Incubators of Knowledge: Predicting protégé productivity and impact in the social sciences

Doctoral education plays a pivotal role in shaping the careers of future scholars and, thereby, making an impact on the trajectory of knowledge creation in a nation. During a doctoral program, students are acculturated to the norms of the discipline, learning scholarly practices and behaviors that will impact them for a lifetime. Advisors, as guides to these scholarly journeymen, serve as critical gatekeepers to the discipline and can have a profound influence on their doctoral students. And yet, very little quantitative data exists that describes the relationship between advisor’s scholarly practices and the future success (measured by productivity and impact) of their advisees. This study proposes a set of analyses to better understand these issues. In particular, we aim to answer two main research questions. The first one is related to the contribution of doctoral students to social science research (the extent and character of this contribution) and the impact of that research (it’s visibility through citations). We will analyze the number of publications produced by doctoral students and the citations received by these publications diachronically and across multiple disciplines. The second question will examine different dimensions of an advisor as a scientist through the framework that we have developed that will examine their knowledge base, knowledge diffusion practices, and whether they are involved in expanding knowledge frontiers and how these are related to the career trajectories and future success of their doctoral students. This approach will allow us to quantify advisor behaviors and look for patterns and correlations with advisee behaviors. The ultimate goal is to produce a viable framework and set of analyses that would enable predicting advisee success based on advisor qualities and student’s publication practices in the course of their doctoral studies. This can be used by policy makers and administrators for more efficient allocation of resources.

Intellectual Merit

Doctoral students comprise a larger portion of the academic workforce; yet, we have very little knowledge of their place in scholarly networks, the degree to which they contribute to scholarly output, and the impact of this output. This work is critical to quantitatively understand the contribution of doctoral students to the creation of knowledge and the relationship between the scholarly practices of advisors and the productivity and impact of their acolytes. It will also enhance our understanding of how the different scientific practices of the advisors—including their embeddedness in particular disciplines, degree of mobility among different disciplines, and involvement in highly collaborative interdisciplinary work—will have an effect on the career trajectories and scientific success of their advisees. Billions of dollars go into the advancement of science—we must take care that some of that money is going to development of the next generation of scholars and that we are providing funding to scholars who are dedicated and able to produce high quality graduates. The research team has the necessary expertise and resources to complete this project and has extensive collaborative experience with each other (member of the team have collaboratively written 11 accepted publications in the last 24 months).

Broader Impacts

Educational opportunities will be created through the funding of master students, one doctoral student, and the integration of this project into a classroom. Students from underrepresented groups will be sought for these positions. In addition, this research will provide a platform for future analyses on the cultural, racial, and gender biases in doctoral education. The research products of this work will be disseminated at national and international conferences and workshops, in order to engage other scientists in this work. Most importantly, the process of matching heterogeneous datasets will be detailed and made available online in order to enhance replicability and enable other scientists to adopt and expand these approaches. The combinations of these datasets and our proposed analyses provide a rich foundation for the development of new metrics and evaluations of knowledge diffusion, scholarly productivity, and scientific impact.