

**Staff Response
To the Committee of Visitors (COV) Report**

Course, Curriculum, and Laboratory Improvement (CCLI) Program

COV Meeting of September 24 - 25, 2009

**PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES
AND MANAGEMENT**

Reviewer Methods

Reviewer Comments

A.1.3 COV Recommendation:

The COV recommends providing mentoring for new panelists along with providing them with examples of exemplary reviews.

Response: We have recently begun conducting webinars for all reviewers and will explore mechanisms for follow-up on site for new reviewers and ways to alert new reviewers to the value of the webinars in helping them produce good reviews. In addition, in our emails to reviewers announcing the webinar, we will stress the importance of the webinar as a tool to help them in writing their reviews.

Panel Summaries

A.1.4 COV Recommendation:

Panel summaries sometimes appear vague when the positive and negative comments are part of one large paragraph. The COV prefers a summary format that describes strengths and weaknesses in different sections.

Response: We will work with the panelists to ensure greater clarity on this issue in the pre-panel webinar and in our on site written and oral instructions to the panelists and during the panel discussions and editing of the summaries.

Jacket Documentation

A.1.6 COV Recommendation

The COV suggests gathering information about resubmitted proposals following program officer mentoring.

Response: Currently there is no formal mechanism for tracking resubmitted proposals.

Integration of Research and Education

A.3.2 COV Recommendation

The COV recommends continuing efforts to ensure that proposers reference leading-edge research to improve capabilities and facilitate course improvement.

Response: This is a useful suggestion and, in both the Program Solicitation and in presentations made as outreach efforts, we will emphasize the importance of referencing leading-edge research and will include reference to some pertinent examples within the Solicitation.

Inter- and Multi-Disciplinary Projects

A.3.5 COV Recommendation

To increase the balance and success of the program portfolio, the COV suggests providing guidance to assist PIs in planning interdisciplinary proposals. Ideally the proportion of interdisciplinary projects in Phase 2 and Phase 3 would increase due to the need for more students trained to work across disciplinary boundaries.

Response: We agree that all STEM fields are becoming increasingly interdisciplinary in their approach and note the increase in interdisciplinary proposals we are receiving. In addition, there is an increase in interdisciplinary approaches appearing in proposals submitted as disciplinary. We will continue to encourage and guide such efforts.

Disciplines and Sub-Disciplines

A.3.10 COV Recommendation

The funding of interdisciplinary projects is commendable and high. The COV feels the program would further benefit from additional resources aimed at technical support to enhance evaluation and to conduct longitudinal studies of program effectiveness.

Response: In our current planning of a formal program evaluation, we will ensure that interdisciplinary efforts are monitored and assessed both for those projects that have been declared as interdisciplinary and for those submitted to specific disciplines but have strong interdisciplinary aspects.

Underrepresented Groups

A.3.11 COV Recommendation

The COV recommends finding ways to increase the number of proposed activities that focus on broadening participation in STEM disciplines, especially among women and minorities.

Response: This is a problem we have noted and tried to address in various ways, with some modest success as attested to by the increase in such proposals over the three years under review. However, we agree that there is room for improvement and will try to make targeted efforts to ensure we reach and work with communities that would be likely to submit such proposals. Efforts will also be made to raise the awareness of all potential submitters of the importance of these issues. These efforts will include attention to such issues in the Program Solicitation and in presentations made as outreach efforts. We will also explore targeting workshops to groups who currently are not submitting proposals.

Program Management

A.4.1 COV Recommendation

The COV suggests developing a method of longitudinally measuring the impacts of grants well beyond the funding period (say five and ten years later) to strengthen understanding of the effectiveness of the program.

Response: As we develop the formal evaluation for CCLI, we are exploring ways to include this type of study within it and are aware that it will be a challenge. As we proceed with the formal evaluation, we will examine the feasibility of conducting such an effort.

Responsiveness to Emerging Research & Education Opportunities

A.4.2 COV Recommendation

The COV suggests the program could benefit from increased funding to support the program's priorities.

As noted in Section C the COV encourages the program to continue to strengthen the research base of proposals by emphasizing this requirement and encouraging proposers to see their contribution as part of a cumulative process of innovation.

Response: We agree.

Responsiveness to Prior COV Comments and Recommendations

A.4.4 COV Recommendation

The COV recommends improving student laboratories as part of projects that use innovative methods to increase student learning.

Response: We agree that innovative approaches and incorporation of modern techniques are important components of student laboratories and, along with updating equipment, we will insist upon updating teaching approaches in such laboratories. This has been a priority in the STEM disciplines we support and will continue to be a priority.

PART B. RESULTS OF NSF INVESTMENTS

Transformative Practice

B. 1 COV Recommendation

The COV applauds the NSF CCLI program for its efforts to disseminate advances using a variety of vehicles including such initiatives as the National Science Digital Library (NSDL).

Efforts to determine the effectiveness of the dissemination activities would be helpful. These efforts should promote a culture of advancing scholarship built on previous knowledge.

Response: We agree and are including this within the components of the formal evaluation currently under design.

