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Assessing Journal Quality in Mathematics Education

Ryan Andrew Nivens

East Tennessee State University, nivens@etsu.edu

Samuel Otten

University of Missouri-Columbia, USA

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Assessing Journal Quality in Mathematics Education

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Ryan Andrew Nivens
East Tennessee State University

Samuel Otten
University of Missouri - Columbia

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The quality of academic journals can be assessed in several ways:

- through acceptance rates
- prestige of editors and editorial board members
- track record of publishing landmark studies in a field
- impact contents make on subsequent scholarship as measured by citations



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Top Tiers by Survey

see Table 1

- Within the mathematics education scholarly community, there has been discussion of “top-tier” journals (Adiredja, Alexander, & Andrews-Larson, 2015; Matthews, 2008; Martin & Larnell, 2013; Star & Rittle-Johnson, 2016).
- These discussions naturally raise questions about what it means to be top tier.
- Toerner and Arzarello (2012) surveyed 75 experts in mathematics education from 32 countries
- Williams and Leatham (unpublished manuscript) conducted a survey involving 46 scholars within the U.S. who were asked to rate 22 journals or proceedings

Goals:

- optimize the standing of mathematics education journals within the current citation-based system of journal rankings
- make efforts to conceptualize and measure journal quality in alternative ways

Citation-based systems

Our focus is on three major journal ranking systems (Bar-Ilan, 2010) looking at the 69 mathematics education journals we compiled:

- Web of Science's *Impact Factor* (IF)
 - only 6 journals present (JRME, IJSME, ESM, EJMSTE, MTL, RELIME)
- Scopus's *SCImago Journal Rank* (SJR)
 - 27 journals present
- Google Scholar Metrics' *h5-index* (h5)
 - 34 journals present

A note about JRME and ESM

Over the 2010-2014 timespan:

- ESM published 346 citable articles
- JRME published 119 citable articles

Comparison of Rankings

see Figure 1

Improving Our Standing

(A) include more journals in the databases that underlie the metric calculations

(B) optimize our citation practices.

Including More Journals Within Scopus

Many important journals in mathematics education are not included in the Scopus database. So none of the citations originating from those journals have any effect on SJR calculations, even for journals that are in the Scopus database

Thus if journal editors and publishers completed the process to be added to Scopus, it would not only raise the profile of their particular journal but it would also boost the citation counts for many other journals in our field.

Including More Journals Within GSM

Journals who publish slightly fewer than 100 articles over 5 years (e.g., MTL, FLM) must consider increasing their output to reach that threshold, which would gain them entry into the GSM system.

<https://scholar.google.com/intl/en/scholar/inclusion.html>

If physical printing restrictions are a reason for the limited output, please consider the age of digital media as it seems unwise to let physical binding inhibit journal quality as measured in these systems.

Optimization of Citation Practices

Authors:

Authors may include more citations in their articles and, specifically, more citations to relatively recent articles since citations to old articles do not factor into the metrics.

Editors:

Editors and publishers may hasten the acceptance of articles and hasten the publication of accepted articles (at least in online-first formats)

Optimization of Citation Practices

- These systems were created to measure impact in the first place.
- Understanding the formulas incentivizes faster reviews and shorter time spans between acceptance and publication.
- The increase in article output per year could also have additional benefits of reducing publication backlogs.
- The research conducted by our field can meaningfully impact others in a timely manner.

Modify or Replace the Citation-Based Systems

- one can point out that ours is a practice-engaged field (e.g., Hiebert, 2013; Lin & Rowland, 2016; Morris & Hiebert, 2015)
- dissemination of scholarship in practitioner journals
- enactment of the ideas by teachers, by instructors of teaching methods courses, by teacher leaders and professional developers,

Modify or Replace the Citation-Based Systems

- alternatives to citation-based metrics, such as journal circulation, downloads, shares, or documented use (e.g., through emails or social media posts from practitioners)
- the notion of “altmetrics” (Priem, Taraborelli, Groth, & Neylon, 2010) that expands beyond citations to also measure views/downloads, engagement (comments or tweets), bookmarking, and sharing

Modify or Replace the Citation-Based Systems

- an important question is whether incoming citations are indicative of the *journal's* impact or the *article's* impact
- the citations (and altmetrics in general) are a direct measure of an article's impact but only an indirect measure of the journal
- As others have pointed out, many articles in high-quality journals do not receive any citations at all and many articles published in so-called medium- or low-quality journals receive large numbers of citations (Segalla, 2008; Starbuck, 2005; van Aalst, 2010)

Another interesting note

- Berg (2016) showed that a randomly-selected article from a journal whose IF is 10 will, 70% of the time, have *fewer* citations than an article from a journal whose IF is 5. Berg concluded that it is highly problematic to use journal citation metrics to draw conclusions about article impact, yet this is often what occurs in cases of tenure and promotion.

