Data for Decision-Making: A Skill-Building Strategy

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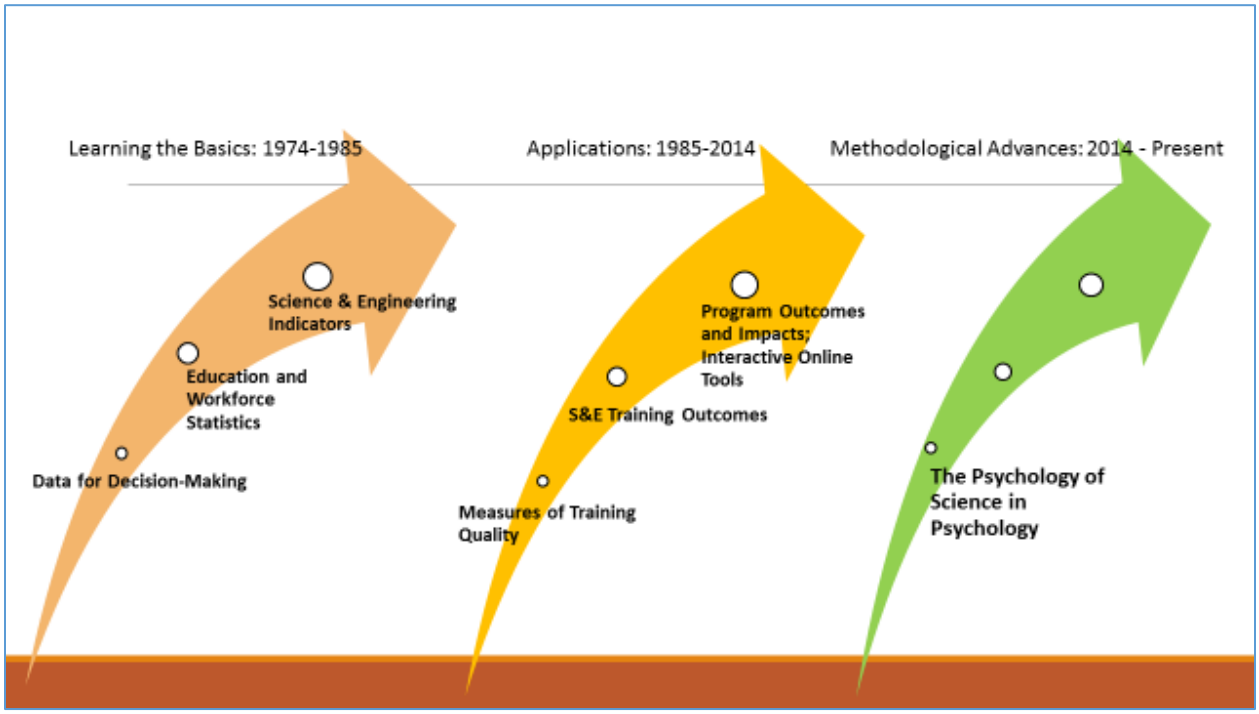

Learning the Basics

40 years ago, the US Senate was engaged in a debate initiated during the era of the "Great Society" regarding the need for quantitative indicators that would monitor US progress towards such social goals as crime reduction, degree attainment in the US population, fair housing practices, and the like. In fact, the US Office of Management and Budget (OMB) released the first *Social Indicators Report* at about the same time that the National Science Board (NSB) released the first *Science Indicators Report of 1973*.

As the US government embraced the idea of indicator reporting, I was asked by Senator Walter F. Mondale in 1974 to explore the feasibility of reviving a bill to establish a Council of Social Advisors

(akin to that in economics) – a legislative idea that could be traced to his predecessor, Senator Hubert H. Humphrey, representing an effort to deepen interpretation and use of statistics for policy and planning. Although the Senator ultimately decided against the idea of reintroducing the bill, this exposure to the information needs of planners and policymakers piqued my curiosity about data collection, analysis and its use in governance.

Two subsequent job opportunities initiated my skill-building strategy in earnest, namely through an analysis of the National Research Service Awards program, and my eventual participation as a team member producing Science Indicators reports.

