Journal quality metrics: Everything you wanted to know but were afraid to ask!

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Presentation Overview

• Current higher education context
• Journal quality metrics: what are they?
• Journal Impact Factor limitations
• Other Journal Quality Metrics (JQM) to consider
• Individual researchers’ impact metrics
• Conclusion & questions
Current higher education context

- Continued erosion of Commonwealth government funding for universities
- Universities’ increasing reliance on other revenue streams
- Increasing scrutiny of universities by governments \( \rightarrow \text{research value for public funds invested} \)
- Increasing competition between universities
- “hired to teach but paid to publish”

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Current higher education context

- Increasing competition for limited pots of government research funding (e.g., ALTC, NHMRC, ARC)
- Focus on international ratings and metrics of universities; examples include:

1. Academic Ranking of World Universities (ARWU);
   \( \rightarrow \text{Monash was ranked at 171 / 500 in 2010} \)

2. Times Higher Education Supplement World University Rankings;
   \( \rightarrow \text{Monash was ranked 61 / 200 in 2010} \)

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United Kingdom

- Research Assessment Exercises (RAE) & its successor exercise called the Research Excellence Framework (REF)
- REF is the new system for assessing the quality of research in UK higher education institutions and will be completed in 2014
- research quality assessed by the expert panels against international standards of excellence and will make use of citation information

New Zealand

- Performance Based Research Fund (PBRF)
- assesses the research performance NZ universities
- Quality is determined by number of research degree completions, the amount of external research funding received, and an evaluation of research performance of all academic staff
- Each academic staff member submits an Evidence Portfolio which records their research outputs, contribution to research environment, and peer esteem
- They are then assessed as A, B, C or R category.
- The A indicates international standing, B national, C local, and R research inactive or active at a lower level.
Australia

• Excellence in Research for Australia (ERA) 2010 initiative assesses research quality within Australia’s higher education institutions
• Discipline clusters in universities were each given a rating:
  • 5: outstanding performance well above world standard
  • 4: performance above world standard
  • 3: average performance at world standard presented
  • 2: performance below world standard
  • 1: performance well below world standard

Background: Journal Quality Metrics (JQM)

• Bibliometrics – the application of statistical analyses to study patterns of authorship, publication, & literature use
• Also referred to as Citation Analysis
• have become widely used by research funding bodies, librarians, publishers, universities, governments, hiring panels, & researchers
• the most used has been the Impact Factor
Background

• we are now entering a new era of bibliometric analysis, where new technological metrics using Internet and usage statistics are increasingly being used
• these are described as webometrics and cybermetrics (e.g., Google Scholar, Scholarometer)

Background

• One type of JQM used by universities, research review agencies, & funding bodies are those published by the Thomson Scientific Web of Knowledge
  – a private, for-profit company
  – acts as a gate-keeper for journals allowed onto its database
• Reported in Journal Citation Reports (JCR)
• Journals have to apply to get listed on the JCR database; many journals apply but only a few get accepted
Impact Factor

- One key journal quality metric that is Impact Factor (IF)
  - a measure of the frequency with which the average article in a journal has been cited in a particular year.

- Calculated by dividing the number of citations in the current year to articles published in the previous two years by the total number of articles published in the previous two years

- Another quality metric often reported is the Journal Rank (JR)

Uses of Impact Factors

- Evaluation of individual researchers or research groups
- Used as a quantitative measure of a researcher’s apparent scientific merit, research output & academic track record
- Claimed as a method for minimising subjectivity & bias in the performance appraisal & tenure review of academic staff
- Used as one criteria for the awarding of competitive research grants
Quality is in the eye of the beholder....

- Scientific journals rank higher than clinical journals
- English-language journals score higher than those published in other languages
- American journals have higher impact factors than European, Australasian or other journals
- Review journals score higher than those containing original articles or reporting original research
- Prestigious journals in different specialist areas may have very different impact factors

Quality is in the eye of the beholder....

- Methodological articles score much higher than those that report new data
- Free electronic access tends to raise the impact factor of a journal
- Review articles are cited more frequently than articles reporting original research
- Only a select few journals in professional and academic fields are listed on IF website
Impact Factor

- *IF* can be manipulated and artificially inflated
- Some authors self-cite
- Some journals encourage the submission of review articles (that are more apt to be subsequently cited)
- Some journals include conference abstracts and letters to the editor as part of the publications cited
- Some journal editors encourage prospective authors to cite references from the journals to which they are submitting articles
- It is not clear whether the number of citations an article receives measures its actual quality or simply reflects the volume of publications in that particular field of research

