Assessing Research Quality and Impact at Cornell University

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Cornell University's Strategic Plan

> puts forth an overarching aspiration for the university: **to be widely recognized as a top-ten research university in the world**, and a model university for the interweaving of liberal education and fundamental knowledge with practical education and impact on societal and world problems.

In addition to deploying the comprehensive set of resources required to enable the university to attain and maintain such a position (top ten), university leaders must also identify and agree on what it means to be "top ten" (what definitions and criteria are to be used) and to agree on how we will measure progress toward this aspiration (what evidence is to be used). Research assessment tools enabled through technology may help in these efforts.

Evaluation and assessment wisdom across diverse fields has commonly purported that you can't improve (or change) what you can't measure. More broadly, this can be recast as you can't improve what you can't observe; i.e., unless you observe an activity, outcome, or impact, you won't know if you are doing better or worse in relation to your goals for that element. This implies that both quantitative and qualitative tools and data may be useful in assessing university research quality and impact.

Technology-enabled Tools to Assess Research Outputs at Cornell University

Technology-enabled tools useful for assessing research outputs focus on providing and organizing both quantitative and qualitative information, from internal and external sources. External sources may include publicly-available as well as private (commercial/purchased) data and tools from specialized vendors. Internal data may derive from all levels of the university (department, college, or university-wide), posing aggregation and interpretation challenges when systems and definitions across these levels differ.

Examples of quantitative data and tools used to assess research activity, outputs, and impact include a variety of internal institutional data represented visually and manipulated easily by users across the university (e.g., through the use of Tableau data visualization and analytics software), and the use of various publicly-available and privately-purchased ranking schemes, such as Times Higher Education World University Rankings (which I won't address here) and Academic Analytics LLC. Cornell University Graduate School's use of Tableau for interactive maps and charts was featured in a *Wall Street Journal* blog (Schectman, J, 2012).

At Cornell, we have found useful the research productivity business intelligence data purchased through Academic Analytics, LLC, which allows comparisons by academic department, doctoral program, broad disciplinary grouping, and university, and provides comparative data on such aggregate and per capita research indicators as total grant dollars, total number of grants, number of faculty members with a grant, dollars per grant, grant dollars per faculty member, percentage of faculty with a grant, and similar measures (aggregate and per capita) for published articles, citations, and honorific awards received by faculty. Such

comprehensive as well as granular data allow analysis regarding the various "levers" that can be manipulated through incentives and disincentives to guide faculty behavior and activity in ways that could stimulate greater research productivity and impact, at least on these measures, and toward goals that are realistic and likely achievable as determined by benchmarking each element against logical peer institutions' performance.

An example of technology-enabled qualitative research productivity information is the electronic database of research impact statements curated by the College of Agriculture and Life Sciences at Cornell (CALS Research and Impact, 2011). Each year, every faculty member is encouraged to submit one or more "impact statements," each providing a descriptive summary of a research program (an integrated set of research projects over time), the societal or knowledge issue or problem the research addresses, the response and impact resulting from the research, and the funding, researchers, and organizations involved over time.

Cornell also uses VIVO, an open source "research-focused discovery tool that enables collaboration among researchers across all disciplines (VIVO, 2013)." Mapping tools through VIVO provide characterizations of activity (publications) and collaborations across disciplines and units, providing insights into disciplinary and cross-disciplinary research activity and impact.

Benefits and Limitations of Metrics to Assess the Nature and Quality of Research Outputs
Cornell's Strategic Plan provides some guidance for thinking about indicators to assess progress (see Appendix D of the Plan); this guidance is applicable to assessing progress on research goals. The authors cautioned about the difficulty of developing "fully adequate measures of progress toward greater excellence … No particular metrics or qualitative indicators will be sufficient, but some sets of combinations of them will be significantly better for tracking progress than others or than having none" (Cornell, 2010). This last caution is important – faculty, particularly in some disciplines, will inevitably argue that the aggregate and/or per capita measures available for their program are incomplete, inadequate, or inaccurate. University leaders might then challenge these critics to propose their own suggestions about the type of information that would be more relevant to evaluate the research productivity and impact of their "unique" research program, and be willing to accept (or at least discuss) the types of observational data or metrics suggested by those faculty. To be widely adopted and integrated into the behavior of a graduate program or academic department, quantitative metrics and qualitative indicators should be developed in consultation with those working in the areas being measured – i.e., faculty for research programs. In addition, it is important to recognize another truism from the evaluation literature – you will become what you measure. Metrics and indicators can help to promote improvement by holding individuals or units accountable for more or higher-value research activity, but they also can be detrimental if attention focuses instead on achieving a particular measure rather than on the larger purposes of increasing overall research impact.

References

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