Chapter 1

Introduction

There can be no question that the social sciences are an integral part of NSF's vision of research at the frontiers of discovery. Dr. Rita R. Colwell, Director, National Science Foundation (1998-2004)[2]

Need and Challenge for SBE Science Education

Over the last quarter of a century, the world has undergone rapid change. Almost every aspect of human life is more complex and interdependent. Advances in communications technology alone have changed the content, speed, scope, and ease of how individuals, organizations, institutions, and governments function and relate to each other. Around the globe, people rely on advanced knowledge and knowledge acquisition—whether for improving their health, increasing their prosperity, expanding their capacities, or promoting their security. This knowledge itself is complex. It requires an understanding of the synergy among physical, biological, behavioral, and social phenomena.

The implications of this reality are two-fold: First, scientific reasoning and inquiry skills need to be more widespread, irrespective of employment sector or social role. Second, major investments in the research enterprise and in pursuing promising ideas are essential to keep pace with society's need for science. No area is more important for public literacy and for knowledge production than the social, behavioral, and economic sciences (SBE). Throughout the history of science, investments in SBE fields have lagged behind other sciences. Recent recognition of this gap requires not just more funds for research, but also efforts to build public support for SBE inquiry and the scientific talent pool to sustain it.[3]

The social, behavioral, and economic sciences contribute substantially to the public good. These fields consist of such disciplines and interdisciplinary specialties as anthropology, economics, geography and regional sciences, history of science, law and social science, linguistics, decision and management science, political science, psychology, social psychology, sociology, and statistics, among others. Understanding and employing the knowledge provided by the SBE sciences are fundamental and requisite to sound decisions at the individual, group, societal, and

[2] Speech to the Consortium of Social Science Associations, December 4, 2000.

[3] Public understanding and valuing of the SBE sciences begin with the scientific and engineering community's support for the SBE sciences in their own terms, not just from the vantage of how they contribute to explaining biological or physical phenomena. Fuller inclusion of the SBE sciences as scientific partners should be evident from the composition of task forces and commissions addressing issues of science, research and fellowship awards, and the appointments and presence of SBE scientists in representational roles.

global levels. Citizens and experts, for example, who lack basic grounding in economics will be ill-equipped to make intelligent choices among competing policies regarding budget deficits and inflation at the domestic level or about the national balance of trade and globalization at the international level.

The SBE sciences contribute penetrating insights into such issues as the causes and consequences of conflict, how individuals and groups perceive and misperceive hazards, how they understand or misunderstand the risks they run in their daily lives, and how they organize and structure their interactions and transactions. The methods of social science also provide essential tools for rigorously examining human phenomena and unraveling the effects of human and social factors. Individuals and households as well as agencies, firms, and governments would make sounder decisions and formulate more effective policies if the rigor in reasoning and in modes of inquiry produced by the SBE sciences were more widely shared. Utilizing this knowledge, however, requires basic competence in the SBE sciences on the part of all citizens. It also requires the advanced education and training of SBE scientists to undertake high-quality research and provide this teaching.

Goals and Framework of the Report

Determining how best to improve education in the social and behavioral sciences is a challenge. Congruent with its mission to advance the state of science and science education, the National Science Foundation (NSF) has committed itself to this task. Under the aegis of the Social, Behavioral, and Economic Sciences (SBE) Directorate, and with the active participation of the Directorate for Education and Human Resources (EHR), NSF seeks (1) to accelerate educational innovation and improve the quality and diversity of social and behavioral science graduates who enter the workforce, and (2) to advance knowledge and understanding of the social and behavioral sciences throughout our citizenry. This report is an outgrowth of that ambition.

The purpose of this report is to provide guidance to NSF on the development of a strategic plan for education and training in the social, behavioral, and economic sciences based on extant information and extensive consultation with the scientific community.[4] The report offers concrete recommendations to improve education and training in the social, behavioral, and economic sciences at each of four levels of the education process—K-12, undergraduate, graduate, and postdoctoral and early career stages. It aims to identify steps that can make a difference in SBE education in the short- and long-term.

[4] The report is undertaken in response to a request from the National Science Foundation for advice and guidance in the development of a strategic plan. Also, the report is relevant to and challenges educational institutions and administrators at each education level and at different types of institutions (e.g., public and private, 4-year colleges and universities; minority serving); scientific societies and professional organizations; and SBE academic departments, schools, and research institutes. Nevertheless, the focus of the report is on NSF and how, through its leadership role, extant funding programs, and potential new initiatives (including in partnership with other institutions), it can work to advance education and training in the SBE sciences.

The report is written in the form of an action plan. For each level of education, the report presents a brief assessment of the current situation in terms of key needs, impediments and challenges, and illustrative best practices in SBE education. The components of an action plan are then set forth, focusing on (1) NSF educational initiatives especially ripe for a fuller integration of the social and behavioral sciences,[5] (2) initiatives or programs for NSF to consider, and (3) some immediate steps to signal and facilitate change. The report also addresses diversity as a key component in the training of a scientifically literate workforce across all levels of the education process.

Fit with NSF Priorities

NSF's interest in greater attention to SBE education and training complements two priorities in the Foundation's five-year strategic plan (FY 2003-2008). First, NSF's *Workforce for the 21st Century* initiative aims to deepen understanding of the pathways to scientific and engineering (S&E) careers and to ensure both a broad talent pool and excellence in S&E education. A key element of this NSF effort is to prepare a workforce to meet the demands of a technologically and scientifically advanced society. Second, NSF has designated *Human and Social Dynamics* as a key topic for scientific attention to address the profound and rapid changes affecting every aspect of daily life. This initiative addresses significant arenas of change—from the demands placed on the human mind to the functioning of complex multi-national organizations that constitute the bedrock of the world economy. While the SBE sciences have the expertise, knowledge, and tools to contribute to both initiatives, a major commitment to education and training in these sciences would yield considerable payoff.

