WHAT ARE METRICS

- Tools we use to try and measure the **worth** or **value** research has by calculating its **impact**.
- Include basic measures such as numbers of publications and their citation counts.
- Evolved from a sub-discipline of library and information science to an instrument of evaluation and benchmarking.
WHAT IS IMPACT

- Impact is the effect or influence that one agent, event, or resource has on another.
- Different from but related to attention and dissemination.
**WHAT IS IMPACT**

- Consider metrics from Facebook:
- ‘reach’ and ‘engagement’

<table>
<thead>
<tr>
<th>Post Message</th>
<th>Type</th>
<th>Posted</th>
<th>Lifetime Post Total Reach</th>
<th>Lifetime Engaged Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a really exciting opportunity to meet an amazing writer!</td>
<td>Link</td>
<td>1/12/16 10:11 AM</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>David Bowie reveals his favourite 100 books</td>
<td>Link</td>
<td>1/11/16 8:48 AM</td>
<td>548</td>
<td>16</td>
</tr>
<tr>
<td>Historical UI music clubs, feat. some amazing disco action, courtesy of the UI Special Collections tumblr.</td>
<td>Link</td>
<td>1/10/16 7:40 AM</td>
<td>360</td>
<td>13</td>
</tr>
<tr>
<td>Check out the new digital collections available from the New York Public Library for FREE!</td>
<td>Link</td>
<td>1/7/16 7:48 AM</td>
<td>158</td>
<td>7</td>
</tr>
</tbody>
</table>
WHY USE METRICS

- Impact metrics can provide tangible evidence of the benefits of research.
- Useful for comparing institutions or research programs, within reason.
- Metrics SHOULD NOT be used to make comparisons across disciplines, because they are discipline specific and vary over time.
- It is important that metrics are used in context.
WHY USE METRICS

- Metrics are important but shouldn’t be used in all instances or situations.
- Researchers can begin tracking their own metrics, gathering information that could influence future work.
- Some metrics can be useful to track research impact, but shouldn’t be used in hiring/firing or promotion decisions.
Unfortunately, universities have become obsessed with metrics.

We risk damaging our academic system with the very tools designed to improve it.
Before 2000, experts used the Science Citation Index on CD-ROM from the Institute of Science (ISI)

2002 – Thomson Reuters made the Web of Science database widely accessible

2004 – Elsevier’s Scopus & Google Scholar (beta version)

2005 – h-index proposed by Jorge Hirsch, a physicist at the University of California, San Diego

2007 – Publish or Perish

2008 – Mendeley

2011 – Altmetric.com

2014 – Plum Analytics
HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)

SITUATION:
THERE ARE 14 COMPETING STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP ONE UNIVERSAL STANDARD THAT COVERS EVERYONE’S USE CASES. YEAH!

SOON:

SITUATION:
THERE ARE 15 COMPETING STANDARDS.
TYPES OF METRICS – BASIC METRICS

- Total number of papers
- Total number of citations
- Average number of citations per paper
- Average number of citations per author
- Average number of citations per author per year
- Average number of papers per author
- Average number of authors per paper
- [http://www.harzing.com/pophelp/metrics.htm#gindex](http://www.harzing.com/pophelp/metrics.htm#gindex)
TYPES OF METRICS – AUTHOR IMPACT

- An author’s impact on their field or discipline.
- Measured using the number of times their academic publications are cited by other researchers.
- There are numerous algorithms to calculate author impact.
- There are many potential biases with these measurements and they should be used with care.
The h-index was proposed by J.E. Hirsch in 2005. Now one of the most widely used metrics.

H-index = number of papers (h) with a citation number ≥ h.

Advantages of the h-index:
- Allows for direct comparisons within disciplines
- Measures quantity and impact by a single value

Disadvantages of the h-index:
- Does not give an accurate measure for early-career researchers
- Calculated only with articles indexed in Web of Science.
more than $h$ citations

citations = papers = $h$

first $h$ papers
AUTHOR IMPACT – G-INDEX

- The G-index was proposed by Leo Egghe in 2006 in order to improve on the h-index.

- "[Given a set of articles] ranked in decreasing order of the number of citations that they received, the G-Index is the (unique) largest number such that the top g articles received (together) at least g^2 citations."

- Advantages of the G-index:
  - Accounts for the performance of author’s top articles
  - Helps to make more apparent the difference between author’s respective impacts. The inflated values of the G-index help to give credit to lowly cited or non-cited papers while giving credit for highly-cited papers

- Disadvantages of the G-index:
  - The debate has continued since 2006 on whether the G-index is superior to the h-index.
The i10-index was created by Google Scholar and measures the number of publications with at least 10 citations.

