

THE FUTURE OF MEASURING SCHOLARLY AND SOCIETAL IMPACT IN THE HEALTH SCIENCES: EXPLORING DIMENSIONS IN NON-TRADITIONAL ALGORITHMS

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WHY MEASURE IMPACT?

Funding Organizations

Tenure and Promotion Committees

A Reliable Evaluation Method of
Scientific Research is important for:

General Public

Scientists

Hiring Committees

ASSESSMENT TOOLS

Bibliometrics:

- Citation Counts

- Journal Impact Factor (IF or JIF),
Eigenfactor etc.

- H-Index

- Relative Citation Ratio (RCR)

Article Metrics or Altmetrics

BIBLIOMETRICS

Impact of Journals
Measuring Tools

IMPACT FACTOR

Method devised by Eugene Garfield to measure impact of scientific journals by the average number of times articles from the journal published in the past two years have been cited in the current year.

HOW DO YOU CALCULATE IF?

- IF = Average number of citations received per paper published in that journal during the two preceding years
- A journal with an IF of 3 in 2013 papers published in 2012 and 2011 received three citations each on average in 2013
- 2013 IF is published in 2014 after all 2013 publications have been processed by the indexing agency
- New journals will not have an IF until after three years



LIMITATIONS OF IMPACT FACTOR

- Invalid, fraudulent and retracted articles continue to be cited and counted for computing the IF (Satyanarayana).
- Popular journals are given an unfair advantage
- North American Centric
- Time constraint to two years is problematic



EIGENFACTOR AND ARTICLE INFLUENCE

- Ranks journals like Google ranks websites
- Reports journal prices and citation influence
- Also contains reference items
- Scores adjust for citation differences across disciplines
- Relies on five year citation data
- Completely free and searchable



MEASURING THE IMPACT OF SCHOLARS



WHAT IS THE H-INDEX?

- A Measurement originally described in 2005 by Jorge Hirsch that aims to describe the scientific productivity and impact of a researcher
- Addresses many of the problems associated with impact factors and the publication process
- An h-index of 30 means that a researcher has published 30 papers that each had at least 30 citations.
- An h-index never decreases
- It increases as new articles are published



CALCULATING AN H-INDEX

Total number of papers published (N_p)

Number of citations (N_c) for each paper.

How many h of a researcher's publications (N_p) have at least h citations each?

Organize articles in descending order.

THERE ARE OTHER WAYS

Fortunately you don't have to calculate yours by hand

Web of Science, Scopus or Google Scholar will do it for you.

These databases may not include all of your work.

They may differ



HOW IS THE H-INDEX DIFFERENT?

H-Index relies on citations to *your* papers, not the journal where it was published.

The way it's calculated a single paper that is well-cited and influential will not skew impact

It is a good way to measure scientists within the same field in a similar stage in their career.

DISADVANTAGES TO H-INDEX

- A paper that is highly cited for negative reasons will count too
- Different fields publish and cite differently and it has no way to take that into account
- It also doesn't take into account the position of authors on the paper
- Shorter careers are at a disadvantage, because it limits authors by the total number of publications
- Based on the past and doesn't predict future performance

HOW TO FIND AN AUTHOR'S H-INDEX IN WEB OF KNOWLEDGE

Web of Science Author Finder

Search Author

Last Name and First initial, Giuse, N.

May need to choose articles

Then create citation report

Right side of the page, you'll see your H- Index

WEB OF SCIENCE- CITATION REPORTS

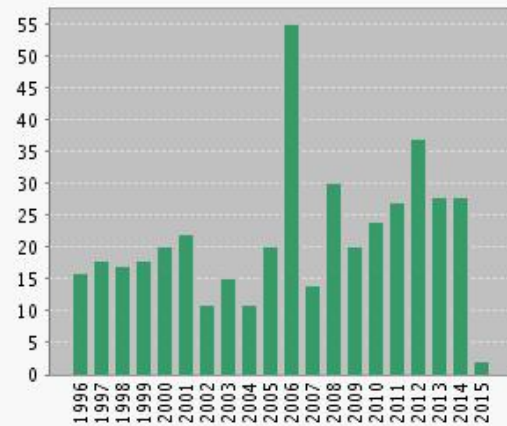
Citation Report: 483

(from All Databases)

