

Beyond Citation-Counting: Metrics and Altmetrics for Demonstrating Scholarly Impact

PRESENTED BY ERIN OWENS

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Hi there! The Notes pane of these slides contains a sort of “script” for the presentation. However, the speaker will not be reading this script word for word, and thus it may vary from the live presentation. This “script” is mostly for the benefit of those who view the slides but did not attend the live presentation. I hope it’s helpful for giving more sense and context to the slides!

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About Me



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About You



Poll Questions

Does your job title or job description contain references to scholarly communications, research metrics, or something related?

Have you ever collected metrics for a scholarly published work, either for yourself or at a faculty member's or administrator's request?

How would you rank your own knowledge of scholarly metrics?

Learning Objectives

After this session, participants will be able to:

1. Define key terms and concepts in scholarly metrics and altmetrics.
2. Discuss how alternative metrics expand a researcher's ability to demonstrate impact.
3. Access tools and resources (particularly those freely available) to begin gathering metrics and altmetrics for a scholarly product or researcher.

Presentation Outline

- ▶ Definitions & Why Do We Care?
 - ▶ Many Metrics for Many Purposes
 - ▶ Limitations & Responsible Use of Metrics
 - ▶ Telling the Story of Research
 - ▶ Interactive Exercises
 - ▶ Questions?
-
- ▶ Highlighted Resources
 - ▶ For Further Reading: Selected References
 - ▶ Join the Conversation: Relevant Listservs

My slides WILL be available after this presentation.

Definitions



In any discussion, it helps to speak the same language, so I want to suggest a few definitions.

Research metrics are quantitative measurements intended to evaluate research product. Many focus on the attention received by a research product, and many focus on journal articles specifically as a type of research product, though there are exceptions.

Bibliometrics are a type of research metrics based on measuring citations. Citations to a whole journal, a specific work, a researcher, etc. may be evaluated with different formulas.

The term *alternative metrics*, or “altmetrics,” describes a broad array of metrics that evaluate attention by means other than citations, particularly centered on digital engagement such as views, downloads, or social media mentions. Altmetrics can apply to journal articles and books, as well as more diverse products such as presentation slides, data sets, and more.

The last term I want to define is *impact*. The definition of this term varies, sometimes a little and sometimes a lot, based on context. A public health researcher and a literature researcher have very different ideas of what “impactful scholarship” looks like—as well they should.

To provide a foundation for our discussion, I will borrow a definition from the book *Meaningful Metrics* by Roemer and Borchardt (2015); they define impact as including two principles: “*effect*, in the sense of a perceptible shift, change, or influence” and “*force*, in the sense of the strength or degree of this effect,” thereby yielding “a two-part determination of where a work can be said to have an effect and to what extent the force of this effect can be quantified and benchmarked” (4).

Why Do We Care About Metrics?

- ▶ Different motivations for different stakeholders—for instance, an individual researcher versus their university administration
- ▶ **Strategic Spending** by Libraries
- ▶ **Competitive Decision-Making**, such as hiring or awarding grants
- ▶ **Relative Ratings** of Individuals, such as tenure/promotion, merit pay
- ▶ **External Validation** of Researcher, Department, Institution
 - ▶ May help to attract students, faculty, donors, etc.

Different motivations for different stakeholders—for instance, an individual researcher versus their university administration

Strategic Spending: Libraries may use journal-level metrics in selecting where to spend limited funds on subscriptions.

Competitive Decisions: Article and researcher metrics may give a researcher an edge in decisions such as hiring or awarding grants.

Relative Ratings: Various metrics may be used to quantify the relative performance of individuals, for purposes such as tenure and promotion or awarding merit pay.

I'll note that the way this is done is not always fair or in accordance in best practices, but it still happens.

External Validation: Researcher and institutional metrics may be used to help validate a researcher's, department's, or institution's importance.

Many Metrics for Many Purposes

Periodic Table of Scientometric Indicators

EC3 metrics		Basic Indicators										Webmetric Indicators (1.0)										Lnk				
h	P	Bibliometric Indicators										Altmetric Indicators														
h-index based Indicators																						Fav	MR	AP	RGP	WS
IF	AF	CS	JCS	FCS	FNCI	NJI	JCS	RgC	MASC	GSC	GSh	Lk	PM	FacL	APV	RGV	Vw									
Journal Impact Factor	Article Factor	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation	Citation					
SJR	EF	SNIP	I3	CI	MCS	MNCS	MCRS	MSNCS	MASP	GSP	Sub	BM	TwM	FacS	ADV	RGD	Dwd									
Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source					
IPP	CPP	CPPEX	ANCP	TNCS	RAI	RSI	RCR	RDCP	JAR	Com	PuPC	NM	WC	FacC	Afr	RGI	Ck									
Impact per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper	Citation per Paper					
%SC	%Pnc	PR	LogZ	IK	TI	STP	NPJ	WCH	Rev	F1Re	GoRev	MoH	ARev	Play	Afg	RGfr	FTV									
Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source	Source Normalized Impact per Source					
PT1	PT10	PT50	HCP	Q1	PWoS	NHCP	PTRJ	Exp	Q&A	F1R	GoRat	MoR	ARat	PS	OS	RGfg	AV									
Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank					
PCol	%CoA	NCoI	ICol	SL	EN	Exc	Sav	ReR	F1FFa	GoRea	MoS	RcCU	RCU	BoD	AA	AAS	DIL									
Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank	Page Rank					
h10	g	a	h(2)	hg	q2	r	ar	k	f	m	m-q	Ch	Th	Dh-T	n	Mh										
h-index	g-index	a-index	h-index	h-index	q-index	r-index	ar-index	k-index	f-index	m-index	m-q-index	Ch-index	Th-index	Dh-T-index	n-index	Mh-index										
h5	Nh	Sis	SiH-T	Hw	Hm	Th	I10	v	e	hla	Mh	RC	CC	Ch	CSs	π										
h-index	Nh-index	Sis-index	SiH-T-index	Hw-index	Hm-index	Th-index	I10-index	v-index	e-index	hla-index	Mh-index	RC-index	CC-index	Ch-index	CSs-index	π-index										
h5-m	2gh	Rbhm	h2-l	h2-c	h2-u	h3	p	Hbar	Mhm	w	b	Gh	SPh	hint	Hrat	πrv										
h5-m-index	2gh-index	Rbhm-index	h2-l-index	h2-c-index	h2-u-index	h3-index	p-index	Hbar-index	Mhm-index	w-index	b-index	Gh-index	SPh-index	hint-index	Hrat-index	πrv-index										

Image credit:
[El profesional de la Información y EC3 metrics](#)

Before I dive into some individual metrics, I want to share this graphic, which I absolutely love, from *El profesional de la información*.

I think this Periodic Table of Scientometric Indicators helps illustrate the SCOPE of the landscape. Obviously I can't possibly discuss all of these, but be aware there is much more to be learned if you decide to go down the rabbit hole. Unfortunately this graph doesn't actually link out to details about each metric. Other resources such as the Metrics Toolkit and Snowball Metrics may be helpful for more details.