Technology to Improve Learning

B.2 COV Recommendation

The COV recommends making sure that a balance exists between learning and development of new technologies. Include findings of these balances in annual reports.

Response: We recognize that this is an issue but believe that it is best handled when making funding decisions and will continue to aim to maintain a good balance.

Research Infrastructure

B.3 COV Recommendation

Increased attention to cyberlearning, consistent with the NSF-wide effort to advance this area would be desirable.

Response: We are gratified that you have noted our efforts during the three years under review. There has continued to be an increase in proposals that employ cyberlearning in those competitions conducted after the years reviewed by this COV and we are continuing to encourage that both in the Program Solicitation and in outreach. That NSF has made cyberlearning one of its priorities has helped raise recognition of its value to STEM undergraduate learning.

PART C. OTHER TOPICS

Areas of Improvement

C.1. COV Recommendations

BROADENING PARTICIPATION IN STEM: The COV commends the program for developing and hosting proposal writing workshops for community colleges and minority serving institutions. These workshops clearly have had a positive impact on the number and quality of proposals subsequently submitted and will ultimately assist in broadening participation in the stem disciplines.

We encourage the program to expand these efforts, especially to institutions who serve diverse populations of students. Additionally, we suggest the program find ways to increase the number of project activities focused on broadening participation in the STEM disciplines, and to get PIs to document how their intellectual contributions are broadening participation in the STEM disciplines. Since the percentage of minority students at community colleges is substantial, increasing NSF funding at the community colleges for projects that serve to increase minority participation would be transformative.

Response: We are glad the COV has noted current efforts and plan to expand them to meet the needs of the target audience mentioned above.

INCREASING INNOVATION ACROSS THE UNIVERSITY: Developing faculty expertise is a key component of the cyclic model for knowledge production and improvement of practice in teaching and learning. However, evidence of transformations in faculty practices is low.

The COV suggests seeking better models for professional development. To increase effectiveness, proposers can build on successful programs from a wide range of professional development programs in precollege, industry, and university settings. Research suggests better results occur when instructors use evidence from success and failure to customize innovations. Drawing on findings which show that short, one-time, summer programs are generally ineffective, we encourage professional development efforts to create programs that provide mentoring and encouragement over a period of time, and support a process of iterative refinement.

We suggest asking projects offering faculty development workshops to track evidence showing that learning materials and teaching strategies (that have demonstrated success in their original contexts) have been disseminated to new educational settings or adopted more widely. Efforts to show that programs lead to change in instructor practices are essential. We would like to know whether changes in instructor practice also extend to changes in student learning. Many educational evaluation methods are available to investigate this important question including cohort comparison studies, studies of the efficiency of instruction, and dose-response studies.

Response: We agree that there is evidence that professional development efforts that provide mentoring and encouragement over a period of time and include a process of iterative refinement appear to be effective and we take this under consideration when making funding decisions. We agree that it is beneficial to continue to gather and disseminate such evidence concerning effective professional development practices and will strengthen such efforts in the future. In the program evaluation currently under design we will include specific items to address these issues.

EVALUATION RESEARCH: **The COV feels the program would benefit from additional resources to support an effort to provide technical support for evaluation and to conduct longitudinal studies of program effectiveness.**

Response: We welcome the suggestion for additional resources and, in addition to setting aside some program funds for this effort, have been given some additional resources from the directorate to do so.

Additional Goals and Objectives

C.2 COV Recommendation

The COV recommends an increase in the travel budget. This increase would allow program officers to be more effective in managing their complex programs.

Response: We acknowledge this suggestion as well and will share with management. We will continue our efforts to do the best we can with the resources available.

Agency-Wide Issues

C.3. COV Recommendations

We note that the program officers often mentor proposers to add evaluation and design components that incorporate contemporary ideas about learning and instruction. We encourage the continuation and strengthening of this effort.

Ultimately we hope that the CCLI work will contribute to a progressing research program that has broad implications for college teaching. For example, many proposals address the challenge of making large undergraduate courses more relevant to the lives of students. It would be helpful to consolidate the results of these studies and ensure that the general findings have an impact on future projects. Programs such as REESE can fund this sort of work as can educational research studies in CCLI.

Similarly, many proposals seek to use new technologies, and to make laboratories or other active learning experiences more effective. A synthesis of work in this area, drawing broadly on upper level precollege and college experiences from earlier CCLI studies could strengthen these studies. Ultimately encouraging development and use of open-source learning environments would be effective.

Response: It is our intent that the program evaluation currently under design will examine the feasibility of contributing to the types of synthesis studies outlined above. In addition, we will explore the possibility of conducting analyses that reveal important common themes and/or issues such as: effective teaching approaches in large introductory classes, and wise use of technology to improve undergraduate STEM education. We currently encourage research on undergraduate education both in this program and others at NSF in coordination with the REESE program. We will continue to encourage increased dissemination of findings through publication and presentations at appropriate venues, such as through STEM and education professional societies. We also will continue to encourage potential PIs to cite and ground their proposals in such findings. We are glad you have noted our current efforts to do so and will continue to strengthen the efforts you have noted above.