**How Can Agricultural Education Scholars Compete with Other Fields h-index's?
Answer: Reporting Their Field Citation Ratios**

Robert Strong
Bruce Herbert
Texas A&M University

James R. Lindner
Auburn University

Nicole Ray
Fresno State University

Primary author:
Robert Strong
Texas A&M University
2116 TAMU
College Station, TX. 77843-2116
979-845-1139
robert.strongjr@ag.tamu.edu

Introduction/need for innovation or idea

Priority 7 of the American Association for Agricultural Education's *National Research Agenda* emphasized the need to address complex problems. Institutions are challenged with producing impact from their research, teaching, and extension efforts with stakeholders (Kassab et al., 2020). Many academic departments now are faced with reporting their impact and the extent the impact aligns with the higher education system's institutional goals. Metrics of scholarly impact, such as citations, is relatively new. The Web of Science bibliometric database was launched in 2002 (Berenbaum, 2019), while both Elsevier's Scopus database and a beta version of Google Scholar were launched in 2004 (Hicks et al., 2015). Research metrics are used in benchmarking, strategic planning, and faculty promotions in universities around the world (Herbert, 2021). Bales et al. (2019). Metrics are used to justify claims of the scholarly or societal impact of scholarly publications. Research metrics are often used with a wide range of other indicators of scholarly prestige such as prestigious awards, speaking invitations, and serving on prestigious panels, committees, or other positions (Kreiner, 2016).

Small disciplinary communities, such as agricultural education, can be at a disadvantage when research is evaluated through measures such as total citation counts or journal impact factors because of the effect of community size on quantitative citation rates (Bornmann & Haunschild (2017; McKiernan et al., 2019). Inititaives in defining the responsible evalutaion of research have called for the use of article-level metrics, the use of metrics combined with other, more holistic methods of evaluation, and the use of metrics that reflect the unique mission and values of researchers and research organizations (Hicks et al., 2015).

How it works/methodology/program phases/steps

The challenges assessing disciplinary differences in citation praxes caused researchers of bibliometrics to develop field-standardized impact indicators referred to as relative citation ratios and field citation ratios. The National Institutes of Health Office of Portfolio Analysis developed the RCR as an effort to improve evaluations of project team's grant outcomes (Hutchins et al., 2016). The Field Citation Ratio (FCR) is a citation-based measure of scientific influence of one or more articles (Moher et al., 2018). It is calculated by dividing the number of citations a paper has received by the average number received by documents published in the same year and in the same Fields of Research (FoR) category (Bornmann & Haunschild, 2017). The field citation rate in Dimensions is given for specific research publications (older than 2 years) and the geometric mean is calculated for researchers and organizations. A value of 1 indicates that a publication is cited at the same rate as the mean citation rate of publications in the same field. A FCR value of 4 indicates that a research publication, researcher, or organization is being cited at four times the rate of the average citations of publications in that field. FCR Mean is the average Field Citation Ratio (FCR), which indicates the relative citation performance of an article, when compared to similarly aged articles in its Fields of Research (FoR) category. The values per year are the years in which the publications were published. As with other calculations involving the FCR, the average calculated is the geometric mean, which reduces the effect of outlier publications with extreme citation rates (Purkayastha et al., 2019).

Results to dates/implications

An example FCR output indicated,

"[Faculty Name] Field Citation Rate (FCR) for multiple articles is over 12.4 – indicating that her scholarship is cited more than 12.4 times the (geometric) average of papers in her discipline published in 2012. This is extremely high. The mean FCR for [University] was 4.12. This provides strong evidence of the scholarly **impact** of her publications."

Another FCR output included,

"[Faculty Name's] Field Citation Rate (FCR) for multiple articles is over 9.7 - indicating that her scholarship is cited more than 9.7 times the (geometric) average of papers in her discipline published in 2019. This is very high. The mean FCR for [University] is 3.64. This provides strong evidence of the scholarly **impact** of her publications."

A third result was,

"[Faculty Name] Field Citation Rate (FCR) for multiple articles is over 7.4 - indicating that his scholarship is cited more than 7.4 times the (geometric) average of papers in his discipline published in 2021. This is very high. The mean FCR for [University] is 2.48. This provides strong evidence of the scholarly **impact** of his publications."

Future plans/advice to others

Promotion, tenure, and post-tenure review decisions have involved the review of faculty's research metrics (Herbert, 2021). Since the type of metrics and their use can affect faculty behavior (both negatively or positively), it is important to draw from the bibliometric and scientometric research literature for best practices and new types of metrics that can support richer narratives of the impact and significance of research. The FCR offers advantages when comparisons and context are needed when using citation rates to justify narratives of scholarly impact and significance. Departmental mentors should communicate strategies to faculty in being more responsive in providing metrics and impact assessments to internal and external stakeholders based on what artificial intelligence tools exist.

Costs/resources needed

The direct costs associated with reporting Field Citation Ratios is purchasing a subscription to Dimensions.ai. Researchers, a Department Head, or Dean's representative can contact dimensions.ai at https://www.dimensions.ai/contact-us/ for quotes. Indirect costs relate to the time researchers would need to allocate in developing a culture of reporting their deliverables and impact in dimensons.ai and other artificial intelligence systems (Google Scholar, ORCID, SCOPUS, ResearchGate, Academia.edu) including social media (LinkedIn, Twitter, etc.) as cited by Strong and Lindner (2023).

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