Journals - Bibliometrics

- ▶ **Based on the Web of Science Knowledgebase:**

- ▶ Impact Factor

$$\text{Yearly Impact Factor} = \frac{\text{Total \# of citations in } y \text{ to items published in } y-1 \text{ and } y-2}{\text{Total \# of "citable items" published in } y-1 \text{ and } y-2}$$

- ▶ *Related: 5-year Impact Factor, Eigenfactor*

- ▶ **Based on the Scopus Knowledgebase:**

- ▶ CiteScore

$$\text{Yearly CiteScore} = \frac{\text{Total \# of citations in } y \text{ to items published in } y-1, y-2, \text{ and } y-3}{\text{Total \# of "citable items" published in } y-1, y-2, \text{ and } y-3}$$

- ▶ *Related: Source Normalized Impact Per Paper (SNIP), Impact Per Publication (IPP), SCImago Journal Rank (SJR)*

- ▶ **Based on Citations, using Cabell's Scholarly Analytics Algorithms:**

- ▶ Cabell's Classification Index (CCI)

- ▶ **Other Journal Metrics:**

- ▶ Acceptance rate (e.g., Cabell's, MLA Directory of Periodicals, etc.)

Journal bibliometrics, particularly the Impact Factor, are some of the most familiar research metrics. These are based on the number of citations that a journal receives to its published content. Impact Factor and CiteScore are very similar, but based on different databases of content, Web of Science versus Scopus. These metrics are not available for every journal, but only for those journals which have been indexed in Web of Science or Scopus. And the calculation itself only counts citations from other works indexed in the same database.

The Cabell's Classification Index is another metric; it shows a journal's influence within its broad field and specific sub-topics. Cabell may cover different journals than Web of Science and Scopus, and their breakdown of topics within a discipline is different, so it provides another alternative in situations where a journal metric is appropriate—and it isn't always.

These metrics describe ONLY the journal level and should not be used as a proxy for evaluating an individual research product or researcher. Because of that limitation, and because these measures tend to more familiar anyway, I am not going to spend more detail on these.

Articles - Bibliometrics

- ▶ Citations, citations, citations
 - ▶ Scholarly (Web of Science, Scopus, Dimensions.ai, dissertation databases)
 - ▶ Non-scholarly – especially showing impact on practice, policy, etc. (Google Scholar, Harzing's Publish or Perish, Google)
- ▶ Counting versus indexing
- ▶ Context, context, context!

Traditional, citation-based bibliometrics can also be collected for individual articles by evaluating citations to the work.

Web of Science and Scopus are useful for identifying citations in scholarly works. Also check out the free app from Dimensions.ai which lists citing works, searching across not only scholarly publications, but also grants, patents, clinical trials, and policy documents. Search dissertations and theses databases to discover citations by graduate students. Google Scholar and Dr. Anne-Wil Harzing's "Publish or Perish" software are also excellent tools for discovering additional citations from sources that are not covered by Web of Science or Scopus.

But never underestimate the value of the ordinary Google web search engine for finding non-scholarly citations. Specialized search engines of gray literature, government documents, public policy documents, or professional and trade publications may also be useful, depending on what type of audience you anticipate for your work.

When evaluating citations to a work, it is important to not simply tally up the total number of citations found in each database. These numbers will often include overlap and may contain some erroneous citations or other problems. Although it is more time-consuming, it is more valuable to create an index of the citing works found in each database, so that

those citations can then be de-duplicated, verified, and otherwise “cleaned up” to paint a more accurate picture.

This citation list is also valuable for understanding CONTEXT. Saying an article was cited 20 times provides no information about how, why, or by whom it was cited. Were the citations just passing footnotes acknowledging it as a minor part of the existing literature? Were they criticisms of poor science? Were they derivative studies that re-used and validated the work’s methodology? An argument for a scholar’s impact will almost always be enhanced by a contextual narrative that goes beyond a citation count and instead explains *why* the work mattered to those who cited it.

When considering context, it is also important to keep in mind that the typical number of citations for a work VARIES between disciplines. You cannot necessarily judge a literature article with 3 citations against a biology article with 12 citations. Tools such as Dimensions.ai can assist with putting this in context via the Field Citation Ratio and an explanation of how the work’s citations compare to the average citations in the field. This metric is not always available, but take advantage of it when you can.

Articles* – Altmetrics

** and other individual works...*

- ▶ Expanding how researchers show impact
 - ▶ Faster than citation
 - ▶ More diverse forms of attention, from a potentially more diverse audience – “not just scholars”
 - ▶ Media mentions (blogs, etc.)
 - ▶ Social media engagement (likes, shares, retweets, etc.)
 - ▶ Webometrics such as views, clicks, downloads, etc.
 - ▶ Saves to reference manager libraries (e.g., Mendeley)
 - ▶ Re-use “badges” to promote work for further attention
- ▶ ...But be sure to get a DOI

So now we’re going to talk about altmetrics, which encompasses many different measures of online attention. In starting, I want to quickly distinguish two terms. We have altmetrics, “small a, and an s” which generally refers to alternative metrics. This is not to be confused with Altmetric, “big a, and no s,” which is a company providing altmetrics-gathering tools. For clarity in this presentation, I will try to refer to the company as Altmetric.com.