IF & Journal Rank of OT Publications

<table>
<thead>
<tr>
<th>Publication</th>
<th>IF</th>
<th>Journal Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Journal of Occupational Therapy</td>
<td>1.419</td>
<td>17/55</td>
</tr>
<tr>
<td>Occupational Therapy Journal of Research</td>
<td>0.358</td>
<td>50/55</td>
</tr>
<tr>
<td>Australian Occupational Therapy Journal</td>
<td>0.438</td>
<td>31/36</td>
</tr>
<tr>
<td>Hong Kong Journal of Occupational Therapy</td>
<td>0.462</td>
<td>30/36</td>
</tr>
</tbody>
</table>
Excellence in Research for Australia (ERA) Initiative

- initiative assesses research quality within Australia's higher education institutions using a combination of indicators and expert review by committees comprising experienced, internationally-recognised experts
- as part of ERA 2010, the ARC generated a Ranked Journal List

journals have been assigned a tier rating consisting of:

- **A***: one of the best journals in its field
- **A**: majority of papers in a Tier A journal will be of very high quality
- **B**: covers journals with a solid, though not outstanding, reputation. Generally, in a Tier B journal, one would expect only a few papers of very high quality. They are often important outlets for the work of PhD students and early career researchers
- **C**: includes quality, peer reviewed, journals that do not meet the criteria of the higher tiers
ERA 2010 Tier Ratings of OT Journals

- American Journal of Occupational Therapy B
- Australian Occupational Therapy Journal B
- Occupational Therapy Journal of Research C
- Scandinavian Journal of Occupational Therapy C
- Hong Kong Journal of Occupational Therapy C
- Occupational Therapy in Health Care C
- Physical & Occupational Therapy in Geriatrics C
- Canadian Journal of Occupational Therapy C
- British Journal of Occupational Therapy C
- Occupational Therapy International C
- Occupational Therapy in Mental Health C
- New Zealand Journal of Occupational Therapy C
- Physical & Occupational Therapy in Pediatrics C
- Journal of OT, Schools & Early Intervention C

ERA 2010 Tier Ratings of PT Journals

- Australian Journal of Physiotherapy B
- Physical Therapy B
- Journal of Orthopaedic and Sports Physical Therapy B
- Physiotherapy Canada C
- New Zealand Journal of Physiotherapy C
- Physical and Occupational Therapy in Pediatrics C
- Physical and Occupational Therapy in Geriatrics C
- Physiotherapy Theory and Practice C
- Physiotherapy Research International C
- Physiotherapy C
- Physical Therapy Reviews C
- Physical Therapy in Sport C
- Physical Therapy Journal of Education C
- Advances in Physiotherapy C
- Pediatric Physical Therapy C
Other journal quality metrics (JQM) to consider

• **Eigenfactor™ Score (EF)**
  • a measure of the overall value provided by all the articles published in a given journal in a year
  • is calculated using Thomson ISI data in a model in which readers follow chains of citations as they move from journal to journal.
  • it ignores self-citations.
  • EF ranks journals in a manner similar to that used by Google for ranking the importance of Web sites in a search
  • Eigenfactors can be freely viewed at www.eigenfactor.org

JQM: **Article Influence™ Score (AI)**

• AI is a measure of a journal’s prestige based on per-article citations
• is calculated by dividing the EF by the percentage of all articles recorded in the JCR
• EF and AI scores rank journals with algorithms using the structure of the entire citation network to evaluate the importance of each journal
• AI scores can be freely viewed at www.eigenfactor.org
JQM: SCImago Journal Rank (SJR)

- SJR includes quality indicators of journals contained in the Scopus database from 1996
- is a prestige metric based on the idea that ‘all citations are not created equal’
- with SJR, the subject field, quality and reputation of the journal has a direct effect on the value of a citation.
- Eliminates manipulation: raise the SJR ranking by being published in more reputable journals
- ‘Shares’ a journal’s prestige equally over the total number of citations in that journal
- SJR is available for free at: http://www.scimagojr.com/index.php

JQM: SJR ‘H Index’

- the SJR ‘H Index’ expresses the journal's number of articles \( (h) \) that have received at least \( h \) citations
- Is also referred to as the *Hirsch Index*
- the SJR ‘H Index’ quantifies both the scientific productivity and scientific impact of journals
- H Index is available for free at: http://www.scimagojr.com/index.php
JQM: Source Normalised Impact per Paper (SNIP)

- measures contextual citation impact by weighting citations based on the total number of citations in a subject field
- measures contextual citation impact by ‘normalizing’ citation values
- takes a research field’s citation frequency into account
- considers immediacy - how quickly a paper is likely to have an impact in a given field
- counters any potential for editorial manipulation
- SNIP values can be freely viewed at: www.journalindicators.com/SearchJournal.aspx

