measuresHE
Higher Education Analytics

Methodology Document

Journals 100 Methodology 2026

Welcome to the inaugural edition of **measuresHE** Journals 100, a comprehensive and forward-thinking initiative designed to bring clarity and rigour to the assessment of academic journals worldwide.

Purpose and Scope

The primary purpose of this ranking is to serve as a robust tool for recognising high-quality academic journals that are genuinely advancing the frontiers of human knowledge. In an era of ever-increasing academic output, discerning true scholarly impact is crucial, and this ranking provides a reliable, transparent, and data-driven mechanism to achieve this goal.

Crucially, the ranking is structured to accommodate the diversity of the academic landscape. A separate, specialised ranking is conducted for each of the top-level subject domains defined by the **measuresHE** classification system (See Appendix). This ensures that journals are compared fairly within their respective fields, acknowledging the distinct publication patterns and citation cultures across different disciplines.

While our publicly available lists feature the Top 100 journals in each top-level subject domain, our comprehensive evaluation included tens of thousands of journals to provide the complete picture. For access to the complete dataset, please contact us at contact@measureshe.com.

Core Principles of the Methodology

The methodology underpinning the **measuresHE** Journals 100 is fundamentally designed to reward genuine scholarly contribution, recognising both the **quality** and the **quantity** of a journal's output. Our guiding principle is to create a system that is not only accurate but also resistant to common manipulative practices that undermine the integrity of academic metrics.

Key Design Robustness Features:

A significant focus of this methodology is its resilience against common forms of metric manipulation. The ranking algorithms are engineered to neutralise or minimise the impact of the following gaming techniques:

- **Paper Mills**: Measures are in place to detect and devalue journals that accept large volumes of poorly-vetted or fraudulently authored papers.
- **Buying Citations**: Sophisticated analysis is employed to identify and discount citations generated through quid pro quo or paid schemes.
- **Self-Citations**: A balanced approach is taken to account for essential self-referencing while strictly penalising excessive or exploitative self-citation practices at the author, group, or journal level.
- **Citation Cliques/Cartels**: Algorithms are utilised to map and reduce the influence of tightly knit groups of journals or authors who systematically cite each other to artificially boost their impact factors.

By being robust against these practices, the **measuresHE** Journals 100 aims to provide a more accurate and ethical measure of scholarly influence.

Applicability and Adaptability

While the default ranking system utilises **measuresHE's** established top-level subject domains, the methodology is inherently flexible and highly adaptable. This same core set of principles and algorithms can be reapplied to generate rankings for a variety of other subject groupings and research classifications, such the UN Sustainable Development Goals, and specific granular research topics such as Artificial Intelligence and Vaccine Development.

This inherent flexibility allows the **measuresHE** methodology to be a powerful tool for research administrators, funding bodies, librarians, and academics seeking to evaluate impact across both broad and specialised scientific landscapes.

Data Source

The ranking data is sourced from OpenAlex, an open-source, community-driven bibliometric database. OpenAlex's global perspective and open nature overcome many of the limitations associated with closed-source systems. Specifically, the calculations for this ranking utilised a data snapshot extracted on November 1st, 2025. This ranking evaluates academic works published from 2020 to 2024.

Metrics

- Volume - Publication volume
- Participation - Diversity of authoring institutions

- Quality - Typical FWCI
- Quality - Median FWCI of best works
- Quality - Gravitas
- Reach - Diversity of citing institutions
- Openness - Open access rate

Publication and citation patterns vary within different subfields of a subject domain, and these dynamics can evolve over time. To ensure fair comparison, where necessary, metrics are normalised based on both the subfield and the year of publication. The subsequent sections detail the specific normalisation methods employed.

Publication volume

This metric measures the **publication volume** for academic journals, which essentially measures a journal's share of research output within broader subject domains over a five-year evaluation period. It specifically focuses on journals that are continuously published throughout that period.

Mathematical Explanation

The metric calculates an aggregated relative volume metric (V) for each continuously active journal (j) within a given academic subject (s). This metric is normalised by the subfield to account for the difference in publication volumes, and publication year to account for changing publication trends.

