

## Lobbying for Discipline-based Education Research

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This working group began its discussions with an assessment of the current state of funding for physics education research (PER). Most PER work is funded directly or indirectly by the National Science Foundation (NSF), primarily through the Directorate for Education and Human Resources (EHR). Within this Directorate three separate divisions fund physics education work, although the funding programs—and therefore the projects that are funded—rarely designate research explicitly as a primary objective. The Division of Elementary, Secondary, and Informal Education (ESIE) funds teacher preparation and curriculum development projects targeted at grades K-12, while the Division of Undergraduate Education (DUE) funds course, curriculum, and laboratory development projects for college and university-level instruction. Research in the teaching and learning of physics is sometimes a component of these projects, and many PER groups are able to partially support their research endeavors by linking them to the development projects funded by ESIE and DUE. A similar situation exists for education researchers in chemistry, geoscience, and other science disciplines.

Projects with a primary focus on research are funded by the Division of Research, Evaluation, and Communication (REC). Although individual projects funded by REC generally receive substantial amounts of support, only a very small percentage of REC-funded projects have a focus on physics education (approximately one in 20), or for that matter any specific science discipline. Most funding goes to researchers with back-

grounds and interests in K-12 math and science education, cognitive science, educational psychology, school systems administration, etc. PER and other discipline-based research groups have found it very difficult to persuade review panels and program directors in REC to designate significant amounts of funding for discipline-based education research. Moreover, the new federal budget proposed this year for NSF incorporates very substantial budget cuts for REC, and this leaves the future of NSF-funded science education research very much in doubt.

Very recently, the Division of Undergraduate Education has established new funding programs within its broader Course, Curriculum, and Laboratory Improvement (CCLI) program specifically targeted at discipline-based education research. Although this new program has yet to make its first set of awards, it represents a promising development in the establishment of ongoing funding mechanisms for research in physics education and similar fields.

Finally, it should also be mentioned that the NSF Directorate for Physical and Mathematical Sciences (MPS)—the home of funding in traditional research fields in physics, chemistry, astronomy, and mathematics—has taken a few tentative steps to participate in funding discipline-based education research. Several modest projects in PER have been funded by MPS over the past few years and, although these projects represent a potentially important first step, the future of such MPS funding remains very uncertain.

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The assessment of the Working Group was that the overall funding situation for discipline-based education research, and specifically for PER, remains poor with an equally dismal prognosis. In terms of the funding levels that are actually required to establish, maintain, and develop a new subfield of physics research on a national basis, there is currently no mechanism in place nor is there any projected for the future that could meet the need.

Ironically, coexisting with the dismal funding situation for discipline-based education research, there are vast amounts of funding being provided to education and outreach projects. For example, the GK-12 program and the Math and Science Partnerships (MSP's) together represent many millions of dollars in current funding. PER workers have often found it very difficult to persuade program directors and project leaders in these programs that expertise in discipline-based education research may be crucial to achieving and documenting success in science education. Similarly, very large funded projects (for example, Science and Technology Centers) are mandated to devote 20% of their total budgets to education and outreach, once again with little contribution by specialists in discipline-based education research.

The Working Group concluded that our funding objectives can be characterized by two distinct themes: (1) the need to increase total federal expenditures on science and science education (a "bigger pie"), and (2) the need for a larger proportion of such funding (relative to present levels) being devoted to discipline-based education research (a "bigger slice"). The Group felt that such increased funding for this research was well justified based on the unusually large educational impact that such targeted funding may achieve for relatively small amounts of funding dollars. Past experience has shown that PER projects have been able to achieve significant learning gains for very modest amounts of funding, and this point merits heavy emphasis in discussions with political leaders and representa-

tives of the science and science education communities.

The Group recognized that the objective of obtaining a bigger pie would require dissemination and constant re-emphasis within the political community of the message that good science—widely recognized as essential to the security and development of the nation—requires good science education; this theme has already been taken up to some extent by the NSF and the National Science Board, among others. This political effort can include lobbying of federal Representatives and Senators through a coherent effort of individuals. Members of the APS Forum on Education are drafting talking points and brief information sheets for members to use when talking to their congresspersons. Additional measures might include a blitz of congress (following the model of high energy physics) with preparation by APS lobbyists. Lobbying of federal powers-that-be by APS itself is a long-term objective; getting science education included in APS lobbying efforts will be a lengthy and (possibly) contentious effort due to perceptions of "turf-infringement," etc.

The Group proposed that the objective of achieving a larger slice might be addressed by lobbying of NSF powers-that-be by a delegation of PER luminaries, and physics luminaries who are sympathetic to PER, in close collaboration with representatives of the education research communities in astronomy, chemistry, mathematics, geoscience, and engineering. This lobbying effort would need to make the case that support for discipline-based education research is well merited based on vast and long-standing evidence that it is actually effective.

Finally, the Group discussed a number of concrete steps that individual APS members might initiate on their own: These include nominating members of the PER community for leadership positions within APS and other professional scientific organizations, voting in favor of PER

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candidates in AAPT and APS elections, and participating in meetings of APS, NARST, and other organizations.

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