Examples of JQM

|--------------------|------|--------|--------------------------|---------------------------------|

<table>
<thead>
<tr>
<th>IF</th>
<th>31.15</th>
<th>34.48</th>
<th>13.66</th>
<th>47.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF / AI</td>
<td>0.6717 / 18.8714</td>
<td>1.7635 / 17.2787</td>
<td>0.1595 / 3.7886</td>
<td>0.6803 / 18.7626</td>
</tr>
<tr>
<td>----------------------</td>
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<td>-------------------------</td>
<td>----------------------------------</td>
<td></td>
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<tr>
<td>SJR</td>
<td>13.754</td>
<td>8.016</td>
<td>0.555</td>
<td></td>
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<tr>
<td>H - Index</td>
<td>463</td>
<td>652</td>
<td>234</td>
<td></td>
</tr>
<tr>
<td>SNIP</td>
<td>7.99</td>
<td>7.94</td>
<td>3.71</td>
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</table>

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<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ERA Journal Rating</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>A*</td>
</tr>
<tr>
<td>IF</td>
<td>0.438</td>
<td>1.709</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>EF / AI</td>
<td>Not available</td>
<td>0.0016 / 0.5754</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>----------------------</td>
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<td>---------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>SJR</td>
<td>0.044</td>
<td>Not available</td>
<td>0.690</td>
<td>0.040</td>
</tr>
<tr>
<td>H Index</td>
<td>16</td>
<td>29</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>SNIP</td>
<td>0.88</td>
<td>1.56</td>
<td>0.05</td>
<td>0.033</td>
</tr>
</tbody>
</table>

Uses of JQMs: Research staff, education-focused positions, library staff

- Source of perceived quality esteem of researchers,’ clinicians,’ and educators’ impact, achievement, merit, and distinction
- Performance appraisals
- Research grant applications
- Hiring committees
- External evaluations (e.g., ERA)
- Some universities have set performance metrics research & education staff are now expected to achieve....
### Nursing / Allied Health Annual Minimum & Aspirational Research Targets 2011 for Level C

<table>
<thead>
<tr>
<th>1) RESEARCH OUTPUTS</th>
<th>Minimum</th>
<th>Aspirational</th>
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</thead>
<tbody>
<tr>
<td>Weighted publication points</td>
<td>0.20</td>
<td>0.40</td>
</tr>
<tr>
<td>Total Publications</td>
<td>1.50</td>
<td>3.00</td>
</tr>
<tr>
<td>Cumulative Impact Factor</td>
<td>2.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Proportion of A/A* Journals</td>
<td>30%</td>
<td>50%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2) RESEARCH INCOME</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$1,000</td>
<td>$10,000</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3) APPLIED MEASURE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Research Income</td>
<td>$300</td>
<td>$3000</td>
</tr>
<tr>
<td>Gov Doc &amp; Prac. Guidelines</td>
<td>0.20</td>
<td>0.40</td>
</tr>
</tbody>
</table>

| 4) HDR SUPERVISION                   |         |              |
| (load per staff member)              | 0.50    | 0.75         |

### Individual Researchers’ & Educators’ Objective Quality Performance Metrics

- Are a number of share-ware computer programs that can be used to generate statistics about an individual’s quality performance metrics; these can be used in addition to JQMs
- Examples of free programs include:
  1. *Publish or Perish*
  2. *Scholarometer*
  3. *Scopus H-Index Calculator*
**Publish or Perish software**

- *Publish or Perish* is a software program that retrieves and analyzes academic citations.
- It uses Google Scholar to obtain the raw citations, then analyzes these and calculates a series of citation metrics.
- It is free to download from: [www.harzing.com/pop.htm](http://www.harzing.com/pop.htm)

**Publish or Perish Citation 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 year
- Average number of papers per author
- Hirsch’s h-index
- Egghe’s g-index
- Contemporary h-index
- Age-weighted citation rate
- Analysis of the number of authors per paper
**Publish or Perish** Citation Metrics for 

- Total number of papers: 95
- Total number of citations: 325
- Average number of citations per paper: 3.42
- Average number of citations per author: 148.42
- Average number of citations per year: 19.12
- Average number of papers per author: 42.72
- Hirsch’s h-index: 9
- Egghe’s g-index: 15
- Contemporary h-index: 6
- Age-weighted citation rate: 42.97
- Analysis of the number of authors per paper: 2.76

**Take home messages**……

- Journal metrics are here to stay
- Important to look at journal metrics when considering where to submit manuscripts
- Important to report other JQMs (EF, AI, SJR, H-Index, SNIP) and not just focus in IF
- Individuals researchers and educators need to monitor, utilise and report their own citation quality metrics (such as the H-Index or G-Index)

Thank You!