1. Fractional Work Value

First, for any given academic work (w), its value is distributed equally across the set of subfields (F_w) to which it belongs. The fractional value (f) of a work w for a specific subfield i is:

$$f_{w,i} = \frac{1}{|F_w|} \text{ if subfield } i \in F_w\text{, 0 otherwise}$$

where $|F_w|$ is the total number of subfields associated with work w.

2. Total Subfield Volume

Next, calculate the total publication volume (T) for each subfield i in a specific year y. This is the sum of the fractional values of all relevant works published in that year and subfield.

$$T_{i,y} = \sum_{w \in W_y} f_{w,i}$$

where W_y is the set of all relevant works published in year y.

3. Active Journal Subfield Volume

Similarly, we calculate the publication volume (N) for a specific journal j in subfield i and year y. This calculation is restricted to the set of journals (J_{active}) that published works in all five years of the analysis period.

$$N_{j,i,,y} = \sum_{w \in W_{j,y}} f_{w,i}$$

where $W_{j,y}$ is the set of relevant works published by journal j (where $j \in J_{active}$) in year y.

4. Relative Volume Calculation

The relative volume (V) for a journal j in a subject s is the sum of its annual relative volumes across all subfields that map to that subject. The annual relative volume for a journal in a subfield is the ratio of its contribution to the total contribution.

This can be calculated by first finding the annual ratio (R) for each subfield:

$$R_{j,i,y} = \frac{N_{j,i,y}}{T_{i,y}}$$

Then, it aggregates these annual ratios by summing them up across all years in the analysis (e.g $y \in \{2020,..., 2024\}$) and all subfields (i) belonging to a given subject (s).

$$V_{j,s} = \frac{\sum_{y, i \in s} R_{j,i,y}}{5|s|}$$

This value, $V_{j,s}$, represents the journal's total relative publication footprint in that subject over the entire five-year period.

Diversity of authoring institutions

This metric measures the **diversity of institutions contributing** to academic journals for various subjects. This metric aims to promote broader scholarly inclusivity that can help foster more innovative and representative research, and encourage diverse perspectives in knowledge production.

It uses a mathematical measure called **Shannon entropy** to determine whether a journal's articles are authored by a wide, diverse range of institutions (high entropy) or are dominated by a select few (low entropy).

Mathematical Explanation

1. Fractional Credit Allocation

First, define the fractional credit (c) that an institution (k) receives from a single work (w) in a specific subfield (i). This credit is proportional to the institution's author count on the work and inversely proportional to the work's number of associated subfields.

Let $A_{w,k}$ be the number of authors from institution k on work w, and let $A_w = \sum_k A_{w,k}$ be the total author "slots" on the work. Let S_w be the set of unique subfields for work w. The fractional credit that institution k receives for work w in subfield i is:

$$c_{w,k,i} = \left(\frac{A_{w,k}}{A_w}\right) \times \frac{1}{|s_w|}$$

2. Aggregated Institutional Contribution to a Journal

Next, sum these fractional credits to find the total contribution (N) of an institution (k) to a specific journal (j), subfield (i), and year (y).

$$N_{y,i,j,k} = \sum_w c_{w,k,i}$$

where the sum is over all works w published in journal j in year y and associated with subfield i.

3. Institutional Proportion and Shannon Entropy

For each journal-subfield-year group, we calculate the proportion (p) of total contributions from each institution k.

$$p_{y,i,j,k} = \frac{N_{y,i,j,k}}{\sum_m N_{y,i,j,m}}$$

where the sum in the denominator is over all institutions m.

Using these proportions, we calculate the **Shannon entropy** (H), a measure of diversity.

$$H_{y,i,j} = -\sum_{k} p_{y,i,j,k} log_2(p_{y,i,j,k})\ where\ 0 < p \leq 1$$

4. Subfield Adjusted Entropy

Each subfield within a subject can potentially have different dynamics and different levels of participation from institutions. Thus we compare a journal's entropy against the subfield average $H_{y,i}$ which is the weighted average of $H_{y,i,j}$ by publication volume.