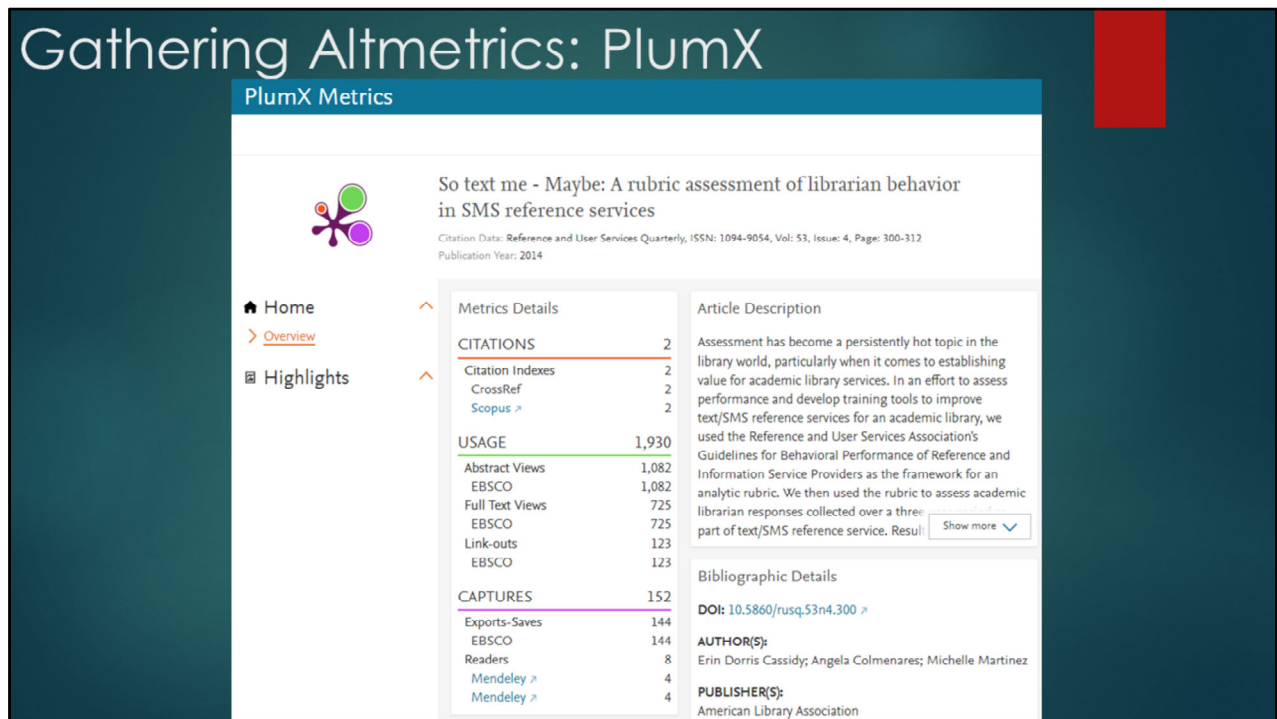
So early in the presentation, we defined altmetrics as metrics that evaluate attention by means other than citations, particularly centered on digital engagement. These alternative metrics can really expand a researcher’s opportunities to show that their work has impact. Why? In no small part because garnering citations takes time, and the average length of time to citation varies widely among disciplines. It may take years before a researcher can really prove their work’s importance through formal citations. But they can much more quickly point to other forms of attention, such as views, downloads, social media discussion, or saving a work to a reference library, actions which demonstrate interest and which might eventually lead to formal citations.

It’s also worth noting that most of the major altmetrics tools I will discuss provide options to re-use “badges” which highlight the attention a work has already received. Positioning these badges in key locations may assist a researcher in driving new attention to the work.

A Digital Object Identifier, or DOI, is the identifier most commonly used to track altmetrics activity for an individual work. Many articles will be assigned a DOI at publication, but it depends on the journal. If you want to track a work that doesn't already have a DOI, you may want to consider uploading it to a repository that offers DOIs, such as figshare or OSF (Open Science Foundation). First be sure that you understand whether any copyright or licensing issues may affect that upload, for instance, if it is a published work. But obtaining a DOI like this can assist you in gathering attention metrics for videos, slides, code, data sets, and many other works beyond just journal articles—this flexibility of application for many types of output is part of what makes altmetrics valuable.

Now that your work has a DOI to identify it, let's shift into looking at a few of the major tools that will aggregate attention metrics.

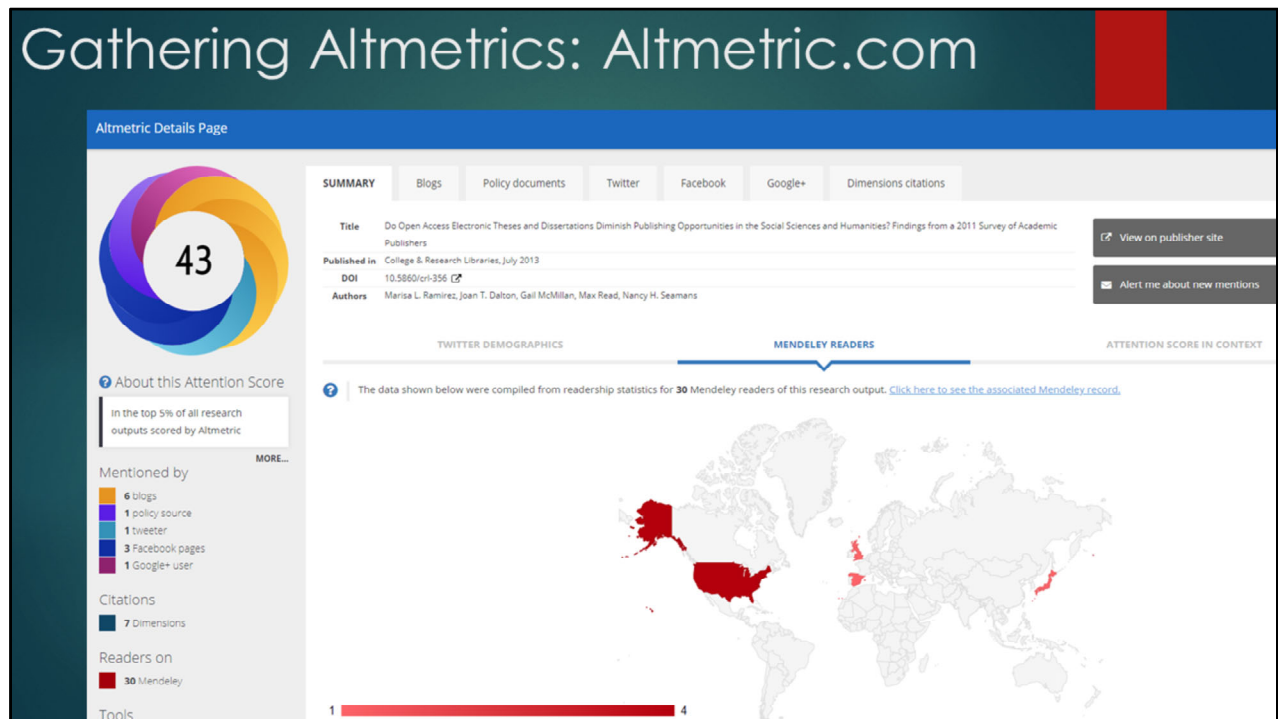
Gathering Altmetrics: PlumX



PlumX Metrics is one major subscription tool. They measure scholarly citations; usage; captures; mentions; and engagement from across many platforms. This information is distilled into a visualization they call the “Plum Print” (like a thumbprint).

Although they do have an institutional subscription product, they also provide a free DOI look-up tool—basically a URL, to which you add a DOI before pasting it into a browser’s address bar. This screenshot actually illustrates the data that you can access through the free DOI look-up tool.

Gathering Altmetrics: Altmetric.com



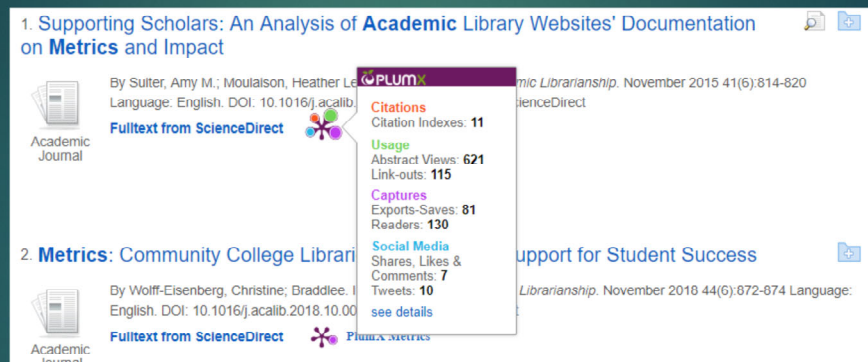
Altmetric.com is another highly visible tool, in no small part because of their choice of names! They survey public policy documents, blogs, mainstream media, scholarly citations, Mendeley, post-publication peer review platforms, Wikipedia, social media, and more. The attention they find is distilled into a visualization that they call the “donut.”