What it is that a journal has direct control over?

- Journals should be evaluated based on the *quality of their editorial and review process*. For example, we would expect high-quality journals to supply insightful and relevant reviews and an editorial process that actively assists the authors in navigating the reviews and the revision process. This could be measured through surveys of authors and reviewers.

What it is that a journal has direct control over?

- Journals should be evaluated based on the *accessibility of their content*. This is not to say that open access journals are automatically of higher quality than subscription-based journals, but it is to say that a journal is ineffective if other scholars and potential consumers of the research cannot access it. Part of the role of the journal, after all, is to support dissemination, not just publication. This could be measured based on circulation, reach, and copyright policies (e.g., are articles allowed to be shared on ResearchGate, social media, etc.).

What it is that a journal has direct control over?

- Journals should be evaluated based on the *time lapses from submission to decision and from acceptance to publication*. Of course, these processing times need to be balanced with the quality of the review process, but journals with efficient turnarounds and rapid publication after acceptance (e.g., through “online first” formats) deserve credit because this supports the progress of the field and is especially important for authors who are on a tenure clock.

Acceptance rates are not a focus

- we did not include acceptance rates as one of our three indicators of journal quality, even though it is directly controllable by the journal
- a journal seeking to lower its acceptance rate to enhance prestige is counter-productive.
 - They could achieve this by encouraging more submissions that are not rigorous or not good fits for the journal, or they could achieve this by rejecting satisfactory studies or reducing their number of published articles. This does not seem to be a good use of time for the authors, editors, or reviewers.

Acceptance rates are not a focus

- A journal that educated its authors on writing high-quality articles and communicated what it means to be a good fit for the journal would be penalized because these steps would reduce some of the characteristics that lead to a higher rejection rate.
- Many sessions are now held by journal editors at our conferences that prepare authors in manuscript preparation. Obviously this will improve the quality of manuscripts submitted, and naturally should contribute to a lower rejection rate

Other developments to consider

- it is becoming increasingly common for researchers to follow not particular journals but rather researchers as individuals, regardless of where their work is published (Larsen & von Ins, 2010).
- For example, setting up personalized alerts from:
 - Google Scholar
 - ResearchGate
 - Academia.com

based on scholars or topics of interest is more efficient than surveying dozens of journals' tables of contents each month.

Other developments to consider

Elsevier

- provides the journal metrics “Source Normalized Impact per Paper (SNIP)” and “SCImago Journal Rank (SJR)” but also provide additional links to view number of downloads and authors, each by country.

Other developments to consider

Springer provides the most comprehensive information of the major publishers

- where the data are available, information on
- Speed: includes the number of days from 1) submission to first decision and 2) 'accept' to Online First publication.
- Usage shows 1) number of downloads, 2) Usage Factor, and 3) number of articles discussed via social media platforms.
- Impact includes subscores for 1) SNIP, 2) SJR, 3) h5-index, and 4) percent of journal author satisfaction (a survey of the likelihood of authors to publish with Springer again).

Other developments to consider

The United Kingdom uses a Research Excellence Framework (<http://www.ref.ac.uk/>) that assesses impact of research as one criterion for quality. Their definition of impact focuses not on citations but on the “effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia” (p. 26).

THANK YOU FOR YOUR TIME!

Ryan Nivens, Ph.D., Associate Professor
Center of Excellence in Mathematics and Science Education
Department of Curriculum and Instruction
Clemmer College of Education
East Tennessee State University | PO Box 70684 | Johnson City, TN 37614
nivens@etsu.edu
423-439-7529 phone | 423-439-7530 fax
Researchgate: http://www.researchgate.net/profile/Ryan_Nivens/
Academia: <https://etsu.academia.edu/RyanNivens>
LinkedIn: <http://www.linkedin.com/in/ryannivens>

Samuel Otten, Ph.D., Assistant Professor
Department of Learning, Teaching, and Curriculum
College of Education
University of Missouri | Columbia, MO 65211
573-882-6231
Researchgate: https://www.researchgate.net/profile/Samuel_Otten
LinkedIn: <https://www.linkedin.com/pub/sam-otten/12/63a/957>

Open discussion and questions.

Presentation based on forthcoming article

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