- Some of you may recall that in 1973 then-HEW Secretary Caspar Weinberger ("Cap the Knife") proposed to eliminate a decades-old federal program of support that provided pre-doctoral and postdoctoral training in the biomedical and behavioral sciences. Congress responded by asking the Academy to study degree production and employment patterns in those areas and to report findings to the NIH Director and to Congress, together with recommendations regarding the appropriate mix of pre- and postdoctoral awards in areas of "national need." Collaborative staffing arrangements on that project gave me the opportunity to acquire and refine data skills in such areas use of federal statistical databases, design and analysis of national surveys of postdoctoral employment experiences, uses of labor force projections, and the design of consensus-building meetings of committees of scientific advisers.
- Development and use of federal statistics expanded even more rapidly through subsequent work as a policy analyst with the Science Indicators Unit at the National Science Foundation. At that time I was asked to update and expand indicators examining the health of the basic and applied research base in the United States, as well as indicators capturing trends in academic science and engineering – from degree production to faculty productivity.

Applications

Time does not permit me to review the myriad opportunities in my career to apply data for decision-making in any detail. Suffice it to say that improvements in computer technology and advances in both qualitative and quantitative analytic techniques made it possible for me to lead a collaborative study at the National Research Council on the "perceived quality" of research-doctorate programs in the United States; to brief the President's Science Advisor on the impact of the National Defense Education Act of 1958 on the growth of the science and engineering workforce in the United States; and to advise

the National Science Board (NSB) on ways to expand their portfolio of Science and Engineering reports to include both a *Digest of S&E Indicators* and an online tool presenting STEM education indicators.

Federal recognition of my contributions to "data for decision-making" culminated in an invitation by the Chief Statistician of the United States to join the US delegation to the First World Forum on Statistics, Knowledge and Policy convened in Palermo in 2004 by OECD, as well as the Second World Forum that convened in Istanbul in 2007 – participation in which contributed to my ongoing work for NSB on their indicators portfolio. Subsequently, OECD invited me to speak at a workshop addressing Data Designed for Decisions in 2009 which included attention to innovative data visualization strategies – an area in which psychologists have traditionally excelled given training we've all received in the art of graphing data.

More recently, as a member of the National Academy of Sciences' US National Committee for the International Union of Psychological Science (USNC/IUPsyS), I had the opportunity to submit suggestions to the United Nations Economic Commission for Europe (UNECE) on the potential role of "sustainable consumption" indicators as part of the Accountability Framework for the Post-2015 Development Agenda – a topic that will be discussed at a ministerial-level meeting in September 2014.

Methodological Advances

Over the years, I have learned that our national statistical system – while somewhat flawed – often represents an important starting point for influencing many types of decisions by planners and policy makers; that well-crafted supplementary data collection strategies can be used to establish frameworks for informed decision-making; and that many contemporary leaders continue to demand accurate and reliable data upon which to make decisions that ultimately affects us and populations of interest to us.

In closing, let me say that it was my privilege to accept the AAAS-APA Congressional Fellowship in 1974 which launched this skill-building odyssey. I hope to return the favor through the nonprofit venture I recently launched – The Psychology of Science in Psychology (PsySiP) Project – whose goal it is to promote the development and use of behavioral measures for more effective policy and planning. Thank you.