Again, this is an institutional subscription, but they also provide free resources. One of these is Altmetric Explorer for Librarians, which provides free access to their interface; it includes access to fewer features than the institutional version, but it will allow you to look up individual works to see their attention details, and I encourage you to request access. I’ve included a screenshot here of the data that you can access in the free Explorer for Librarians.

Their second free resource is a browser plugin, or “bookmarklet,” that anyone can use from any web page with a DOI to instantly look up the attention donut for that DOI.

Dimensions.ai from Digital Science is a newer resource. I briefly mentioned Dimensions earlier for tracking scholarly citations, but they also include the Altmetric.com donut, so this is another FREE way to access Altmetric.com tracking, along with the other data that Dimensions provides.

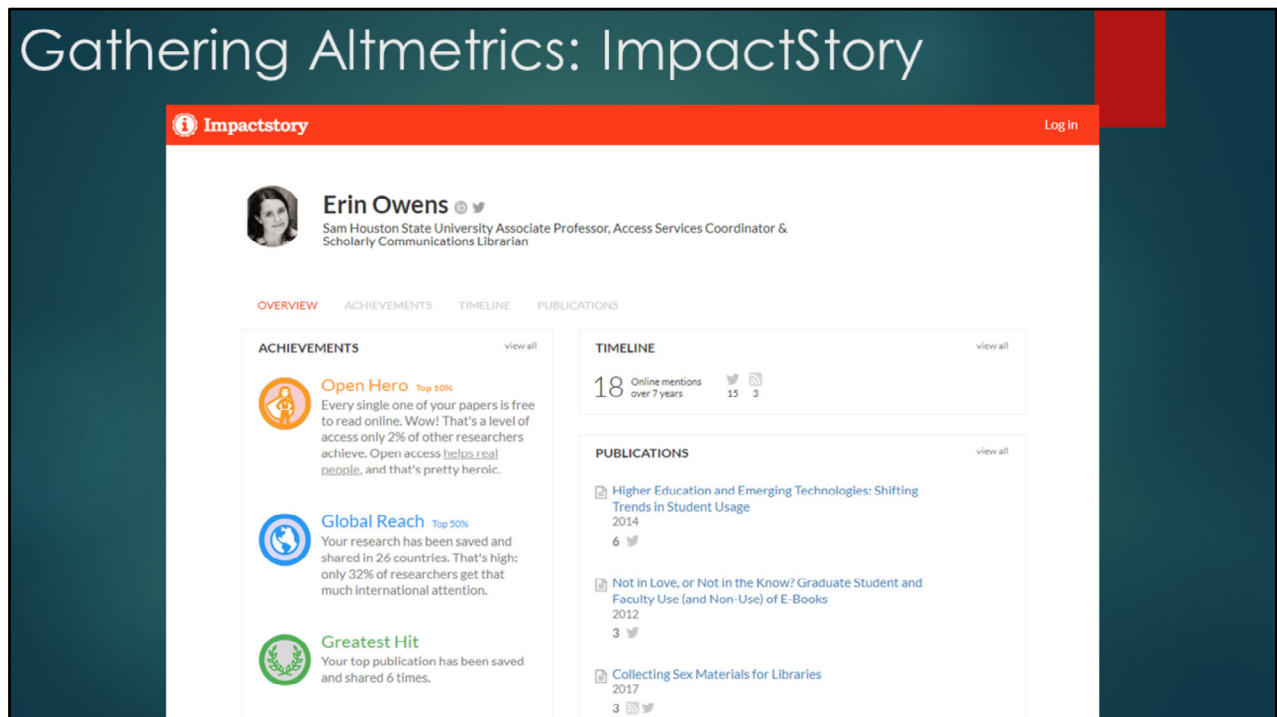
Gathering Altmetrics: Publishers/Vendors



Both Altmetric.com and Plum have deals with commercial publishers and vendors, so if your library subscribes to databases such as EBSCO Discovery Service, ScienceDirect, Taylor & Francis Online, Wiley Online Library, or others, you may be able to access Altmetric donuts or Plum prints for at least some of the content in those databases and publisher websites.

Here's a screenshot from EBSCO Discovery Service just to illustrate.

Gathering Altimetrics: ImpactStory



ImpactStory is another good tool. It doesn't incorporate nearly as many measures as Altimetric and Plum, but it's FREE, and it doubles as a researcher profile, including providing one place to link out to OA versions of works. One reason I especially like it is that it also provides unique measures aligned with different researcher values, for instance, what percentage of your work is available open-access, how global your reach is, and how your work impacts researchers in the Global South. Alternative, values-based metrics like these can be important when we describe the attention that a work receives.