You searched for: **AUTHOR: (Tay, Y)** [...More](#)

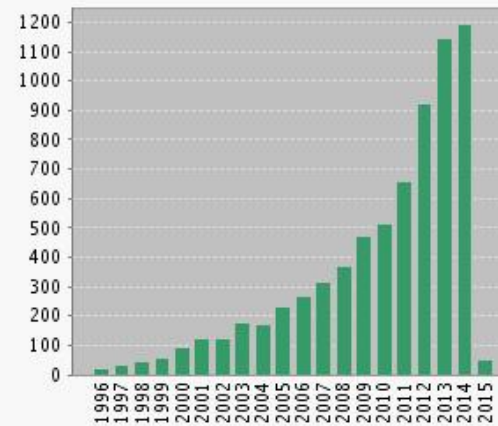
This report reflects citations to source items indexed within All Databases.

Published Items in Each Year



The latest 20 years are displayed.
[View a graph with all years.](#)

Citations in Each Year



The latest 20 years are displayed.
[View a graph with all years.](#)

Results found: 483

Sum of the Times Cited [\[?\]](#): 7129

Sum of Times Cited without self-citations [\[?\]](#): 6991

Citing Articles [\[?\]](#): 6170

Citing Articles without self-citations [\[?\]](#): 6097

Average Citations per Item [\[?\]](#): 14.76

h-index [\[?\]](#): 35

RELATIVE CITATION RATION (RCR)

- One shortcoming of the H-Index is that it has no way to take into account that different fields publish and cite differently
- Although there are many variants and modifications of the h-index, some which normalize across the fields, such as the relative h-index
- Clinicians have less time to do research and publish (and cite), so their citation rates are lower than researchers in the natural sciences

RELATIVE CITATION RATIO (RCR)

Uses the co-citation network to field-normalize citation numbers

Article citation rates are divided by an expected citation rate derived from performance of articles in the same field

Results in an RCR that is article level and field independent

iCite – web tool for calculating Relative Citation Ratios of articles listed in PubMed at <https://icite.od.nih.gov>

DISADVANTAGES OF TRADITIONAL BIBLIOMETRIC SYSTEMS



DISADVANTAGES.....?

Slow - long time to accumulate
Some are available only via
subscription resources

Measure influence only on a specific scientific community, ignore
interdisciplinary work

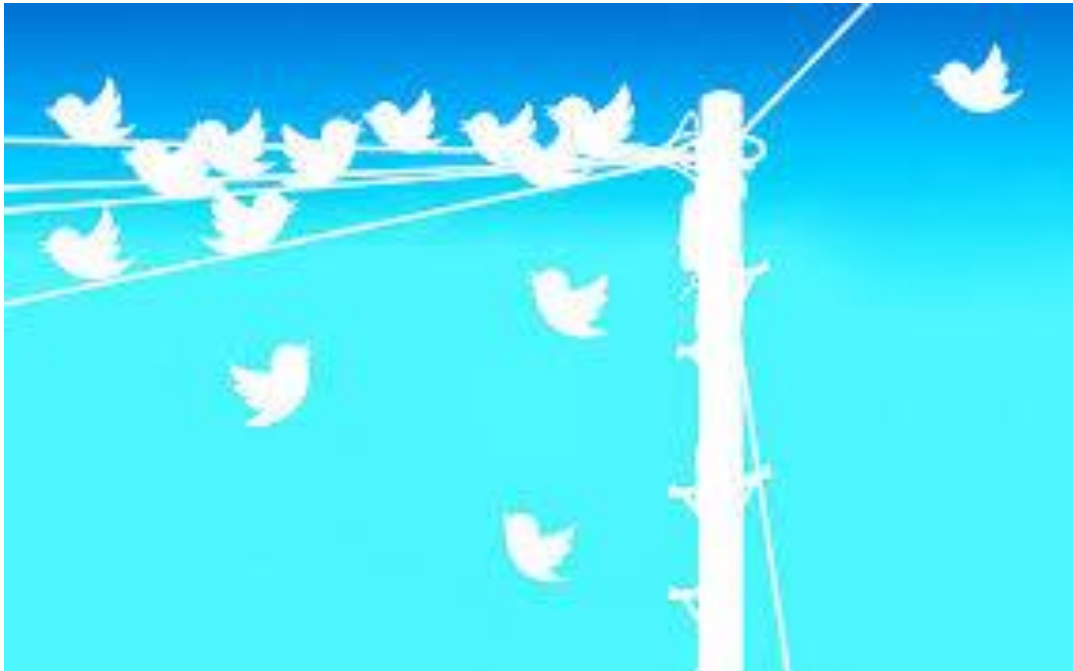
Not represented - grey literature

Not considered – the diversity of publication mechanisms beyond
formal journal articles