$$H_{y,i} = \frac{\sum_{j}(H_{y,i,j}\sum_{k} N_{y,i,j,k})}{\sum_{j}\sum_{k} N_{y,i,j,k}}$$

$$H'_{y,i,j} = \frac{H_{y,i,j}}{H_{y,i}}$$

5. Weighted Arithmetic Mean

The entropy score for each group is weighted by the total work count for that group.

$$Weight_{y,i,j} = \sum_{k} N_{y,i,j,k}$$

The diversity score for a journal j in a broader subject s (which contains multiple subfields i) is the **weighted arithmetic mean of the subfield adjusted entropy**.

$$H_{amean}(j, s) = \frac{\sum_{y,i\in s} H'_{y,i,j} Weight_{y,i,j}}{\sum_{y,i\in s} Weight_{y,i,j}}$$

Quality - Typical FWCI

Field Weighted Citation Impact (FWCI) is a part of Snowball metrics. In essence, it compares the number of citations a publication receives with the average number of citations of the publications of the same type, in the same subject and published in the same year. This metric assesses the "typical" quality of publications in a journal.

FWCI in this context is calculated using the following definition

- All cited publications must be from the years 2020 to 2024, are not paratext or retracted and are of the type “article” or “review”.
- All citing publications must be from the years 2020 to 2025, are not paratext or retracted and not of the types “preprint”, “paratext”, “erratum” and “retraction”
- The “field” in FWCI is defined as the **subfield** in OpenAlex
    - OpenAlex links each publication to a set of topics, and each topic has exactly one parent subfield. Each of these links has a score between 0 to 1.
    - For this calculation, only publication-subfield links with score >=0.5 are used except for publications where no link has a score equal or greater than 0.5. In those cases the publication-subfield link with the highest score is used for each publication
    - Publications with no topics are ignored

Mathematical Explanation

The metric measures an outlier-trimmed arithmetic mean of the FWCI for each journal-subject pair. This specific type of trimmed mean is often called an **Olympic mean**.

FWCI as a measure is bounded at the lower end by zero, but is unbounded at the top end. Its global average is one. Thus, a simple arithmetic mean can sometimes be distorted by a small number of outliers at the top end. We use the Olympic mean to remove this distorting effect.

1. Define the Initial Dataset

First, for a given journal (j) and subject (s), we define the set of all its published articles from 2020-2024, which we'll call $W_{j,s}$. Each work w in this set has an associated Field-Weighted Citation Impact score, $FWCI(w)$.

2. Order and Trim the Data

For the set $W_{j,s}$ with $n = |W_{j,s}|$ articles, the articles are ordered based on their FWCI score from lowest to highest.

A new, trimmed set of works, $W'_{j,s}$, is created by including only those works whose position, $R(w)$, falls within the central 90% of the distribution. The condition for inclusion is:

$$n \times 0.05 < R(w) \leq n \times 0.95$$

This effectively removes the 5% of works with the lowest FWCI scores and the 5% of works with the highest FWCI scores.

3. Calculate the Olympic Mean

The olympic mean of the journal j for subject s is the simple arithmetic mean of the FWCI scores of the works in the trimmed set $W'_{j,s}$.

$$FWCI_{omean}(j, s) = \frac{\sum_{w \in W'_{j,s}} FWCI(w)}{|W'_{j,s}|}$$

This calculation gives a measure of the central tendency of the journal's citation impact that is not skewed by the most or least successful publications.

Quality - Best works

This metric assesses the peak performance of a journal by analyzing the citation impact of its highest-performing articles. Unlike the Olympic Mean, which measures the central tendency of the journal after removing outliers, this metric specifically isolates the journal's most impactful contributions to determining the quality ceiling of the research it publishes.

This implementation isolates the uppermost tier of a journal's performance by focusing exclusively on the top 5% of its output. By restricting the analysis to this elite subset of works, the metric identifies true outliers of excellence and measures the journal's ceiling for research impact.

Mathematical Explanation

The metric calculates the median Field-Weighted Citation Impact (FWCI) of the top 5% of articles published by a journal j within a specific subject s.