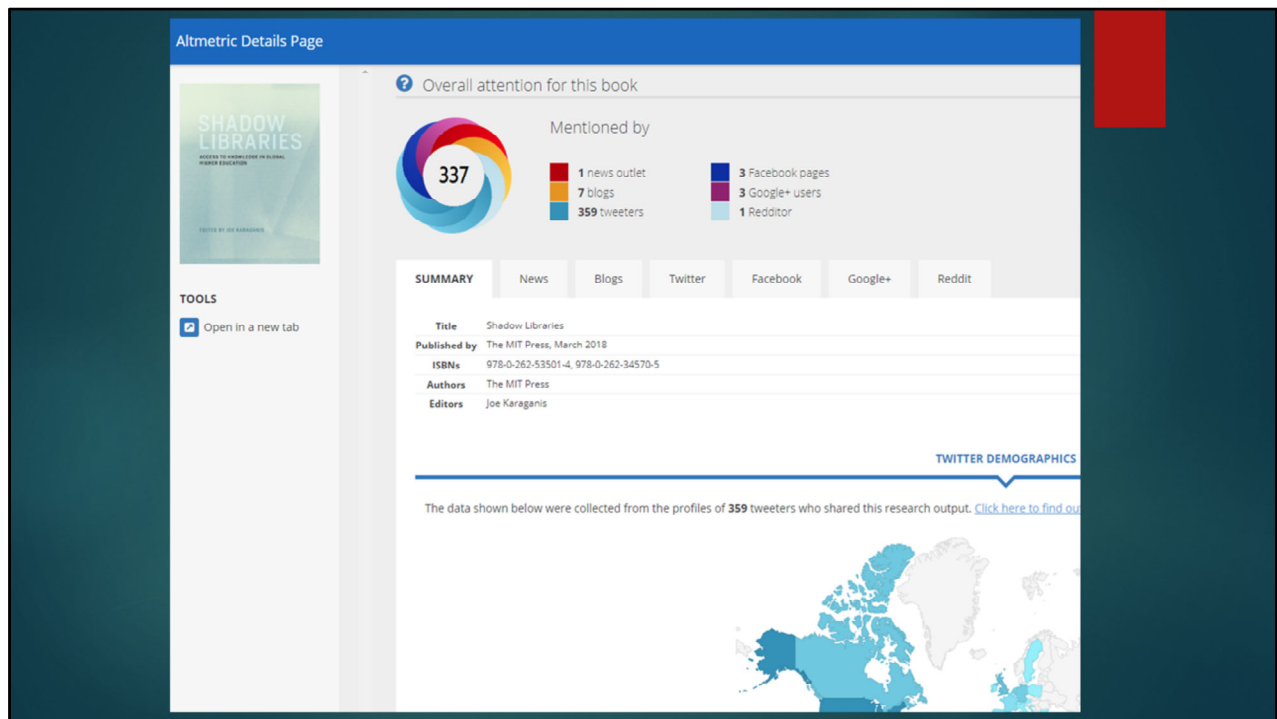
Individual Outputs: Other Metrics

- ▶ Open Syllabus Project – impact on teaching
- ▶ Altmetric for Books

I also want to branch out for a moment and consider a few additional types of metrics for individual outputs or works.

We've looked at scholarly impact and online attention, but what about impact on teaching? If a researcher's work is adopted as course material, this presents a new angle for discussing the work's importance. One tool that can help is the Open Syllabus Project, which will search contributed syllabi for a title or author. However, be aware it is not a comprehensive database of course syllabi.

Many of the metrics we've discussed previously have focused on journal articles, but in some disciplines, books are the gold standard for research outputs. Altmetric.com has been expanding their product to provide Altmetric for Books, which will give you an overview of attention very similar to what it provides for journal articles, but using an ISBN rather than a DOI...



Here's a screenshot to give you a sense of the attention they can track for a book...

Individual Outputs: Other Metrics

- ▶ Open Syllabus Project – impact on teaching
- ▶ Altmetric for Books
- ▶ WorldCat holdings of books
- ▶ Reviews: Scholarly, Librarian, Non-scholarly
- ▶ Awards
- ▶ Evolving and Emerging Metrics
 - ▶ **Field-weighted citation ratio**
 - ▶ **Relative Citation Ratio (RCR)** – for works in PubMed (1995 on) – being explored for expansion beyond the biomedical field
 - ▶ **HuMetricsHSS** – “humane” metrics, values-based framework
 - ▶ **Research Quality Plus (RQ+)** – a measure of value that takes into consideration contextual factors, dimensions of quality, and systematic assessment using rubrics and evidence

You can also look at holdings of the book in WorldCat-participating libraries: how many libraries hold the book, how internationally is it held, and so forth? Reviews are another data point. These may include scholarly reviews in disciplinary journals, short reviews targeted at librarians in outlets such as Choice or Library Journal, and non-scholarly reader reviews from sites like GoodReads and Amazon; aim for quality anecdotes among these reviews along with simple counts. And of course, if a book, article, or any other work wins an award, that information should be gathered as well.

I also want to touch briefly on a couple of emerging metrics that may be less familiar. Earlier I briefly mentioned the field citation ratio, sometimes available from Dimensions.ai or other sources; this ratio takes into account the average number of citations that articles in a field usually receive. One very specific field-weighted citation ratio is the Relative Citation Ratio, or RCR, developed by the National Institutes of Health (NIH). Currently it is only applied to biomedical literature in the PubMed database from about 1995 onwards. But it is being explored for possible expansion to other fields, including the arts and humanities.

HuMetricsHSS is an initiative for rethinking humane indicators of excellence in academia. Many quantitative metrics are geared towards scholarship practices in

the sciences, and the humanities are often disadvantaged. HuMetricsHSS provides a values-based framework for evaluating a scholar's progress in collegiality, quality, equity, openness, and community. The HuMetricsHSS team is still wrestling with how this will be measured, but it is an intriguing area to watch as it evolves.

Finally, I want to mention Research Quality Plus or RQ+, a measure defined by Canada's International Development Research Centre (IDRC) in Ottawa, which attempts to take contextual factors into consideration when measuring value. They envision RQ+ being grounded in the local experience and argue that it will provide a better mechanism for evaluating research from the Global South by not trying to compare it to other experiences and contexts.

Researcher Metrics

- ▶ *h*-index
 - ▶ For author: Author has *h* papers with at least *h* citations each
 - ▶ WOS, Google Scholar, Publish or Perish, Scholarometer
 - ▶ Bar charts versus beam plots
 - ▶ Limitations
- ▶ *h*-index can also be applied to departments, universities, journals, etc.

H-index is a metric often used for individual researchers, though it can also be applied to departments, universities, or journals. This metric tries to balance both productivity and impact, how much you publish and how much your publications are cited. The point at which an author has *h* papers with at least *h* citations each is the *h*-index. If you have published 10 papers, and one has 50 citations, but the rest have only 2 citations each, then your *h*-index might still only be 2.

H-index has some weaknesses, for instance, it may favor senior over junior researchers, and comparisons should still be done only within a field. However it may be helpful in comparing a researcher to others in the same field with similar years of experience.

I will add that there are many, less commonly referenced, spin-offs of *h*-index, including the *h*₅-index and the *g*-index. In the Feb 2019 issue of the journal *Scientometrics*, Hirsch, who proposed the *h*-index to begin with, further proposed a new *h*-alpha ($h\alpha$), which generated quite a bit of argument in the March issue!

Limitations of Metrics

► Unclear Why Authors Cite

"Enthusiasm for citation indexing...is based on the assumption that citations give a fair picture of the intellectual links between publications. It would be more accurate to say that they give the picture that authors record.

The deviation results from memory failures, lack of self-awareness, carelessness, plagiarism of other people's citations without having actually used them, the widespread custom of not citing 'obvious' sources, and many other causes—all consequences of the simple fact that the author selects citations to serve his scientific, political, and personal goals and not to describe his intellectual ancestry."

– Kenneth May, 1967

I would be remiss if I didn't talk about the limitations of metrics, because we should understand both the strengths and the shortcomings when we engage with these kinds of assessment tools.

First of all, it pays to maintain perspective on any metrics based in **citations**, because it isn't always clear why authors cite and what the inclusion—or exclusion—of a citation is really meant to communicate.

Limitations of Metrics

► Backwards-Looking

"All research assessments (whether using metrics or peer review) are essentially backward-looking and based on past performance.

We assume that because someone or something has performed in the past, it will do so in the future. But that is an assumption."

- Elizabeth Gadd, 2018

But beyond just citation-based metrics, we should also acknowledge the limitations of research metrics more broadly.

They are all inherently backward-looking. Or if you've ever heard a radio advertisement for an investment opportunity or mutual fund, you've probably heard that fine print at the end: "Past performance is not an indicator of future results."