Steps Toward a Strategic Plan for SBE Science Education

In 2002, as part of adopting *Human and Social Dynamics* (HSD) as an NSF priority area, the SBE Directorate initiated explicit consideration of the need for education and capacity building in the social and behavioral sciences. The Directorate decided to pursue planning on this issue concurrent with the launch of the HSD initiative. The Education and Human Resources Directorate, concerned also with improving and broadening human capacity in all fields of science, indicated a commitment to work with the SBE Directorate on this challenge. In joining this activity, the EHR Directorate hoped to identify significant opportunities for EHR and SBE collaboration, given the growing recognition of the centrality of the SBE sciences to addressing some of the most pressing issues facing society.

As is often the practice within the National Science Foundation, the SBE Directorate took several steps to engage the wider scientific community in developing a strategic plan for improving education in the social, behavioral, and economic sciences. On January 16, 2003, representatives from approximately 20 social and behavioral science societies attended a Planning Meeting at NSF to discuss the state of education and human resource development in their fields and to lay

[5] While the report focuses on opportunities within a large number of extant NSF programs, the intent is to illustrate a more general need for intentional consideration of the SBE sciences in current or future initiatives.

the groundwork for a National Workshop on building scientific capacity and increasing public literacy in the SBE sciences. The National Workshop, held on June 12-13, 2003 in Washington, DC, generated the ideas and recommendations that form the basis of this report.

To help with the development of a strategic plan, the NSF sought the widest possible guidance. SBE disciplines (e.g., anthropology, economics, psychology, sociology) and interdisciplinary fields (e.g., child development, communications, demography, education research) were included whether or not they had identifiable, separate programs in the SBE Directorate. Also, the education community was included at all levels from kindergarten to continuing career development. In addition, NSF determined that it would not itself lead this activity. Accordingly, NSF turned to the authors of this report, through a grant to the American Educational Research Association (AERA), to assist in planning the National Workshop, to direct the Workshop, and to prepare this report.

Planning Meeting of Scientific Societies

The January 2003 Planning Meeting convened by the SBE Directorate brought together representatives of scientific societies to examine education and training needs in the disciplines and specialties they represent. The purpose of the one-day meeting was to (1) learn about the state of education and human resource development across the SBE sciences; (2) share information on the education and training programs and activities of each association; (3) identify needs and opportunities at all educational levels; (4) provide advice on key issues to be weighed in organizing a National Workshop; and (5) consider how education and human resource development should be infused into the emerging NSF initiative on *Human and Social Dynamics*. All of the participants contributed materials for a briefing book that provided useful background for the meeting.

This one-day meeting yielded substantive ideas and information and revealed widespread enthusiasm for convening a National Workshop to identify and address systematically needs, opportunities, strategies, and recommendations for building human capacity. Participants agreed that intentional consideration of education and training in the SBE sciences was critical to ensuring an adequate talent pool of researchers. They also agreed on the need for increasing public literacy about the social and behavioral sciences.

Meeting participants identified specific needs of the social and behavioral sciences at various levels of the education process and highlighted key topics for further attention. Discussion focused on the need to reform curricula from pre-college through higher education, develop innovative approaches and employ new technologies in teaching, emphasize research-based experience and mentoring, enhance teacher training and instruction from K-12 through graduate education, and focus much more on professional development throughout the education process, including at the postdoctoral level and beyond.

The National Workshop

The June 2003 National Workshop on "Improving Education in the Social, Behavioral, and Economic Sciences: A National Dialogue" was a first-ever event focused on capacity building in the SBE sciences (see Appendix A). Approximately 120 leading social scientists and educators participated in this "working" meeting (see Appendix B). As set forth in the agenda, the first day was designed as a series of plenary sessions with brief presentations and open discussion of the major themes and issues to be addressed in the action plan. The second day consisted of four breakout sessions in which participants engaged in intensive discussions about ongoing programs, innovations, and opportunities at the different stages of education: K-12, two-year and undergraduate, graduate, and postdoctoral and career development (see Appendix C).

From the outset, attendees understood that the meeting was aimed at providing advice and counsel that could form the basis of a plan of action for education and training in the SBE sciences. To prepare for the meeting, participants were provided with readings and data on the topical issues to be considered at the Workshop (including the materials prepared by the scientific societies for the January Planning Meeting). The plenary sessions were intended as catalysts for the more focused work that would take place in the breakout sessions.

The breakout sessions were structured around the core issues to be addressed in this report. From the vantage of an educational level, each group examined key needs in SBE education and training, best practices that could make a difference, impediments to overcome, extant NSF programs especially ripe for the fuller integration of the social and behavioral sciences, and new initiatives or strategies that should be considered over the short- and long-term. In addition, all groups were asked to address diversity in students, faculty, and the scientific workforce. Participants were also encouraged to record their ideas on any issues they thought merited additional consideration.

This approach to the Workshop was quite helpful in the preparation of this report. Attendees came from many different disciplines and fields, from diverse backgrounds and institutional settings, and with different levels and types of experience. Those assembled were anchored on the task and discussed, debated, and distilled what they knew and thought with remarkable candor and agility. While the Planning Meeting and all of the background materials were very useful, the deliberations at the National Workshop provided the basis for this report. Thus, in the truest sense, this plan of action to improve SBE science education and training is a collective work reflecting the ideas and input of many experts.

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