1. Define the Dataset and Order

Define $R(W)$ and n in the same way as described in the FWCI Olympic mean section

2. Identify the Best Work

We define a subset of "best works" of a journal, denoted as W_{best}, which consists of the articles falling in the top 5% of the distribution. The condition for inclusion is:

$$R(w) > n \times 0.95$$

This strictly filters for the highest-performing 5% of the journal's papers based on citation impact.

3. Calculate the Best Work FWCI

The FWCI of the best works is defined as

$$FWCI_{best}(j, s) = Median(\{FWCI(w) | w \in W_{best}\})$$

This measure provides a robust indicator of the maximum impact a researcher might expect when publishing their best work in this journal, unaffected by the "long tail" of lower-cited papers.

Quality - Gravitas

This metric measures a journal's ability to influence the conversation within an academic community. One can think of citations as a conversation. The cited journal speaks and the citing journals listen and integrate the information. If that citing journal itself is listened to by others, then the contents from the first journal can spread to a wider audience.

This differs from traditional citation-based metrics such as FWCI in the sense that FWCI treats each citation as the same, while Gravitas treats each citation differently based on the influence of the citing journal.

Mathematical Explanation

The objective is to compute the **eigenvector centrality** of journals within subject-specific citation networks using the PageRank algorithm.

Graph Formulation

For each academic subject s, a weighted, directed graph $G_s = (V_s, E_s)$ is constructed from the articles published in 2020 to 2024.

- **Vertices (V_s)**: The set of vertices represents all journals that are active within subject s.
- **Edges (E_s)**: A directed edge $(j_i, j_k) \in E_s$ exists from a citing journal j_i to a cited journal j_k. Same journal citations where $j_i = j_k$ are ignored..

- **Weights (w_{ik})**: Each edge is assigned a weight, w_{ik}, corresponding to the citation count from journal j_i to journal j_k within that subject.

PageRank Algorithm

The PageRank for a journal (node) j_k is calculated using an iterative algorithm that finds the stationary distribution of a random walk on the graph G_s. The score at the tth iteration, $PR_t(J_k)$, is given by the formula:

$$PR_t(j_k) = \frac{1-\alpha}{N} + \alpha \sum_{j_i \in M(j_k)} \frac{PR_{t-1}(j_i)}{L(j_i)}$$

$$PR_0(j_i) = \frac{1}{N} \text{ for any journal } j_i \in E_s$$

Where:

- $M(j_k)$ is the set of journals that cite journal j_k.
- $PR_{t-1}(j_i)$ is the PageRank of a citing journal j_i at iteration $t - 1$.
- $L(j_i)$ is the total weighted out-degree of journal j_i (i.e., the total number of its outgoing citations).
- N is the total number of journals in the graph for the subject.
- α is the damping factor. Sometimes it may be specified as the reset probability, which is $1 - \alpha$

The algorithm iterates until the L1 norm of the difference between the PageRank vectors of successive iterations is less than a specified tolerance (10^{-10}). The resulting $PR(j_k)$ value for each journal represents its influence centrality within the subject's citation network.

This algorithm can also be expressed as a matrix formula:

$$PR_t = \alpha M PR_{t-1} + (1 - \alpha)\frac{I_N}{N}$$

$$PR_0 = \frac{I_N}{N}$$

Where

- PR_t is the PageRank vector at iteration t. Each element $PR_{t,j}$ is the PageRank score of journal j at iteration t
- α is the damping factor as specified above
- M is the transition matrix derived from the citation graph. An element M_{kj} in this matrix represents the probability of transitioning from journal j to journal k. It is constructed from the weighted adjacency matrix of the citation network, then normalising each column to sum to 1
- N is the total number journals (nodes) in the network
- I_N is vector of size N. Every value of the vector is 1.

Reach - Diversity of citing institutions

This metric evaluates the diversity of academic institutions citing a journal's work. A high score indicates a journal has a broad and varied reach across the academic community, while a low score suggests a more niche or limited impact.

Mathematical Explanation

1. Fractional Credit Allocation

The calculation is built on two distinct forms of fractional credit that are combined to determine the value of a single citation link.

- **Cited Work Value ($f_{w,i}$)**: The value of a **cited** work (w) is distributed evenly across its associated subfields (i). If a work belongs to a set of subfields S_w, its value in any single subfield is the reciprocal of the set's size.

  $$f_{w,i} = \frac{1}{|S_w|}$$

  For example, if a paper is categorised under 3 subfields, its value within each of those subfields is 1/3.