Advantages of i10-index:
- Very simple and straightforward to calculate
- My Citations in Google Scholar is free and easy to use

Disadvantages of i10-index
- Used only in Google Scholar
Charles Robert Darwin
naturalist (1809-1882)
life sciences - evolution - biogeography - speciation - natural selection
Verified email at unr.edu.ar
Homepage

<table>
<thead>
<tr>
<th>Citation indices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Citations</td>
<td>77539</td>
</tr>
<tr>
<td>h-index</td>
<td>80</td>
</tr>
<tr>
<td>h10-index</td>
<td>331</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Citations to my articles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Select: All, None | Export |

<table>
<thead>
<tr>
<th>Title / Author</th>
<th>Cited by</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin of species</td>
<td>21806 *</td>
<td>1978</td>
</tr>
</tbody>
</table>
| CMA Darwin  
DMP |  |
| The descent of man | 11815 | 2009 |
| C Darwin  
Digireads.com |  |
| The expression of the emotions in man and animals | 9556 | 2002 |
ACTIVITY
CREATE A GOOGLE SCHOLAR PROFILE
Reflect the importance of a particular journal in a field, taking into account the number of articles published and citations per year.

Like author impact measurements, journal impact measures can only be so informative.
Journal Citation Reports (or JCR) is a product of ISI Web of Knowledge and is an authoritative resource for impact factor data.

- Provides impact factors and rankings based on millions of citations, with numerous sorting options including impact factor, total cites, total articles, and immediacy index.
- In addition, JCR provides a five-year impact factor and visualized trend data.
<table>
<thead>
<tr>
<th>Year</th>
<th>Total Cites</th>
<th>Journal Impact Factor</th>
<th>Impact Factor Without Journal Self Cites</th>
<th>5 Year Impact Factor</th>
<th>immediacy Index</th>
<th>Citable Items</th>
<th>Cited Half-Life</th>
<th>Citing Half-Life</th>
<th>Eigenfactor Score</th>
<th>Article Influence Score</th>
<th>% Articles in Citable Items</th>
<th>Normalized Eigenfactor</th>
<th>Average JIF Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>8,575</td>
<td>3.488</td>
<td>3.122</td>
<td>4.143</td>
<td>0.738</td>
<td>149</td>
<td>9.7</td>
<td>9.3</td>
<td>0.01280</td>
<td>1.373</td>
<td>100.00</td>
<td>1.43332</td>
<td>87.937</td>
</tr>
<tr>
<td>2013</td>
<td>8,006</td>
<td>3.730</td>
<td>3.332</td>
<td>4.121</td>
<td>0.558</td>
<td>156</td>
<td>9.6</td>
<td>9.7</td>
<td>0.01311</td>
<td>1.490</td>
<td>100.00</td>
<td>1.44521</td>
<td>89.819</td>
</tr>
<tr>
<td>2012</td>
<td>6,997</td>
<td>3.531</td>
<td>3.132</td>
<td>4.077</td>
<td>0.717</td>
<td>145</td>
<td>9.0</td>
<td>9.5</td>
<td>0.01356</td>
<td>1.582</td>
<td>99.31</td>
<td>Not A...</td>
<td>89.132</td>
</tr>
<tr>
<td>2011</td>
<td>6,347</td>
<td>3.069</td>
<td>2.925</td>
<td>3.710</td>
<td>1.000</td>
<td>111</td>
<td>9.1</td>
<td>9.7</td>
<td>0.01304</td>
<td>1.484</td>
<td>100.00</td>
<td>Not A...</td>
<td>88.144</td>
</tr>
<tr>
<td>2010</td>
<td>5,902</td>
<td>2.874</td>
<td>2.524</td>
<td>3.629</td>
<td>0.482</td>
<td>85</td>
<td>8.8</td>
<td>9.5</td>
<td>0.01414</td>
<td>1.455</td>
<td>98.82</td>
<td>Not A...</td>
<td>81.136</td>
</tr>
<tr>
<td>2009</td>
<td>5,265</td>
<td>2.771</td>
<td>2.521</td>
<td>3.476</td>
<td>0.711</td>
<td>90</td>
<td>8.4</td>
<td>8.8</td>
<td>0.01429</td>
<td>1.344</td>
<td>94.44</td>
<td>Not A...</td>
<td>84.133</td>
</tr>
<tr>
<td>2008</td>
<td>5,324</td>
<td>2.961</td>
<td>2.700</td>
<td>3.912</td>
<td>0.361</td>
<td>97</td>
<td>7.9</td>
<td>8.9</td>
<td>0.01792</td>
<td>1.618</td>
<td>97.94</td>
<td>Not A...</td>
<td>86.795</td>
</tr>
<tr>
<td>2007</td>
<td>4,921</td>
<td>2.224</td>
<td>2.330</td>
<td>3.468</td>
<td>0.260</td>
<td>100</td>
<td>7.6</td>
<td>8.3</td>
<td>0.00000</td>
<td>1.498</td>
<td>98.30</td>
<td>Not A...</td>
<td>86.437</td>
</tr>
</tbody>
</table>
Advantages of JCR
- Helps to measure research influence and impact at both journal and category levels
- Shows relationship between citing and cited journals

