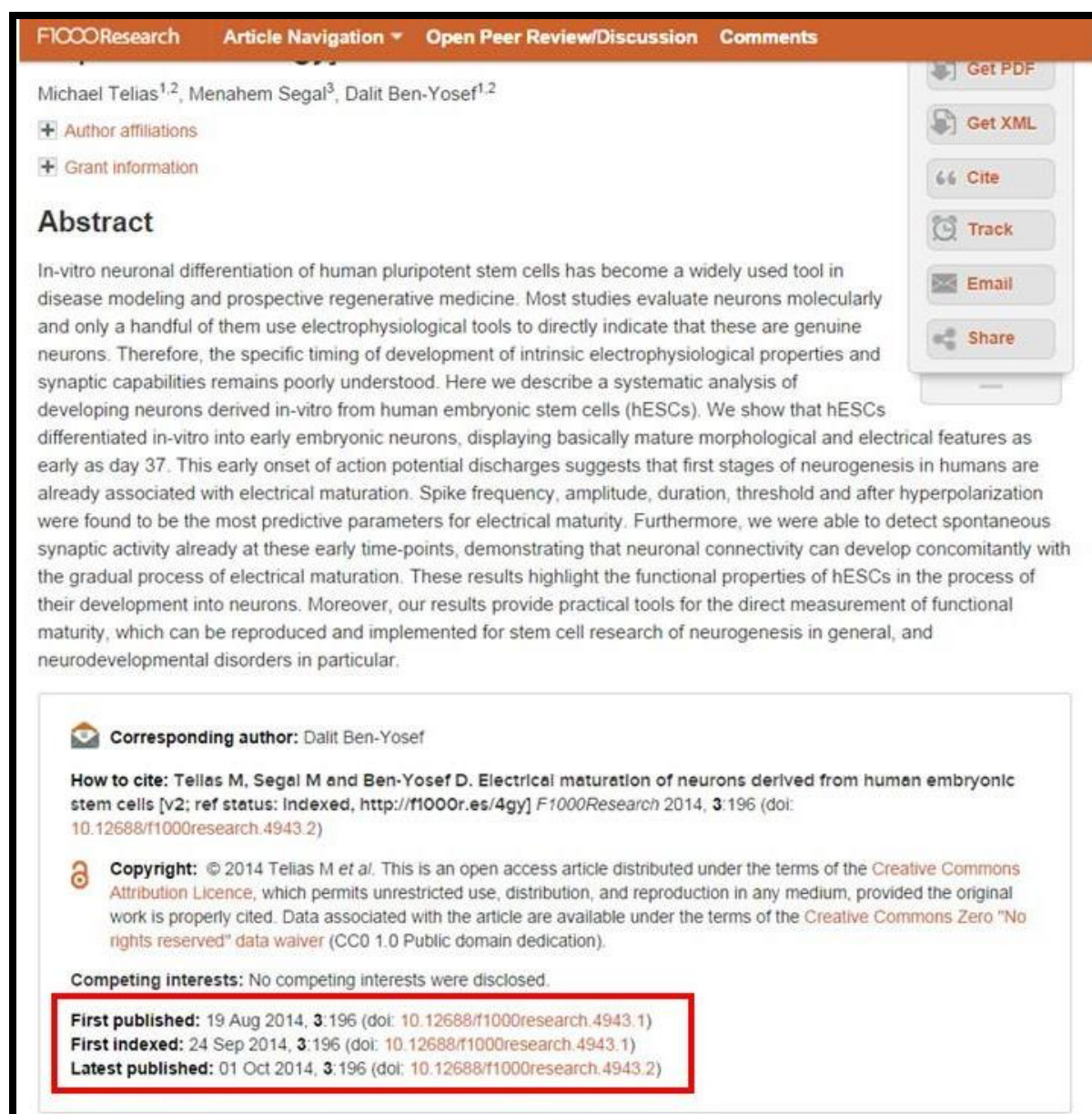


Figure 14

¶40 Legal scholarship generally does not employ formal peer review, and this is a level of transparency that may not be comfortable for some authors. Nonetheless, SSRN and academic repositories would do well to consider when a scholarly work that is not formally published is sufficiently developed to warrant more than transitory availability.

Conclusion

In 1996, Bernard Hibbitts speculated that law reviews "as we know it" could disappear in the next decade.¹⁰ Eighteen years later, Hibbitts would probably still recognize the law reviews published today, even if he read the articles on his computer rather than paper. Hibbitts' call for legal scholarship to embrace digital publishing is still relevant, though the options have evolved. STEM journals show that publishing in HTML and EPUB, along with PDF, and assigning persistent identifiers to digital articles, is feasible. Legal scholarship will become more accessible and flexible if law journals adopt some of these practices.

¹⁰ Bernard J. Hibbitts, *Last Writes--Reassessing the Law Review in the Age of Cyberspace*, 71 N.Y.U. L. REV. 615, 616 (1996).