Do not tell the entire story



WHAT ABOUT.....



number of readers of an article ?

discussions, research, or innovations sparked by a publication?

scholar engagement via presentations, academic blog posters etc.?

invited lectures reflecting significant contributions?

Paradigm shift occurring in scholarly research output

Increasing opportunities to bypass
traditional publishing mechanisms

In addition to traditional scholarly

- “raw science” (datasets, code, and experimental designs etc.)
- semantic publishing or “nanopublication”
- self-publishing via blogging, microblogging
- comments or annotations on existing work

ALTMETRICS |

ALTMETRICS

- Defined as “scholarly impact measures based on activity in online tools and environments” (Priem, Groth, and Taraborelli 2012)
- Tools that help track a scholar’s influence and relevance beyond traditional citation metrics
- New ways to track influence across evolving modes of scholarly communication
- Help track the **influence of other forms of scholarship**
- defined as citable and accessible products not limited to publications, data sets, software, patents, and copyrights (National Science Foundation 2013)

Priem, Jason, Paul Groth, and Dario Taraborelli. 2012 “The Altmetrics Collection.”

ALTMETRICS ARE....

Views, Downloads

Bookmarks

Links

Conversations (blog mentions, Facebook posts etc.)

Shared citations (e.g. Mendeley, CiteULike)

Tweets

Data uploads



CRITICISM OF ALTMETRICS

“little is known about the intentional, motivational or experiential motives of the users.”

“Researchers must ask if alt-metrics really reflect impact, or are just empty buzz.”

“Tweets may be an immediate act of impetuosity, where as a citation in a peer-reviewed paper will necessarily take a longer period.”

Do not necessarily measure in-depth scholarly engagement, they can either be “gamed” (e.g. raised through disingenuous interaction) or lack the inherent value of citation-based metrics.

Self promotion and Selective promotion.”

Taylor, M. "Towards a common model of citation: some thoughts on merging altmetrics and bibliometrics." *Research Trends* 35 (2013): 19-22.

FORMAL CITATIONS VS SOCIAL CITATIONS

- Slow
Part of academic culture
- Good tool to understand **scholarly impact**
- Fast
derived from popular culture
- Some *might* be good for **scholarly impact**
some *might* be good for **social impact**

Organizations collecting altmetrics



Publishers displaying article level altmetrics



CROWDSOURCING PEER-REVIEW WITH ALTMETRICS



- waiting months for two opinions vs. thousands of conversations and bookmarks in a week
- Supplement traditional peer-review?

NEXT STEP FOR ALTMETRICS COMMUNITY IS TO...

- create best-practices for collecting, aggregating, normalizing, and displaying altmetrics data.



MOVING TOWARDS A COMMON MODEL?

Merging altmetrics
and bibliometrics



**INCLUDING ALTMETRICS IN TENURE
AND PROMOTION PACKETS**

SOCIETAL IMPACT

- Increasingly funding agencies want to know how research benefits society.
- Tenure and Promotion committees should also consider societal impact.
- Funding agencies want to know how research affects society, instead of how it affects other researchers.
- This requires scholars to engage in public outreach.
- Altmetrics may be one way to determine if researchers strategies are connecting them to the general public.