Disadvantages
- Lack of credibility with impact factor
Journal impact factors ‘no longer credible’

The measure of scholarly impact is now being manipulated so much that it has ceased to be meaningful, editorial claims.

Trickery by editors to boost their journal impact factor means that the widely used metric “has now lost most of its credibility”, according to Research Policy journal.

With many editors now engaged in “ingenious ways” of boosting their impact factor, “one of the main bastions holding back the growing scourge of research misconduct” has been “breached”, the publication warns in an editorial.

In the past two decades, the reliance on impact factors when deciding which academics are promoted or granted tenure has grown.

Citable Items: The Contested Impact Factor Denominator

Discussing the Journal Impact Factor inevitably leads one down a rabbit hole. While the numerator of the ratio (total citations) to the journal is clear enough, the denominator (citable items) causes great confusion, and getting a clear answer to its construction requires real work.

This post is about the Impact Factor denominator — how it is defined, why it is inconsistent, and how it could be improved.

In their paper, The Journal Impact Factor Denominator: Defining Citable (Counted) Items, Marie McVeigh and Stephen Mann describe how Thomson Reuters determines what makes a citable item. Their guidelines include such characteristics as whether a paper has a descriptive title, whether there are named authors and addresses, whether there is an abstract, the article length, whether it contains cited references, and the density those cited references.
A journal’s Eigenfactor score is measured as its importance to the scientific community. Scores are scaled so that the sum of all journal scores is 100.

It is intended to reflect the influence and prestige of journals.

The mean Article Influence Score is 1.00. A score greater than 1.00 indicates articles in the journal have above-average influence.

<table>
<thead>
<tr>
<th>Order</th>
<th>Journal</th>
<th>Percentile</th>
<th>EF</th>
<th>AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ECOLOGY</td>
<td>EF: 98</td>
<td>0.081672</td>
<td>2.6366</td>
</tr>
<tr>
<td></td>
<td>ISSN: 0012-9658</td>
<td>AI: 96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MOL ECOL</td>
<td>EF: 98</td>
<td>0.07334</td>
<td>2.0817</td>
</tr>
<tr>
<td></td>
<td>ISSN: 0962-1083</td>
<td>AI: 95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Advantages of Eigenfactor / Article Influence Score:
- Can be accessed for free
- Includes built in evaluation period of five years
- Attempts to give a more accurate representation of the merit of citations than raw citation counts

Disadvantages of Eigenfactor / Article Influence Score:
- Eigenfactor assigns journals to a single category, making it more difficult to compare across disciplines
- Some argue that Eigenfactor score isn’t much different than raw citation counts.
The SCImago Journal & Country Rank is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus® database.

The SJR is a measure of a journal’s impact, influence or prestige.

It expresses the average number of weighted citations received in the selected year by the documents published in the journal in the three previous years.
Google Scholar Metrics allows authors to view journal rankings and rating by various h-indices.

Journal rankings can be viewed for the top 100 publications in 9 different languages, or by broad subject areas and numerous subcategories.

<table>
<thead>
<tr>
<th>Publication</th>
<th>h5-index</th>
<th>h5-median</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Journal of the American Society for Information Science and Technology</td>
<td>64</td>
<td>82</td>
</tr>
<tr>
<td>2. Scientometrics</td>
<td>46</td>
<td>58</td>
</tr>
<tr>
<td>4. Journal of Informetrics</td>
<td>39</td>
<td>57</td>
</tr>
<tr>
<td>5. Journal of Information Science</td>
<td>26</td>
<td>39</td>
</tr>
<tr>
<td>6. The Journal of Academic Librarianship</td>
<td>26</td>
<td>37</td>
</tr>
<tr>
<td>7. Journal of Documentation</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>8. Library &amp; Information Science Research</td>
<td>26</td>
<td>34</td>
</tr>
</tbody>
</table>
ACTIVITY

BROWSE THROUGH THE JOURNAL METRIC SERVICES FOR YOUR DISCIPLINE
The Web of Knowledge features ResearcherID, a service with which you can create and manage your scholarly profile, generate citation metrics and connect with other scholars.

