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Questioning the Metrics for Performance Evaluation

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Abstract—This paper is a summary of the author’s presentation in the panel entitled “Publish or Perish: An Evaluation of the Quality, Quantity, Ethics and Review Process of IEEE/PES Publications” given at the IEEE Power Engineering Society 2008 General Meeting. This paper summarizes the publication metrics that are part of the academic performance evaluation of tenure track electrical and computer engineering faculty members at U.S. institutions. In particular, the performance metrics are discussed relative to promotion criteria.

Index Terms—Academia, promotion, tenure, publication

I. INTRODUCTION

TENURE and promotion typically depend on a faculty member’s prowess in teaching, research, and service. At most research institutions, the emphasis is on research, or scholarly activity, which includes externally funded research and journal publications. In fact, a recent survey of faculty members at Research and Doctorate-granting institutions rated student classroom evaluations as “very important” for granting tenure only 10% and 19% of the time respectively [1] – the implication being that research is weighted far more heavily in tenure consideration. The requirements of tenure and promotion continue to focus heavily on research and the number of publications is one quantitative measure of an individual’s research quality. As many universities enhance their research and graduate education missions, the emphasis on journal publication increases. As stated in [2]:

“Research” generally does not mean research – it means publication, as we have seen, for there is no other way that a legitimate and consistent system can be established to evaluate the quantity and quality of a person’s research.”

Therefore, faculty members are continually pressured to “publish or perish.” It may be argued that the amount of externally funded research may also be a measure of research productivity, but not all external funding is competitively obtained. External funding may come from industrial contacts, individual relationships with program managers at foundations or research laboratories, federal earmarks, or

other directed funding mechanisms. Therefore peer-reviewed publications are seen as the only “pure” form of assessment of original research ideas and productivity.

In engineering fields, publications come in three basic forms: the conference article, the journal article, and the technical book. In the humanities fields, one is seldom tenured without publishing a seminal book, but in engineering fields many successful faculty members may never write or book, or if they do so, it will be at a later point in their career. Thus the publication emphasis for tenure and promotion is article publication. As stated in [3] in listing the “10 Commandments for Getting Tenure” – the very first commandment is *Publish, publish, publish*.

II. PUBLICATION QUALITY

Faculty members are expected to publish articles in both quality and quantity, so how are these metrics measured? Scientific journals are typically rated with respect to the *Institute of Scientific Information (ISI) impact factor*. The impact factor depends on a number of different criteria including number of citations of articles, numbers of submissions, etc. and can be used to provide a gross approximation of the prestige of journals. In scientific fields, there are a large number of journals in which to publish and the ISI impact factor is often used during faculty evaluation to assess the quality of articles based on the journal in which they appeared. In engineering fields, however, the number of journals in which to publish is much lower and the ISI impact factor is not as widely applied. For example, in power systems, some of the available journals are:

- IEEE Transactions on Power Systems
- IEEE Transactions on Power Delivery
- International Journal of Electrical Power & Energy Systems
- Electric Power Systems Research
- International Journal of Power and Energy Systems
- IET Generation, Transmission & Distribution
- Electric Power Systems and Components

Power systems authors may also publish in other journals that focus on circuits and systems, control, or industrial applications. Given the number of potential authors worldwide and the small number of journals available for publication, it is not surprising that competition is fierce

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among authors and that many journals are over-whelmed by the number of submissions.

The peer-review process is utilized to maintain the quality of articles that are selected for publication. However, this process is not guaranteed to identify the highest quality papers since the review process is not a “blind” process – a process in which the authors’ identities are hidden. Therefore, well-known authors are more likely to be successful in the review process and reviewers’ personal prejudices against nationality, occupation, gender, etc. may subconsciously play (positively or negatively) into their review and recommendation for unknown authors. However, by increasing the number of reviewers, the integrity of the review process can be improved.

Conference publications, on the other hand, tend to have a less arduous review. Conference organizers face competing interests when setting up the review process for the proceedings articles. Many conferences are intended as revenue generating events and the largest group of conference attendees is authors and other presenters. If a rigorous review structure reduces the number of attendees, the conference profits are adversely affected. Therefore, the review standards for proceedings papers tend to be lower than for journals.

Indeed, many conferences accept papers for their proceedings based on the review of an editorial board, rather than a full peer review, may make a decision based on a slightly lower quality standard, or utilize fewer reviewers to make a decision.

For these reasons, journal articles are often perceived by faculty evaluators as having a higher quality than conference papers, even if the conference papers cover the same material or reach a larger audience.

III. PUBLICATION QUANTITY

One of the most frequently asked questions from new faculty members about tenure is: How many journal articles are needed? This is a difficult question to answer definitively. As stated in [1]: “What is a strong tenure case? That is like asking how long a piece of string is.” Many universities publish the tenure and promotion procedures, but avoid putting in specific numbers. This is because the awarding of tenure is a subjective, rather than an objective, process. However, there is a general rule of thumb that more is better.

At U.S. Research and Doctoral-granting institutions, the publication average is typically 2-3 journal articles and 4-5 conference articles per year for a relatively research active tenure track faculty member, but universities have a variety of standards and expectations and these numbers can vary significantly from institution to institution. But it is unlikely that a U.S. faculty member could be tenured or promoted with few or no journal publications. Therefore, faculty members must constantly have articles in preparation or in the review pipeline to meet these standards.

IV. OBSERVATIONS AND CONCLUSIONS

The *publish or perish* paradigm has fostered an academic environment where success, and even individual self-esteem is measured by the number of articles published in top peer-reviewed journals. It is common practice to send out at least five of candidate’s published papers for assessment from external reviewers at the time of promotion and tenure. The ranking and perception of a department’s graduate program is closely correlated with the number of publications per faculty member. In the interest of improving a department, junior faculty are often expected to have more prolific journal publication records than the senior faculty making the recommendations.

It is unlikely that the pressure to publish will diminish in the academic culture in the near future. This aspect of the teaching-research-service expectation of faculty members is one of the primary indicators of the strength of a faculty members’ research productivity.

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M. L. Crow received her B.S.E. in electrical engineering from the University of Michigan, Ann Arbor, and her Ph.D. in electrical engineering from the University of Illinois-Urbana/Champaign. She is currently the F. Finley Distinguished Professor of Electrical Engineering at the University of Missouri-Rolla. Her area of professional interest is power electronics applications to bulk power transmission systems analysis and security and engineering education. She has authored a book and over 100 technical articles. She served as Dean of the School of Materials, Energy & Earth Resources from 2003-2007 and is currently Director of the Energy Research & Development Center. She served as the Vice President for Education/Industry Relations of the IEEE Power Engineering Society from 2002-2004 and is currently chairman of the IEEE PES Power Engineering Education Committee. She is a Registered Professional Engineer in the State of Missouri.