Project Abstract

Disseminating Computational Modeling in the Social Sciences
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Objective

The social world that we observe reflects a web of interdependent processes, with macro-level social structures emerging in nonobvious ways from micro-level behavior. Unfortunately, most empirical social science research has focused on estimating and interpreting correlations in cross-sectional data, giving us limited insight into the underlying generative processes. Our failure to consider dynamics and interdependence has been partly due to the relative paucity of longitudinal and multi-level data and partly due to the supposed intractability of theoretical problems involving complex dynamic systems. But the progress being made in the natural and physical sciences using computational models makes it clear that our commitment to static lenses is now more a function of habit than need.

Computational modeling frees social scientists from constraints of analytical tractability and data availability, allowing us to rigorously consider emergent behavior of dynamic systems specified by theory. It also adds another approach to the production and analysis of data, one more in keeping with a laboratory than an observational study. We may use computational experiments to directly investigate social dynamics in "artificial worlds." The patterns we observe in this setting, by manipulating inputs and analyzing the results, can help elucidate theoretical debates and inform empirical research. The discipline of formal modeling requires us to specify our theory and identify our assumptions explicitly. Formalization closes the gap between theory and methodology. More than anything else, this is essential to the coherence and advancement of a field.

Even as these innovative tools mature and proliferate, however, the audience for computational modeling remains largely confined to a small community of modelers. Although a handful of interdisciplinary centers advance these tools, only a handful of disciplinary social science programs currently offer training in computational modeling. Most B.A. and Ph.D. students thus graduate without learning to be critical consumers of research using these innovative tools, let alone use the tools in their own research. Unsurprisingly, relative to peers in the physical and natural sciences, most social science journals have poorly-developed standards for evaluating research employing computational models.

We aim to make research in social dynamics both more rigorous and more accessible by offering training resources in computational modeling. First, we are running development workshops at professional meetings to promote curricular reform and to foster disciplinary training standards.

Second, we are assembling a resource manual that will enrich coursework in computational modeling and also provide hands-on explorations of social dynamics for substantive social science courses. Lastly, we are developing a web portal with a repository of source code, exercises, and demonstration software, including an arena for interactive learning. The online repository will also aid in developing methodological standards and improve the integrity of computational modeling research by making source code and other supplementary materials available to the social science research community.

Project Progress

We are currently developing a suite of materials for training social scientists in dynamic modeling, in tandem with model seminars that we have offered at the University of Washington and Cornell University. The web portal mentioned above is currently under development.

In line with our goal to transform disciplinary institutions, we recently conducted a development workshop at the 2005 annual meeting of the American Sociological Association; in 2006 we will offer a session at the conference for Chairs of Departments of Sociology, focusing on fundamental changes to graduate and undergraduate curricula in Sociology. We are also reaching out to scholars in other disciplines – many of which have been quicker to explore and adopt computational modeling – to coordinate dissemination of lessons in disciplinary training across the social sciences.

Broader Impacts

The edited volume on computational modeling, online repository for source code and other materials, and the development workshops at professional meetings will assist faculty in designing courses on computational modeling and in integrating modeling into their existing course offerings. By enhancing teaching and curriculum development, our goal is to improve the integrity of students' applied training in dynamics within traditional social science disciplines. The short-term result should be a faster rate of adoption in disciplinary curricula and improvement in training quality. This will contribute to a longer-term result of increasing emphasis on and integrity of modeling dynamics in the social sciences.

Project Website

http://depts.washington.edu/modeling/