One problem that ResearcherID addresses is name ambiguity.

ResearcherID, in tandem with ORCID, assigns a unique ID to each author and allows authors to identify papers that they contributed to.

With the Web of Knowledge, you can set up citation alerts.
Google Scholar Citations is a citation service provided free of charge.

It is easy to set up, especially if you already have a Google account.

Like other citation tracking services, it tracks academic articles, but it also counts theses, book titles and other documents towards author citation metrics.

Google Scholar Citations can be used to view citation graphs of your articles or get an email alert every time an article is cited.
PLoS Article Level metrics (ALM) is a service provided by the Public Library of Science (PLoS) for all authors of works published in PLoS journals.

ALM goes beyond traditional metrics and considers not just citation data, but also data regarding usage (such as views and downloads), mentions in blogs and other media, as well as metrics related to social media.
Publish or Perish is downloadable software that uses Google Scholar data to calculate the following metrics:

- Total number of papers
- Total number of citations
- Average number of citations per paper
- Average number of citations per author
- Average number of papers per author
- Average number of citations per year
- Hirsch's H-Index and related parameters
- Egghe's G-Index
- The contemporary G-Index
- The age-weighted citation rate
- Two variations of individual H-Indices
- An analysis of the number of authors per paper
The **Open Researcher Community ID** is an increasingly recognized persistent digital identifier.

- The unique number assigned to you will allow publishers and aggregators of scholarly literature to distinguish you from researchers with similar names.

- This is a powerful tool in author disambiguation and it takes just a few minutes to [sign up](#).
ACTIVITY
CREATE RESEARCHER ID ACCOUNT
Altmetric collects and collates disparate information to provide you with a single visually engaging and informative view of the online activity surrounding your scholarly content.
Impact Story is an open-source web-based tool that helps scientists explore and share the diverse impact of their research products.
ImpactStory.
Open carrots for Open science

Funders bring the sticks, we add carrots. ImpactStory helps open scientists tell the full story of their research impact: we reveal diverse metrics of engagement and reuse for articles, datasets, software, and more.

Embed on your CV

Custom persistent URL

Context for your metrics

Open data, open source

ImpactStory is a non-profit built around open tools to support web-native scholarship.

AM MORE than my H-INDEX.
Plum Analytics uses modern metrics to help answer the questions and tell the stories about research. Plum expands the traditional metric profile with:

- **Usage** – clicks, downloads, views, library holdings, video plays
- **Captures** – bookmarks, code forks, etc.
- **Mentions** – blog posts, comments, etc.
- **Social media** – likes, shares, tweets
- VIVO is a scholarship and research-focused discovery tool fed from institutional and publicly accessible data
- VIVO includes a network of experts and profiles, and an archive of publications, including UI theses and dissertations
- Library-run project in development since 2013 with updates weekly
- Profiles automatically generated, with user accounts easy to make
Contribution of anthropogenic warming to California drought during 2012-2014

*Academic Article* ©

- [View record in Web of Science](#)
- [Link to article (via DOI)](#)

**authors**

- Abatzoglou, John T
- Cook, Benjamin I
- Cook, Edward R
- Seager, Richard
- Smerdon, Jason E

... more
Contribution of anthropogenic warming to California drought during 2012–2014

Overview of attention for article published in Geophysical Research Letters, January 2015

SUMMARY

You are seeing a free-to-access but limited selection of the activity Altmetric has collected about this research output. Click here to find out more.

Title
Contribution of anthropogenic warming to California drought during 2012–2014

Published in
Geophysical Research Letters, January 2015

DOI
10.1002/2015GL064924

Authors
Williams, A. Park, Seager, Richard, Abatzoglou, John T., Cook, Benjamin I., Smerdon, Jason E., Cook... [show]

About this score
In the top 5% of all research outputs scored by Altmetric

Mentioned by
28 news outlets
18 blogs
213 tweeters
1 Wikipedia page
14 Google+ users
1 Reddit

Readers on

Twitter demographics

The data shown below were collected from the profiles of 213 tweeters who shared this research output. Click here to find out more about how the information was compiled.