- **Citing Institutional Credit ($c_{w,k}$)**: The credit for a **citing work** (w) is distributed proportionally among its authoring institutions (k). Let $A_{w,k}$ be the number of author occurrences from institution k on work w, and let A_p be the total number of author occurrences on that paper ($A_w = \sum_k A_{w,k}$). The credit for institution k is:

$$c_{w,k} = \frac{A_{w,k}}{A_w}$$

For instance, if a citing work w has 2 authors from Stanford and 1 from MIT ($A_w = 3$), Stanford's credit is $c_{w,Stanford} = \frac{2}{3}$, and MIT's is $c_{w,MIT} = \frac{1}{3}$.

2. Combined Citation Weight

The total fractional citation weight (N) that a cited journal (j) receives from a citing institution (k) in a given subfield (i) and year (y) is the sum of the combined fractional values over every individual citation link. A link is a pair (w_{cited}, w_{citing}) where work w_{cited} in journal j is cited by work w_{citing} (with authorship from institution k).

$$N_{y,i}(j \leftarrow k) = \sum_{(w_{citied}, w_{citing})} (f_{w_{cited}, i} \times c_{w_{citing}, k})$$

This calculation correctly attributes the value of each citation by accounting for the multi-disciplinary nature of the cited work and the multi-institutional nature of the citing work.

3. Shannon Entropy of Citations

Using the combined weights, we first determine the **proportion** (p) of a journal's total incoming citations that come from each unique institution.

$$p_{k,y,i,j} = \frac{N_{y,i}(j \leftarrow k)}{\sum_m N_{j,i}(j \leftarrow m)}$$

Here, the denominator is the sum of citation weights from all citing institutions (m) for that journal in that year.

The diversity is then calculated as the **Shannon entropy** (H) of this probability distribution.

$$H_{y,i,j} = - \sum_k p_{k,y,i,j} log_2(p_{k,y,i,j}) \ where \ 0 < p_{k,y,i,j} \leq 1$$

A high H value indicates that the journal received its citations from a diverse range of institutions.

4. Subfield Adjusted Entropy

Each subfield within a subject can potentially have different dynamics and different levels of citations from institutions. Thus we compare a journal's entropy against the subfield average $H_{y,i}$ which is the weighted average of $H_{y,i,j}$ by publication volume.

$$H_{y,i} = \frac{\sum_j (H_{y,i,j} \sum_k N_{y,i,j,k})}{\sum_j \sum_k N_{y,i,j,k}}$$

$$H'_{y,i,j} = \frac{H_{y,i,j}}{H_{y,i}}$$

$N_{y,i,j,k}$ is the fractional count of works published in journal j in year y in subfield i by institution k, and is defined the same way as it is in Authoring Institution Diversity.

5. Weighted Arithmetic Mean

The citing institution diversity score for a journal j in a broader subject s is the **weighted arithmetic mean** of its entropy scores. The weight ($Weight_{y,i,j}$) is the journal's total fractional publication volume in subfield i and year y, calculated as $Weight_{y,i,j} = \sum_w f_{w,i}$ for all works w published by journal j.

$$H_{amean}(j, s) = \frac{\sum_{y,i \in s} H'_{y,i,j} Weight_{y,i,j}}{\sum_{y,i \in s} Weight_{y,i,j}}$$

This ensures that a journal's diversity score in fields where it is more active has a greater impact on its final score.

Open access

This metric measures the extent to which a journal's research output is Open Access (OA) relative to the norms within its specific academic fields. It rewards journals that make a higher proportion of their work freely available compared to their peers, while accounting for the varying prevalence of Open Access publishing across different disciplines.

Mathematical Explanation

The metric calculates a weighted adjusted open access rate ($AdjOAR$) for each journal j within a given academic subject s. This involves determining the journal's fractional open access rate and comparing it against a baseline for its subfields, then aggregating these values based on publication volume.d.

1. Fractional Work Value

Consistent with the methodology used for publication volume, the value of each work w is distributed equally across the set of subfields F_w to which it belongs.