Limitations of Metrics

- ▶ Manipulation
- ▶ Context / Interpretation
- ▶ Absence of metrics ≠ absence of impact
- ▶ Journal prestige vs economics of access
- ▶ Fundamental philosophy on the pursuit of knowledge

[Manipulation:] Potential manipulation of a metric, or “gaming the system” usually just requires motivation. Citation-based metrics could be manipulated by means such as self-citation, reciprocal citation deals between authors, or similar. Altmetrics such as views or downloads could be manipulated through bots, incentivizing others to boost the appearance of attention, a professor requiring students to download his work, or other means.

[Context/interpretation:] Furthermore, any number can be used out of context, misconstrued, or misinterpreted.

[Absence of metrics:] Sometimes there are simply gaps in what numbers can be obtained, but the absence of readily available metrics does not automatically equate to the absence of impact, a fact of which I frequently try to reassure individual researchers.

[Journal prestige vs. economics of access:] When researchers feel pressured to publish only in high-impact journals, which tend to be very expensive, who is being excluded? Researchers at small institutions with smaller library budgets, researchers in developing countries, and others will not have access to the work in these scholarly journals, so they are excluded from the conversation we create.

[Philosophy:] Fundamentally, there is also an argument that the over-emphasis on arbitrary measurements to justify research as “worthwhile” undermines the philosophy that the pursuit of knowledge has intrinsic value. If a work is not cited within 2 years – or within 20 years – does that indicate that the work has no value? That it does not have the capacity for future value? That the researcher is not still worthy of recognition for their pursuits and accomplishments?

Responsible Use of Metrics

- ▶ Different types of impact require different metrics
 - ▶ Use a metric only as intended
 - ▶ Use a constellation of metrics
 - ▶ Present metrics in context
 - ▶ Ultimately, metrics do not measure quality; peer review does
-
- ▶ [San Francisco Declaration on Research Assessment \(DORA\)](#)
 - ▶ [Principles of Research Assessment and Management \(University of Bath\)](#)

Taking into account some of the limitations of metrics, here are a few considerations for using them responsibly.

Different types of impact require different metrics; be sure you select the metrics appropriate to the impact you want to show.

Use a metric only as intended. Be sure you understand its definition, what it is meant to describe, and use it accordingly.

Use a constellation of metrics; never try to reduce a researcher, an article, or a body of work to one single number.

Present metrics in context, not in isolation.

Keep in mind that ultimately, metrics can measure different types of impact and attention, but they do not actually measure quality: expert peer review does that.

The 2012 San Francisco Declaration on Research Assessment (DORA, <https://sfdora.org/>) recommends the abandonment of the use of journal-level metrics in hiring, promotion, and funding.

Telling a Story About Research



The best approach is often to think first about the story. I chose this image for the slide because this photo made me think, “Oh, there’s a story here!” And a scholarly output or a researcher’s body of work should be the same way. There’s a story there, even if it’s not immediately self-evident to the casual observer. Write this story first and use it as the framework for the metrics. A good story should explain the individual’s identity as a researcher—what do they study and why? Who is their audience, and why does the work matter to that audience? How does their work fit into the culture, values, or goals of their discipline? Of their institution? How has their work, and the attention it receives, changed over time? If their audience is outside academia, how has their work affected practice, policy, teaching, or other areas? After writing the story in clear language, then carefully collect the most appropriate metrics to provide evidence for the impact described in the story. Make sure you have a justifiable reason to include each metric, rather than just stuffing in numbers for the sake of numbers.

In addition to pulling related metrics and integrating them into the story, consider what graphs or other data visualizations might be helpful for communicating those metrics in a different way.

Seek strong anecdotes to accompany the numbers, especially with altmetrics. For example, sharing one thoughtful and substantive tweet about your work from an important peer in your field may count for much more than just a total count of tweets. Anecdotes can help

to illustrate the quality of attention received, rather than just the quantity.

One resource that may be particularly helpful here is the Becker Library Framework for Assessing Research Impact, which suggests relevant indicators and supporting evidence for research impact in the areas of Advancement of Knowledge, Clinical Implementation, Legislation and Policy, Economic Benefit, and Community Benefit.

Interactive Exercises



Now we're going to move into the last section of the presentation, where I want you to participate in some exercises about selecting and contextualizing. Examples will come primarily from our own field, Library and Information Science, because we can bring in a foundational idea of the goals and values in our field, rather than needing to discuss these with a researcher.

I want to emphasize that these exercises are not designed to have right and wrong answers; different individuals will have different ideas about which metrics are most valuable and how to present or explain them, and all of your perspectives may be valid. The important part is to clearly think through why you see value and how you will communicate that value to others.

The screenshot displays the Dimensions.ai interface for a specific article. The top navigation bar includes the Dimensions logo, a search icon, and a search bar containing '0807 Library and Information St...'. The main content area is divided into several sections:

- Publication - Article:**
 - Title:** University libraries and the postgraduate student: physical and virtual spaces
 - Journal:** New Library World, Volume 113(Issue 9/10), 439-447, 2012
 - DOI:** <https://doi.org/10.1108/03074801211273911>
 - Authors:** Colin Beard - Freelance Consultant, Bournemouth, UK; David Bawden - City, University of London
 - Abstract:** Purpose – This study aims to examine the library/information issues affecting graduate students, both those on taught courses and those undertaking research. It seeks to focus specifically on their perceptions of the value to them of physical and digital resources and spaces, and how well their needs were being met.
- Publication metrics:**
 - Dimensions Badge:** 8 Total citations, 4 Recent citations
 - Field Citation Ratio:** n/a
 - Relative Citation Ratio:** n/a
 - Altmetric:** 16 (Blogs (1), Policy documents (1), Twitter (7), Mendeley (69))
 - Research Categories:** Fields of Research: 0807 Library and Information Studies
- Publication citations - 8:**
 - Information Behavior of Electrical Engineering and Computing Doctoral Students and Their Perception of the Academic Library's Role: A Case Study in Croatia** (2018, Libri - Article) with Altmetric 2 and Open Access link.
 - Predicting the Role of Library Bookshelves in 2025** (2017, The Journal of Academic Librarianship - Article) with Citations 2, Altmetric 59, and Open Access link.
- Policy Document Citations - 2:**
 - Academic library impact: improving practice and essential areas to research** (2017, Analysis & Policy Observatory (APO))
 - Academic library impact: improving practice and essential areas to research** (2017, Analysis & Policy Observatory (APO))

So here are a set of screenshots representing an article's record in Dimensions.ai. This article was published in 2012 in New Library World. The Dimensions and Altmetric badges in the Publication Metrics section summarize the article's citation metrics and altmetrics. I've also included the first two publications which cited this work, as well as information on policy documents citing this work.

Look over this information for a moment and then comment in the chat: What stands out to you, either metrics that seem particularly meaningful, or contextual factors that might be valuable to include?

[...chat...]

