

Science of Learning Centers Response to the 2009 COV report

The Committee of Visitors (COV) convened on March 9-11, 2009 to review the Science of Learning Centers (SLC) Program. The COV was led by Dr. John King who chaired the committee of 9 members. Committee members were selected for background and expertise reflecting the multidisciplinary nature of the program, as well as for management and evaluation experiences relevant to large-scale research centers.

The 9 members met in plenary and in issue-focused sessions, the latter being aligned with key questions included in the COV report template. The process also consisted of presentations by SLC Program Directors, Q&A sessions, and discussions with SLC Program Officers, SLC Coordinating Committee members and SLC Co-Technical Coordinators. On the third day, the COV reported out to Dr. David Lightfoot, Assistant Director of the Directorate of Social, Behavioral, and Economic Sciences (SBE), and Dr. Judy Sunley, Deputy Assistant Director of SBE in an open session that was attended by the SLC Program Directors, SLC-Coordinating Committee members, and SLC Co-Technical Coordinators.

The SLC Program is extremely grateful for the care and thoughtfulness the committee brought to this important service to the National Science Foundation, and for the leadership of Dr. John King in chairing this process. We share the Committee's belief in the ambition and transformative potential of this program; and we deeply appreciate the insights and suggestions that the COV provided to help us meet the significant challenges that such a program also presents. The following responses consider and address each recommendation made by the COV.

Recommendation #1 : Continue and Expand the Program

We are greatly encouraged by the COV's recommendation to continue and expand the SLC program, and by the committee's recognition of the Program as an essential long term investment in our nation's capacity to innovate. We point to the international recognition the program has received, and can report strong interests from groups in Australia, Japan and Europe who have expressed a desire to emulate the Program's activities.

Advances in fundamental knowledge about learning will have broad and deep societal impacts. The SLC Program constitutes a comprehensive and systemic approach to catalyzing and supporting a new interdisciplinary field, the Science of Learning. We aim to continue development of the SLC program as a strategic framework to produce innovations in science, technology, education, and workforce preparation. We expect to capitalize on the unique opportunities and added value conferred by the large-scale and long-term funding that is characteristic of centers. In addition, we will take advantage of

the shared scientific focus of the six centers on the study of learning in its many dimensions. This coherence of purpose promotes shared interests across centers, which presents unique opportunities for enhancing activities in research, education, and knowledge transfer to bring about even greater synergy and possibly to change the nature of how work is done.

There are many exciting possibilities to choose from in moving forward. However, the program budget is limited and significantly *reduced* from previously projected levels.

What follows are priorities to: **a) continue** existing activities that have proven productive and/or effective, and **b) expand** and/or further develop other activities we know to be critical for the SLC Program to achieve its full potential, and for the SLC Network to function effectively as a national and international resource.

a) Continuation of existing investments/activities

A primary activity for 2010 is preparation of five SLCs to seek NSF and NSB approval of continued funding. This includes renewal of funding for Years 6-10 for the three cohort #2 centers which would then be in Year 4 of operations, and renewal of funding for Years 7-10 for two cohort #1 centers, which would then be in Year 6 of funding.

Continuation of the following key activities is important for the vitality and functioning of the SLC Program.

- Inter-SLC Student Workshop. This student-initiated activity has been highly successful in stimulating cross-center collaborations, exchange of information and sharing of resources, including best practices for student participation in governance at centers. Importantly, it has also fostered a strong sense of community among the students, which is a source of personal and professional support likely to last throughout their careers.
- PI meeting. This annual event for about 100 participants facilitates exchange of information, sharing of resources, and exploration of collaborative opportunities between centers. It has been a very effective venue for the centers to share ideas and resources, often instantiated in collaborations that are mutually beneficial and that avoid duplication of efforts. More recently, as the centers become more established, discussions have extended to how the SLC network can play a role in catalyzing and sustaining the development of a cross-disciplinary science of learning.
- Annual meeting with evaluators. This annual meeting provides a venue for the centers' independent evaluators to exchange ideas and methodologies, and for NSF to provide guidance about how the evaluations can be made as useful as possible to the centers and to NSF.
- EAGERs, RAPIDs, workshops and supplements. Although the level of funding through these mechanisms is relatively low, previous awards have been very productive. For example, supplements to existing NSF awards (non-SLC awards) have engaged other researchers in the work at the centers, thus increasing the value of the centers as national resources. Workshops on

key themes of research in the SLC portfolio (Science and Engineering of Learning, Language Learning and Education, Educational Neuroscience) included participation from key members of the larger research communities to add perspectives and to identify important new directions for future research. A workshop to target an important but understudied area (Art, Creativity and Learning) stimulated a number of excellent SGER and supplement applications that were funded by the SLC Program. Such awards will help to build capacity for research in this and other areas not represented in the SLC portfolio, as the research communities prepare for future Centers competitions and other NSF support.

b) Expansion of the SLC Network of Centers as a national and international resource to anchor and sustain a multidisciplinary community focused on learning. This expansion is discussed below in terms of *Infrastructure Development*, *Pathways of Expansion* and *Program Strategies* to accomplish the above.