CURRICULUM VITAE

Print

- Add a static Altmetric “donut” badge CV items
- Can go to Altmetric embeddable badges page at <http://api.altmetric.com/embeds.html>
- This works for any item that has a DOI
- Enter the DOI on the Badge Builder and screenshot to add to your print CV
- Or copy and paste the information into your CV.
- Example of a CV with altmetrics included at <https://drive.google.com/file/d/0BzVyoVbp68fZU2tqTVNfZHlaMDIVczRJb0VZWXB1VjdDMHBV/view>
- Example Entry: “I also conduct science outreach through Twitter where I have posted 8782 tweets and have 1414 followers (combined from two accounts) since starting in earnest in June 2013. I try to make my posts as accessible to the public as possible, resulting in a broad mixture of followers both inside and outside academia. Most of my Twitter posts are from @TrevorABranch (8416 tweets, 1173 followers) and include summaries of papers that came out that day, breaking fisheries news, live-tweeting of departmental talks, advertising quantitative fisheries jobs, and highlighting my upcoming lectures. Many of my tweets are widely retweeted (the highest so far was 240 times). On the right is a post about a new paper by Purcell et al. on the high value of sea cucumbers, which was retweeted 35 times to a potential audience of 58,930 people.”

TENURE NARRATIVE

- Might feel more natural to put altmetric type information in your tenure narrative.
- Gives you an opportunity to highlight particularly relevant or important information about the impact of your work.
- My research was cited by the CDC

- Qualitative descriptions will probably be more meaningful than quantitative altmetric numbers. Most people may not know what an altmetric badge number of 35 means.
 - Give more examples

BEYOND ARTICLES AND CHAPTERS AND BOOKS

Don't forget

- Creating and curating data sets
- Presenting at Conferences
- Videos
- These things have to be discoverable somehow to gather altmetrics

IMPACTSTORY

Free Researcher Profile Platform like Altmetrics

Gathers and displays altmetrics for a body of work

Create a profile and link it to your ORCID ID

Divides influence into four categories

Buzz

Engagement

Openness

Fun

EXAMPLE

7 ACHIEVEMENTS



Global Reach

Top 50%

Your research has been saved and shared in 29 countries. That's high: only 40% of researchers get that much international attention.

👉 Countries include Australia, Austria, Belgium and 26 more.



Wikitastic

Your research is mentioned in 1 Wikipedia articles!

👉 Your Wikipedia titles include [Altmetrics](#).



Greatest Hit

Top 50%

Your top publication has been saved and shared 118 times. Only 42% of researchers get this much attention on a publication.

👉 Your greatest hit online is [New perspectives on article-level metrics](#) developing ways to assess research uptake and impact online.



Open Access

60% of your research is free to read online.



Global South

Of people who save and share your research, 17% are in the Global South.

👉 Countries include Brazil, Chile, India and 8 more.



Follower Frenzy

Top 50%

Someone with over 33.976 thousand followers has tweeted your research. Only 39% of scholars have been tweeted by someone with this many followers.

👉 Thanks, [@MSF_uk](#).

Filter by dimension

📢 buzz (1)

👤 engagement (4)

🔒 openness (1)

😊 fun (1)

ALTMETRIC BOOKMARKLET

Score in Context – get it at <https://www.altmetric.com/products/free-tools/bookmarklet/>

Add the Bookmark to your browser and you can access altmetrics scores for any article that Altmetric indexes – Click Altmetric It!

Click for more details

Attention Score in Context – compares it to other articles in the same journal, within the same time period, and compared to scores across the entire Altmetric database.

Do Altmetrics Work? Twitter and Ten Other Social Web Services

Overview of attention for article published in PLoS ONE, May 2013



About this Attention Score

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

MORE...

Mentioned by

- 8 news outlets
- 15 blogs
- 3 policy sources
- 292 tweeters
- 5 Facebook pages

SUMMARY

News

Blogs

Policy documents

Twitter

Facebook

Wikipedia

Google+

Title Do Altmetrics Work? Twitter and Ten Other Social Web Services

Published in PLoS ONE, May 2013

DOI 10.1371/journal.pone.0064841 [↗](#)

Pubmed ID 23724101 [↗](#)

Authors Mike Thelwall, Stefanie Haustein, Vincent Larivière, Cassidy R. Sugimoto, Lutz Bornmann, Thelwall... [\[show\]](#)

Abstract Altmetric measurements derived from the social web are increasingly advocated and used as early... [\[show\]](#)

[View on publisher site](#)

[Alert me about new mentions](#)

TWITTER DEMOGRAPHICS

MENDELEY READERS

ATTENTION SCORE IN CONTEXT

The data shown below were collected from the profiles of **292** tweeters who shared this research output. [Click here to find out more about how the information was compiled.](#)