[template for possible responses...] I'm hearing some great suggestions here. Here are a few things that I might highlight about this article [mention the following if they haven't already been discussed]

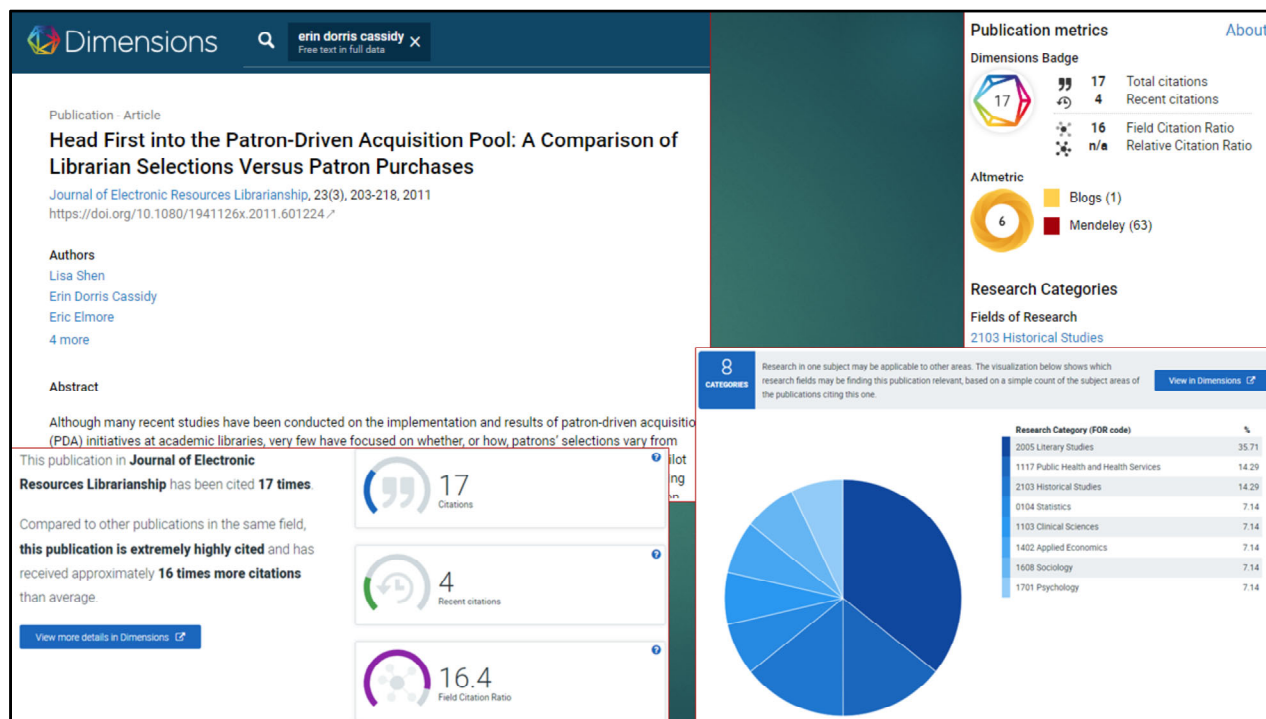
It was published in 2012, but its most recent citations date to 2018 and 2017, meaning that it is still consistently receiving attention almost 7 years after publication; good staying power.

The policy document citation seems very significant to me; I would want to pull up that document, see how this article was referenced, learn more about what the APO authoring organization is, and write some contextual narrative about the significance of this report and the citation of this article within it.

My curiosity is piqued by the second citing publication, which has received 2 citations and an Altmetric score of 59. I would probably want to investigate the context at a deeper level. How did that publication use this article? What kinds of attention are encompassed by that score of 59? Is it plausible that high attention to that citing work will bring some increased attention back to this work, if it is referenced in a significant way? I can't be sure going in that this line of questioning will yield something substantive, but it's definitely an area I would want to check out if I were reporting about the work of one of these authors.

The one blog post probably isn't something I would include, unless it was written by some lynchpin individual that gave it real credibility and significance.

The 69 Mendeley saves are interesting, because those could indicate an intent to cite this article in the future, to use this article to inform a library space redesign, or similar. At the same time, however, 7 years after publication, those saves in a reference manager may no longer indicate the potential for future citations the same way that they would for a newly published article.



This next article record is also from Dimensions.ai, but I have highlighted some different types of information.

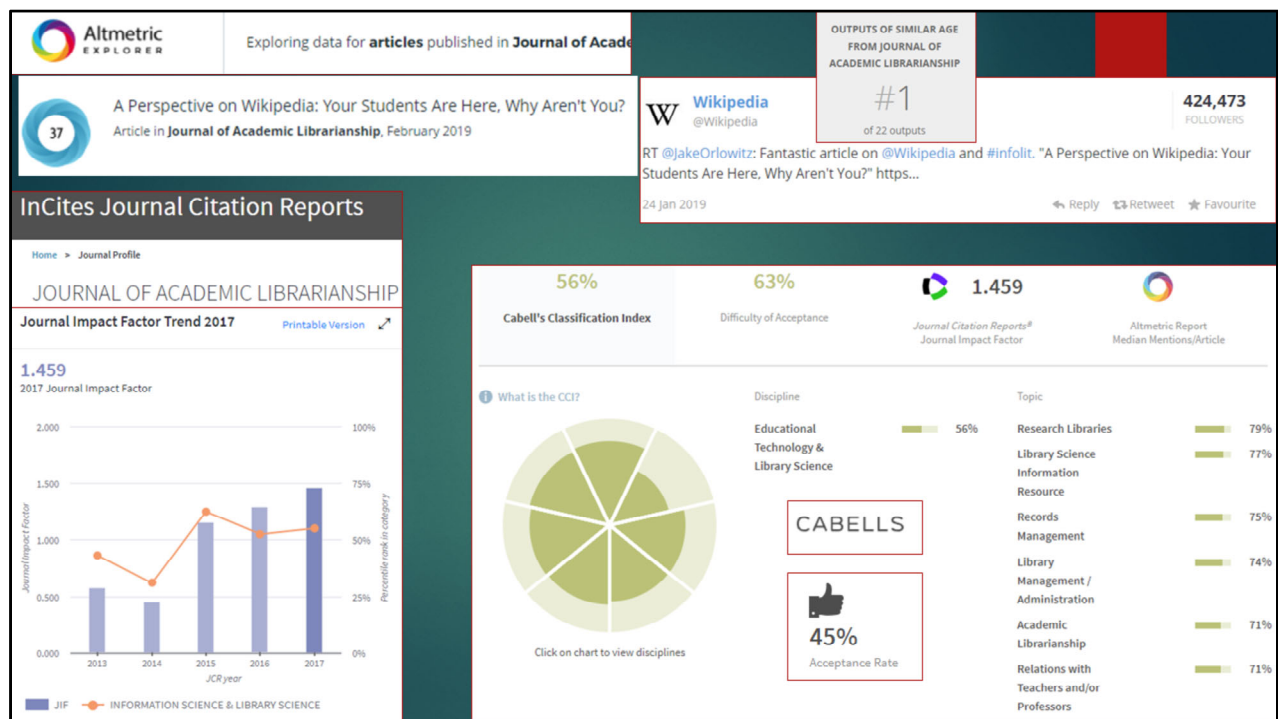
What stands out to you here that might be worth reporting or investigating? Anything here you might be concerned about reporting? Share your comments in the chat.

