The Use and Misuse of Science: Refining the Theoretical Framework of Science Policy

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1. ABSTRACT

This poster examines the use and misuse of science information in the federal government. Scientific information is a vital component of policy making in the U.S. today. Stine notes that science research is "intricately linked to societal needs and the nation's economy in areas such as transportation, communication, agriculture, education, environment, health, defense, and jobs" [7, p. i]. In the past, the relationship between science and policy was seen as a linear process: science conducted research, collected data, and presented its findings to federal agencies, which then use that evidence to determine the best policy action [2, 5].

However, the reality of science policy is far more complex; while science is a valuable source of information, it is also problematic, since scientific data may conflict with political, moral, and economic values [5, 6, 7]. For example, if endangered fish reside in a lake, politicians may face choices between preserving the ecosystem, irrigating nearby farms, and allowing recreational use of the lake. Each choice has economic, environmental, and political ramifications. Doremus explains that "esthetic, ecological, educational, historical, recreational, or scientific" values can all be considered relevant foundations for agency decisions [3, p. 1136]. Because of this complexity, "the political community and the scientific community… collaborate at the boundary of politics and science over the integrity and productivity of research" [5, p. 143]. In this conceptualization, "government cannot make good policy decisions unless the decision makers have access to, and appropriately use, the best available understanding of the facts" [4, p. 1639].

Federal agencies, like individuals, have information behaviors—they create, access, review, share, evaluate, and act upon information in order to formulate and assess public policy.

Agencies could accept scientific conclusions and use them as the basis of policy formation. Agencies could accept the science, yet determine that it is not the best or sole basis of effective policy. Of course, agencies could reject or partially reject the science, thus creating more opportunities to basis policy on other considerations. Typical agency behavior with respect to science falls across a spectrum, with science being neither unreservedly endorsed nor discarded. While "a scientist views science as a way of learning, a policy maker…may see science as the justification for a decision, a requirement of the law, a tool or impediment, or something that opposes or supports their viewpoint" [1, p. 1005]. Furthermore, agency information behavior with respect to science does not exist in isolation. There is recurring interaction between science and policy. For instance, scientists who study the toxic effects of chemicals and report their conclusions to the Environmental Protection Agency, to guide agency behavior, will likely continue studying the same chemicals and providing additional information to further influence policy. How the EPA behaves with respect to the scientific information may shape future research, communication efforts, or the information behaviors of the scientists themselves.

Principal-agent theory is frequently used to explain how science and policy interact. Under this approach, federal agencies, as principals, contract with science to provide needed information. Science then acts as an agent, supplying data and conclusions in exchange for funding, prestige, and other rewards [5, 6]. Principal-agent theory captures a significant portion of the interaction between science and policy, but does not reflect the entire relationship. Specifically, principal-agent theory has little to say about how agencies use science—the information behaviors in which they engage—or how these information behaviors affect subsequent interaction with scientists. The theory currently does not address the problem of under-utilized or under-appreciated agents. If the agents perceive their work is not incorporated into policy, perhaps they will refuse to do further work, will begin doing shoddy work, or will attempt to subtly integrate policy advice into their work. Since these information behaviors are, in fact, a crucial part of formulating policy, they ought not be overlooked.

The nature of the recurring interactions, and how they are affected by agencies' information behavior, has not been explicitly examined in the previous literature. This poster illuminates these aspects of the relationships between science and policy. Specific

examples of agencies using and misusing scientific information will be drawn from the literature to illustrate the complex interactions. The full, cyclical relationship between science and policy will be portrayed, demonstrating how agencies' information behaviors may affect subsequent research and communication behaviors. This will necessarily entail a refinement of principal-agent theory as it has been applied to science policy.

This research will be a valuable contribution in several ways. It brings science policy—how scientific information is used or misused—to the explicit attention of iSchools and their cognate fields of study. As we create technological tools and engage in policy-relevant research, we need to pay attention to how our data and conclusions may or may not be utilized. In addition, science policy can benefit from the theoretical and conceptual rigor of the trans-disciplinary research of the iSchools. Finally, the research will also test and strengthen the use of principal-agent theory as it applies to science policy. Overall, this theory has great utility, but can be refined to address more of the interaction between science and policy.

2. References

[1]   Brosnan, D.M. (2007). Science, law, and the environment: The making of a modern discipline. *Environmental Law, 37*, 987-1006.

[2]   Bush, V. (1945). *Science: The endless frontier.* Office of Scientific Research & Development. Retrieved June 1, 2008 from http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm

[3]   Doremus, H. (1997). Listing decisions under the Endangered Species Act: Why better science isn't always better policy. *Washington University Law Quarterly, 75*, 1029-1153.

[4]   Doremus, H. (2008). Scientific and political integrity in environmental policy. *Texas Law Review, 86*, 1601-1653.

[5]   Guston, D.H. (1999). *Between politics and science: Assuring the integrity and productivity of research.* Cambridge: Cambridge University Press.

[6]   Guston, D.H. (2003). Principal-agent theory and the structure of science policy, revisited: 'Science in policy' and the US Report on Carcinogens. *Science & Public Policy, 30*(5), 347-357.

[7]   Stine, D. (2008, April 22). *Science and technology policymaking: A primer.* CRS Report for Congress: RL 34454.