Appendix: Pertinent Reports and Other Work Products

IDA Science and Technology Policy Institute

- Diminishing Funding and Rising Expectations: Trends and Challenges for Public Research Universities: A Companion to Science and Engineering Indicators 2012. National Science Board (NSB). Analytic support (STPI Task Leader). 2012. Link to NSB report: http://www.nsf.gov/nsb/sei/companion2/index.jsp
- R&D, Innovation and S&E Workforce: A Companion to Science and Engineering Indicators 2012. National Science Board (NSB). Analytic support (STPI Task Leader). 2012. Link to NSB report: http://www.nsf.gov/nsb/publications/pub_summ.jsp?ods_key=nsb1203
- "Duplication, Overlap, Fragmentation, and Gaps." In The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio. National Science and Technology Council (NSTC). Analytic support (STPI Task Leader). December 2011. Link to NSTC report: http://www.whitehouse.gov/sites/default/files/microsites/ostp/costem federal stem education portfolio report.pdf
- "National 'Educational Technology' Plans: Progress and Remaining Challenges." P.E. Flattau. Address at 4th Annual Psychology Day at the United Nations. April 2011. Available at: http://www.apa.org/international/united-nations/flattau-address.pdf
- STEM Education Data and Trends. National Science Board (NSB). Analytic support (STPI Task Leader). March 2010. Link to NSB interactive tool: http://www.nsf.gov/nsb/sei/edTool/
- Assessment of the DoD Laboratory Civilian Science and Engineering Workforce J. M. Seng and P.E. Flattau, IDA Paper P-4469, Alexandria, VA, June 2009. Available at: http://www.ntis.gov/search/product.aspx?ABBR=ADA506429
- Early Outcomes of the National Science Foundation's Grants Program on "How People Learn Engineering" (HPLE) P. E. Flattau, B. Lal, C. Horin, H. Martinez, and J. J. Ford, III, IDA Document D-3725, Institute for Defense Analyses, January 2009. Available at: http://nsf.gov/eng/eec/EEC_Public/EEC_Program_Evaluations.jsp
- Portfolio Evaluation of the National Science Foundation's Grants Program on "International Research and Education in Engineering" (IREE) P.E. Flattau, B. Lal, A. Laskey, and J. J. Ford, III IDA Document D-3727, Institute for Defense Analyses, January 2009. Available at: http://nsf.gov/eng/eec/EEC_Public/EEC_Program_Evaluations.jsp
- Preliminary Findings from the NSF Survey of Object-Based Scientific Collections: 2008 P. E. Flattau, M. Boeckmann, P. Lagasse, N. Mitchell, and D. Singpurwalla IDA Document D-3707, Institute for Defense Analyses, December 2008. Available at: www.nsf.gov/pubs/2009/nsf09044/nsf09044.pdf
- "An Emerging Role for Data Visualization" P. Flattau, *Psychology International*, Volume 19 (4), October 2008. Available at: http://www.apa.org/international/pi/
- Report of the Task Group on Conceptual Knowledge and Skills. National Mathematics Advisory Panel. Analytic support (STPI Task Leader). Link to NMAP Task Group report: http://www2.ed.gov/about/bdscomm/list/mathpanel/index.html
- Digest of Key Science and Engineering Indicators 2008. National Science Board (NSB). Analytic support (STPI Task Leader). January 2008. Link to NSB report: http://www.nsf.gov/statistics/digest08/
- The National Defense Education Act of 1958: Selected Outcomes P.E. Flattau, J. Bracken, R. Van Atta, A. Bandeh-Ahmadi, R de la Cruz, and K. Sullivan, IDA Document D-3306, Institute for Defense Analyses, March 2006. Available at: http://www.ida.org/stpi/pages/D3306-FINAL.pdf
- S&T Collaboration: Ideas for Enhancing European-American Cooperation. Summary of a Workshop convened by the President's Council of Advisors on Science and Technology (PCAST). STPI Task Leader. October 2004. Link to PCAST report: http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-04-stcollab.pdf

- Federal-State R&D Cooperation: Improving the Likelihood of Success. Summary of a Workshop convened by the President's Council of Advisors on Science and Technology (PCAST). STPI Task Leader. June 2004. Link to PCAST report: http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-04-fedstate.pdf

National Academy of Sciences/National Research Council

- Research-Doctorate Programs in the United States: Continuity and Change, M.L. Goldberger, B. A. Maher, and P.E. Flattau (Eds.), for The Conference Board of Associated Research Councils, Washington, DC: National Academy Press, 1995. http://www.nap.edu/catalog.php?record_id=4915
- Careers in Science & Technology: An International Perspective, for the National Science Foundation, Chapter on "Utilizing Points of Intervention: A Critique," Washington, DC: National Academy Press, 1995. http://www.nap.edu/catalog.php?record_id=5109
- Meeting the Nation's Needs for Biomedical and Behavioral Scientists, for the National Institutes of Health, Washington, DC: National Academy Press, 1994. http://www.nap.edu/catalog.php?record_id=4750
- "Report from the Workshop on Faculty Aging, Performance Evaluation, and Tenure." Prepared for the NAS/NRC Committee on Mandatory Retirement in Higher Education in Ending Mandatory Retirement for Tenured Faculty, P.B. Hammond and H.P. Morgan (Eds.), for the US Office of Equal Opportunity, Washington, DC: National Academy Press, 1991. http://www.nap.edu/catalog.php?record_id=1795
- Behavioral Measures of Neurotoxicity, R.W. Russell, P.E. Flattau, and A. M. Pope (Eds.), Washington, DC: National Academy Press, 1990. http://www.nap.edu/catalog.php?record_id=1352
- Rosenzweig, M.R. and P.E. Flattau, "The US National Committee for the International Union of Psychological Science." *International Journal of Psychology*, 23: 367-376, 1988.
- Personnel Needs and Training for Biomedical and Behavioral Research. Chapters on Behavioral Research, for the National Institutes of Health, Washington, DC: National Academy Press, 1976 – 1979 (Annual Series).
- Personnel Needs and Training for Biomedical and Behavioral Research. Chapters on Health Services Research, for the National Institutes of Health, Washington, DC: National Academy Press, 1976 – 1979 (Annual Series).
- Personnel Needs and Training for Biomedical and Behavioral Research. Chapters on Nursing Research, for the National Institutes of Health, Washington, DC: National Academy Press, 1976 – 1979 (Annual Series).