[...chat...]

[template for possible responses...] Great thoughts, y'all! You quickly observed some of the key points here. [mention the following if they haven't already been discussed]

So at first glance, I love that this article includes a field citation ratio, which is supposed to contextualize the number of citations relative to the average number in the field. But on closer inspection, I find myself suspicious of two facts: First, saying that 17 citations is 16 times more than average sounds high to me, just based on instinct. Second, why is the system classifying this article in the field of Historical Studies, and how is that affecting the field-weighted citation ratio that sounds off to me? I would be very concerned about reporting this data until I could better understand where it is coming from and verify its accuracy.

The graph of research fields that have cited this article also looks terrific at first glance, but raises questions for me. If I'm already questioning the category that this article has been placed in, I don't know to what extent I can trust these categories either. None of these citations are categorized as Library and Information Science, which seems strange given the topic of the article and journal. If I really thought there might be interdisciplinary value in this article that would be worth highlighting, I might feel more comfortable pulling that list of 17 citations and checking another sources, such as UlrichsWeb, to determine disciplines. If it truly does reflect noteworthy interdisciplinary interest, I could construct my own pie chart.



Here I've compiled data points about both an individual article and the journal that published it, originating from multiple sources: Altmetric Explorer, Journal Citation Reports, and Cabell's Scholarly Analytics.

What sorts of metrics or contextualizing factors seem pertinent to you? Once again, please share your comments in the chat.

[...chat...]

[template for possible responses...] Some great insights... [mention the following if they haven't already been discussed]

While I don't always cite a journal's Impact Factor in the discussion of an article, in this case, I think the JIF could be used as just one piece of data that helps to illustrate the influence of this particular journal in the field. I might combine the JIF with the Cabell's Classification Index data to explain that *Journal of Academic Librarianship* is a highly influential journal, both in focused topic areas like Academic Librarianship and in the wider field of Library and Information Science, which is what the orange line on the bar chart is telling us.

While a simple number of tweets might not be informative, sharing this tweet from Wikipedia as an anecdote might be more meaningful: the link to this article was retweeted by a well-known information website to its 424 thousand followers.

I'm a little ambivalent about the acceptance rate in this case. When acceptance is very low, I may say that suggests that the article compared favorably to other works in the discipline that were competing for that space. In this case, 45% is not bad, but it's also not necessarily so stellar that I would feel the need to call it out if I have other attention metrics that I could discuss.

Resources

► Paid / For-Fee Tools

- [Journal Citation Reports](#) (Clarivate)
- [Web of Science](#) (Clarivate)
- [Scopus](#) (Elsevier)
- [Dissertations & Theses](#) (ProQuest)
- [Cabell's Scholarly Analytics](#)
- [MLA Directory of Periodicals](#)

- [Altmetric.com](#) (institutional subscription)
- [PlumX Metrics](#) (institutional subscription)

► Free Tools

- [Eigenfactor.org](#)
- [SCImago SJR](#)
- [Journal Indicators](#) (SNIP, etc.)
- [Google Scholar](#)
- [Harzing's Publish or Perish](#) (free software)
- [Mendeley](#)
- [Open Syllabus Project](#)
- [WorldCat.org](#)
- [Dimensions.ai](#)
- [ImpactStory](#)

- [Altmetric Explorer for Librarians](#) (free login for limited capabilities)
- [Altmetric Bookmarklet](#) (browser plugin)
- PlumX DOI lookup (add a DOI to the end): <https://plu.mx/a/?doi=>
- [HuMetrics HSS](#)
- [iCite](#) (RCR, from NIH)
- [The Metrics Toolkit](#)
- [Snowball Metrics](#)
- [Becker Medical Library Model for Assessment of Research Impact](#)

Compiled links to the various resources referenced in this presentation

Selected References

- ☆ Blaise Cronin & Cassidy R. Sugimoto (eds.), *Scholarly Metrics Under the Microscope: From Citation Analysis to Academic Auditing* (Information Today, 2015) – An incredible read that draws together 60 years worth of both classic and recent papers on metrics
- ☆ Robin Chin Roemer & Rachel Borchardt, *Meaningful Metrics: A 21st-Century Librarian's Guide to Bibliometrics, Altmetrics, and Research Impact* (Association of College and Research Libraries, 2015) – Some resources are outdated already, but a great foundation to learn more and follow along with practical examples
 - ▶ ACRL Scholarly Communications Toolkit, <http://acrl.libguides.com/scholcomm/toolkit/impact>
 - ▶ San Francisco Declaration on Research Assessment (2012, <https://sf-dora.org/>)
 - ▶ Elizabeth Gadd, "Better, fairer, more meaningful research evaluation – in seven hashtags," LSE Impact Blog (27 Sep 2018), <http://blogs.lse.ac.uk/impactofsocialsciences/2018/09/27/better-research-evaluation-in-seven-hashtags/>
 - ▶ Robin Chin Roemer & Rachel Borchardt, "From bibliometrics to altmetrics: A changing scholarly landscape," *College & Research Libraries News* 73, no. 10 (2012): 596-600, <http://crln.acrl.org/content/73/10/596.full>
 - ▶ Reinhard Werner, "The focus on bibliometrics makes papers less useful," *Nature World View Column* (13 Jan 2015), <http://www.nature.com/news/the-focus-on-bibliometrics-makes-papers-less-useful-1.16706>
 - ▶ *Scientometrics* vol 92, no 2 (Aug 2012): Special Discussion Issue on Journal Impact Factors, <https://ezproxy.shsu.edu/login?url=https://link.springer.com/journal/11192/92/2/page/1>
 - ▶ Kenneth May, "Abuses of Citation Indexing," *Science* 156, no. 3777 (19 May 1967), pp. 890+892, <https://ezproxy.shsu.edu/login?url=https://www.jstor.org/stable/1721510>
 - ▶ J. Priem, D. Taraborelli, P. Groth, & C. Neylon. (2010), *Altmetrics: A manifesto*, 26 October 2010, <http://altmetrics.org/manifesto>

Far from a comprehensive list, but a few key references.

Join the Conversation: Relevant Listservs

- ▶ ALA lists – Subscribe through lists.ala.org
 - ▶ ACRL Scholarly Communication listserv: scholcomm@lists.ala.org
 - ▶ ACRL Research Assessment and Metrics Interest Group: resmetig@lists.ala.org
- ▶ Lis-Bibliometrics listserv (UK) - <https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=LIS-BIBLIOMETRICS>
- ▶ INORMS Research Evaluation listserv (INORMS-RES-EVAL) (UK/int'l.) - <https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=INORMS-RES-EVAL>

By no means a comprehensive list of every virtual space where related discussion takes place, but a few of my favorite lists to monitor for intelligent discussion of scholarly research metrics.

Questions?

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 - ▶ Find links to my Impact Story, full CV, and more at <https://shsulibraryguides.org/profiles/owens>

What questions do you have for me?
[What else?]