Infrastructure Development:

At this juncture, it has become apparent that development of infrastructure for the program as well as for the network of centers is critical to the Program's ability to realize the full scope of its mission. Some specifics:

- *Infrastructural support at the programmatic level* could offset some of the workload difficulties arising from insufficient staffing for the program, and enable more efficient coordination of center management and monitoring functions, e.g. contractors to support the program by gathering summary data from the centers, and creating an SLC network website that provides information about the centers, enables on-line reporting, and facilitates knowledge dissemination and outreach to stakeholders.
- *Cyberinfrastructure for research and communication.* The SLCs are generating vast amounts of data that could be of use to other centers and the larger research communities. Additional resources are needed to further develop cyberinfrastructure to support data management and sharing, large scale analysis and communication. Program staff will work with the NSF Office of Cyberinfrastructure (OCI) to explore options, and will encourage SLC members to seek funding from OCI programs to meet their needs.
- *Infrastructure to facilitate transfer of research findings to influence educational practice.* Several key resources (e.g. expertise, tools, organizational support) are required for the successful implementation of research findings in classroom practice. This is a complex challenge that suffers from a dearth of successful models. In collaboration with the centers and the E&HR Directorate, the SLC Program will undertake an

analysis of these issues to formulate strategies for helping the SLCs achieve maximal impact along the research-to-educational practice continuum.

- *Establishment of internal (NSF) mechanisms to improve public awareness of SLCs* through regular dissemination of SLC activities and accomplishments using a variety of media. This includes working closely with the NSF Office of Legislative and Public Affairs (OLPA) to coordinate the centers' publicity efforts with OLPA and its media outlets.

Pathways of expansion:

We are working to expand the capabilities of the network of centers as a learning organization, with individual centers as nodes in the network. Our plan is to be strategic in capitalizing on expertise and potential research synergies within the SLC network and, where needed, to seek expertise from elsewhere to leverage current NSF investments. This includes expanding the network beyond the US by strengthening the centers' existing international partnerships, and by adding new partners to deepen expertise and broaden the SLC portfolio. Specifically, we will:

- *Encourage new partnerships and encourage the centers to seek new resources* to facilitate coordination of inter-center research along directions of mutual benefit. For example, language learning is studied in all six centers even though the principal focus of each center is distinct. New partnerships that can fill gaps in expertise will also be encouraged.
- *Extend domestic nodes to include international nodes of relevant activities* that will enhance research, training and knowledge transfer opportunities for SLC awardees and students. We will encourage the centers to strengthen and expand their international connections through more frequent and sustainable student/faculty exchanges, and to seek additional resources through proposal submissions to OISE programs. We will build on the momentum of strong interests from Australian researchers who would like to host a Science of Learning workshop in 2010, in collaboration with the SLC Program. We will take this opportunity to bring together the SLCs and all other major international efforts in science of learning, to further develop an international network for exchanging information, coordinating efforts, and sharing resources.
- *The SLCs provide an exceptionally rich environment for student training in multidisciplinary research, leadership training and teamwork.* We will encourage the SLCs to expand their student training efforts by acquiring additional resources through proposal submissions to other programs such as REU Site, IGERT, etc.
- *Encourage the SLCs to develop new paradigms of support to sustain the centers after NSF funding is terminated.* A meeting with the presidents of center partner institutions is being planned.

Program Strategies:

The SLC Program is planning a retreat in late fall of this year (2009) to undertake strategic planning for implementation of the above activities. This meeting will include the SLC Program Directors, members of the SLC Coordinating Committee, SLC Co-Technical Coordinators, and SLC administrative staff. Given the budget constraints in the immediate future, the program will seek creative ways to supplement program resources through partnerships with other NSF units and funding agencies, including:

- *Partnerships with relevant NSF directorates* to facilitate and support knowledge transfer at centers, for example, with E&HR to connect research and educational practice, and with ENG to connect research with technology development.
- *Partnerships with other Federal agencies.* For the last 4 years, the SLC Program has received \$600,000 per year from the Office of Behavioral and Social Science Research (OBSRR) of NIH to support the addition of health-related research projects to existing SLCs. This is the final year of the arrangement. The SLC Program will seek additional partnerships with NIH and other Federal agencies, including DARPA, ONR, Department of Education, NEH, and NEA.

Recommendation #2: Do not hold another competition until the results of the current efforts have been more fully assimilated.

The SLC Program concurs with this recommendation. There are no plans for another competition in FY2010.

Recommendation #3: Do not merge the SLC Program with other center programs.

Plans are underway to move the budget and management of the SLC Program into SBE, which will help to maintain its autonomy. This reorganization also entails a partial distribution of center funds to research directorates involved in the management of an SLC. It is hoped that infusion of funds to collaborating directorates would provide incentives for inclusion of SLC Program responsibilities in the normal workload of the SLC co-technical coordinators who have full programmatic workloads within their own divisions.

Recommendation #4: Rethink the nature of “evaluation” as applied to SLC Program participants:

Progress since COV: The SLC Program appreciates the COV’s sensitivity to how NSF evaluation and reporting mechanisms may have unintended negative effects on the performance of centers. In response to the COV recommendation to be more flexible in

addressing the challenge of monitoring the centers, we are experimenting with a new format for the annual site visit review process. This has been implemented in our site visits this year, and feedback from centers and site visit reviewers has been highly enthusiastic and positive. Key elements of the new format include:

- PI's are encouraged to undertake self-reflection on how the center has evolved, to identify its strengths and weaknesses, and are given the option to provide input into selection of issues to be discussed during the site visit.
- Pre-visit teleconference with site team members to better clarify review criteria particularly on issues of added value, and integrative nature of the center.
- The on-site process now includes less presentation time, more time for dialogue and discussion, and a session on the last day for the site visitors to provide feedback directly to the centers (an open report-back session).
- The Site Visit Report template consists of questions for review team response. These questions explicitly request information about added value, integrative nature of the center, and follow-up on important issues specific to each center.