The fractional value f of a work w for a specific subfield i is:

$$f_{w,i} = \frac{1}{|F_w|} \text{ if subfield } i \in F_w \text{ otherwise } 0$$

where $|F_w|$ is the total number of subfields associated with work w.

2. Baseline Open Access Rate

Next, we calculate the baseline Open Access Rate OAR_{base} for each subfield i in a specific year y. This represents the average level of open access of research in that field.

It is calculated as the sum of fractional values for all open access works in that subfield divided by the total fractional volume of the subfield:

$$OAR_{base,i,y} = \frac{\sum_{w \in W_{i,y}} (I(w \text{ is } OA) \times f_{w,i})}{\sum_{w \in W_{i,y}} f_{w,i}}$$

Where:

- $W_{i,y}$ is the set of all relevant works published in subfield i and year y.
- $I(w \text{ is } OA)$ is an indicator function that is 1 if the work is Open Access, and 0 otherwise. This information comes from the OpenAlex database.

3. Journal Fractional Open Access Rate

Similarly, we calculate the Open Access Rate for a specific journal j in subfield i and year y.

$$OAR_{j,i,y} = \frac{\sum_{w \in W_{j,y}} (I(w \text{ is } OA) \times f_{w,i})}{\sum_{w \in W_{j,y}} f_{w,i}}$$

Where $W_{j,y}$ is the set of relevant works published by journal j in year y.

4. Adjusted Open Access Rate

We then determine the adjusted rate by comparing the journal's rate to the baseline rate of the subfield. This normalises the score, ensuring journals are judged against the specific standards of their field.

$$AdjRate_{j,i,y} = \frac{OAR_{j,i,y}}{OAR_{base,i,y}}$$

If the baseline rate $OAR_{base,i,y}$ is 0, the adjusted rate is set to 0.

5. Aggregated Weighted Score

The final metric aggregates these adjusted rates across all subfields and years associated with the journal. The score is a weighted arithmetic mean, where the weight is determined by the journal's publication volume in that specific subfield and year.

This ensures that the journal's performance in fields where it is most active has the greatest impact on its final score.

Let the weight $Weight_{j,i,y}$ be the total fractional publication volume of journal j in subfield i and year y:

$$Weight_{j,i,y} = \sum_{w \in W_{j,y}} f_{w,i}$$

The final Adjusted Open Access Rate $AdjOAR$ for journal j in subject s is:

$$AdjOAR_{j,s} = \frac{\sum_{y,i \in s} (AdjRate_{j,i,y} \times Weight_{j,i,y})}{\sum_{y,i \in s} Weight_{j,i,y}}$$

This results in a single score representing the journal's relative openness contribution to the subject.

Metric Scoring

The previous section describes how the values of each metric is calculated. This section describes how the metric values are transformed into metric scores that range from zero to 100.

Metric	Higher is better	Scoring Algorithm	Weight
Publication volume	True	Exponential CDF	6%
Typical FWCI	True	Exponential CDF	30%
Median FWCI of best works	True	Exponential CDF	20%
Authoring institution diversity	True	Normal CDF	5%
Gravitas	True	Exponential CDF	30%
Citing institution diversity	True	Normal CDF	5%
Open access	True	Normal CDF	4%

Normal CDF and Exponential CDF are well defined statistical functions.

The overall score of each journal j in each subject s is defined as the weighted sum of the metric scores.

$$overall_{j,s} = \sum_{metric} score_{metric,j,s} \times weight_{metric,j,s}$$

Eligibility Criteria

1. A journal is required to demonstrate continuous publication within the relevant subject domain across the entire 5-year evaluation period.
2. Eligibility for ranking within a specific subject domain necessitates that a journal's Publication Volume (as previously defined herein) contribute a minimum of 33% to that subject domain.
3. To be considered for ranking in a domain, a journal must contribute at least 0.01% to the domain's total Publication Volume of all continuously active journals.

Appendix

Subfield to domain mapping

The details of the mapping of OpenAlex subfields to **measuresHE** subjects and domains is available here.

Why OpenAlex

Powering the Next Generation of Research Intelligence