Mendeley readers

Score in context
IN SUMMARY…
THINGS TO REMEMBER

- All metrics are flawed but some are useful
- Do not use journal-based metrics to measure the quality of research articles, to assess individuals, or in hiring/firing or promotion decisions
- Use a range of article metrics and indicators when you need to
- Challenge research assessment practices that rely heavily on impact factors
- Promote and teach best practices that focus on the value and influence of research, not the value and influence of metrics
THANK YOU!
ANNIE GAINES – AGAINES@UIDAHO.EDU | @LIBRARIANNIES
<table>
<thead>
<tr>
<th>Metric</th>
<th>How Calculated</th>
<th>Update Frequency</th>
<th>Source</th>
<th>Keep in mind</th>
<th>Use it for</th>
</tr>
</thead>
</table>
| Journal Impact Factor (JIF)   | Calculated annually from average number of citations received per paper during the 2 preceding years. Calculation is based only on journals indexed by Thomson Reuters. (citation based) | Full year’s data necessary before calculating. 2014-2015 data will not be ready until summer 2016 | Proprietary algorithm Published in database: Journal Citation Reports (JCR) from Thomson Reuters (ISI) | • Journal level metric  
• Calculated only for JCR journals  
• Journal self-citations included in calculation  
• Easily manipulated, and no longer trusted | • Targeting journals in which to publish  
• Identifying journals relevant to a specific discipline  
• Measuring a journal’s status |
| Eigenfactor Score             | Based on the number of times articles from the journal published in the past five years have been cited in the JCR year and takes into account which (highly cited or less highly cited) journals have contributed to these citations. Journal self-citations are removed. (Citation based) | Updated with each new release of JCR Impact Factors | Algorithms and metadata are described at the website: [www.eigenfactor.org](http://www.eigenfactor.org) Published in Journal Citation Reports, and at Eigenfactor website | • Journal level metric  
• A journal’s Eigenfactor score doubles when it doubles in size – the more articles a journal publishes, the higher the Eigenfactor | • Targeting journals in which to publish  
• Identifying journals relevant to a specific discipline  
• Measuring a journal’s status |
| Article Influence Score       | Calculated from the journal’s Eigenfactor Score divided by the normalized fraction of all articles published in all journals. The mean score is 1.00, greater than 1.00 indicates above average influence, and less than one below average influence. (citation based) | Updated with each new release of JCR impact factors | Algorithms and methodology are described at the website: [www.eigengactor.org](http://www.eigengactor.org) Published in Journal Citation Reports and at Eigenfactor website | • Journal level metric  
• Score captures relative importance of a journal on a per article basis, but is not tied to a specific article  
• Article influence scores of a journal can vary between Eigenfactor and JCR even for the same year  
• Eigenfactor metrics may take into account some other sources (such as dissertations) besides journals | • Targeting journals in which to publish  
• Identifying journals relevant to a specific discipline  
• Measuring a journal’s status |
<table>
<thead>
<tr>
<th>Metric</th>
<th>How Calculated</th>
<th>Update Frequency</th>
<th>Source</th>
<th>Keep in mind</th>
<th>Use it for</th>
</tr>
</thead>
</table>
| h-index             | The largest number $h$ such that $h$ publications have at least $h$ citations.  | Timeframe and updates depend on the source | Can be manually calculated using citation databases. Calculated automatically by Web of Science, Scopus, Google Scholar | • Typically a scholar-level metric; may also be calculated for journals or any other defined set of documents  
• Bounded by total number of publications 
• Favors scholars with longer careers 
• Does not account for author position or number of co-authors 
• Researchers with common surnames may be better off calculating the h-index manually | • Measuring impact of an individual’s publications  
• Comparing researchers within disciplines |
| i10 index           | Number of publications with at least ten citations                            | Based on citations from all articles indexed by Google Scholar. | Created by Google Scholar and used in Google’s My Citations feature. Sources are unclear and subject to change. | Scholar-level metric | Measuring impact for an individual's publications Comparing researchers within disciplines |
| Article-level metrics (PLoS) | Not a single metric but a suite of metrics:  
  Article usage (views & downloads) 
  Citations 
  Social networks 
  Blogs & media coverage 
  PLoS community input | Real-time | • Article usage: PLoS, PubMed Central  
• Citations: PubMed Central, Scopus, CrossRef, Web of Science  
• Social networks: CiteULike, Connotea, Twitter, Facebook, Mendeley  
• Blogs & Media: Nature Blogs, Research Blogging | No single metric, so it can be more complex to present in context | • Demonstrating immediate impact of your research across multiple non-traditional communication channels  
• Benchmarking performance of a particular item against similar items |
<table>
<thead>
<tr>
<th>Metric</th>
<th>How Calculated</th>
<th>Update Frequency</th>
<th>Source</th>
<th>Keep in mind</th>
<th>Use it for</th>
</tr>
</thead>
</table>
| Impact story           | Not a single metric but a suite of metrics: Article usage (views and downloads) Citations Social networks Blogs & media coverage PLoS community input                                                                                                                                 | n/a              | Including but not limited to: PLoS ALM, Facebook, Slideshare, Github, Wikipedia, CiteULike, Delicious, Mendeley, Dryad, F1000  [www.impactstory.org](http://www.impactstory.org) | • Gathering IDs may not capture everything  
• Artifacts may be missing some metrics  
• Number of items on a report is currently limited  
• Data displayed is not currently CC0 due to licenses with data sources                                                                                                                                 | • Demonstrating immediate impact of your research across multiple non-traditional communication channels  
• Benchmarking performance of a particular item against similar items  
• Gathering IDs may not capture everything  
• Artifacts may be missing some metrics  
• Number of items on a report is currently limited  
• Data displayed is not currently CC0 due to licenses with data sources                                                                                                                                 |
| Journal acceptance rates | Proportion of items accepted for publication in the past year                                                                                                                                                                                                            | n/a              | Editors (may have to request)                                                                 | • May not be transparent or easily available                                                                                                                                                           | • Demonstrating potential impact for an unpublished or relatively recent article  
• Demonstrating potential impact for an unpublished or relatively recent article  
• Gathering IDs may not capture everything  
• Artifacts may be missing some metrics  
• Number of items on a report is currently limited  
• Data displayed is not currently CC0 due to licenses with data sources                                                                                                                                 |
| Visibility             | n/a                                                                                                                                                                                                         | Varies           | Sources vary                                                                                                                                          | • May be difficult to do a systematic search and capture for this type of information  
• Difficult to provide context for comparison                                                                                                                                                        | • Demonstrating broader impact of your research that does not fit into traditional or formal metrics  
• Demonstrating broader impact of your research that does not fit into traditional or formal metrics  
• Gathering IDs may not capture everything  
• Artifacts may be missing some metrics  
• Number of items on a report is currently limited  
• Data displayed is not currently CC0 due to licenses with data sources                                                                                                                                 |
| Ownership count (libraries) | As indexed in the WorldCat catalog                                                                                                                                                                             | Depends on the contributing library, but a record is added every 10 seconds | OCLC, or Online Computer Library Center Inc, a non-profit library service and research organization.                                                                                                      | • May not be recognized or valued as an indicator of impact in some fields  
• As library budgets have decreased, libraries are purchasing fewer items and instead relying on ILL                                                                                                                                 | • Demonstrating broad dissemination  
• Demonstrating value to academic and/or public audiences  
• Ideal for monographs  
• May not be recognized or valued as an indicator of impact in some fields  
• As library budgets have decreased, libraries are purchasing fewer items and instead relying on ILL                                                                                                                                 |
<table>
<thead>
<tr>
<th>Metric</th>
<th>How Calculated</th>
<th>Update Frequency</th>
<th>Source</th>
<th>Keep in mind</th>
<th>Use it for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indexed in major databases</td>
<td>A general indication of the quality of a scholarly publication.</td>
<td>Varies depending on database</td>
<td>Typically commercial publishers</td>
<td>The criteria for indexing varies by database and may not be transparent</td>
<td>Demonstrating value of publishing in a journal that is new or not yet established</td>
</tr>
<tr>
<td></td>
<td>Example: for biomedical disciplines, indexed for PubMed in MEDLINE by the National Library of Medicine</td>
<td></td>
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</tbody>
</table>
| Web metrics (views, downloads, shares) | Calculated by the repository or website, typically excluding bots           | Varies, typically real-time | Analytic code within the repository or database system itself | Similar accuracy issues with all web statistics, although many repositories screen out traffic from bots and web crawlers | Demonstrating the reach and impact of the item
Complementing data from other sources to provide overall indication of impact |
| Editorial board quality            | Journal website, reputation among colleagues                                 | Varies                    | Colleagues                           | Can be unreliable, biased, or lag behind actual events                      | Complementing quantifiable metrics                                         |