

# Committee on Education

## Annual Report 2000

The members of the Committee on Education (COE) for 2000 were: Ronald J. Bieniek, E. Dan Dahlberg, Kenneth C. Hass (Chair), Kenneth J. Heller, Theodore W. Hodapp, Andrea P. T. Palounek, Helen R. Quinn, Richard A. Saenz (Vice-Chair), and James J. Wynne. Laurie E. McNeil also served as a temporary liaison to the National Task Force on Undergraduate Physics (NTFUP), and Paul Hickman served as a consultant.

The COE met twice during 2000: on April 16-17, at APS Headquarters in College Park, MD, and on October 21-22, in Chicago, IL. Ken Hass also represented the COE at several related APS committee meetings: the Committee on Careers and Professional Development (CCPD, February 25), the Physics Policy Committee (PPC, September 7), and the Executive Board (September 23). During the course of the year, in response to a request from the COE, the APS Bylaws were changed with regard to statutory membership by elected officers of the APS Forum on Education (FE<sub>d</sub>); in the future, instead of the FE<sub>d</sub> Councillor, the Past-Chair of the FE<sub>d</sub> will serve on the COE along with the FE<sub>d</sub> Chair-Elect and Chair. By ensuring that *all* COE members will then serve for three years, with three new members rotated in every year, this change is viewed as a major step toward improving the relationship between the COE and the FE<sub>d</sub>, which has continually evolved toward greater clarity and synergy since the inception of the FE<sub>d</sub>.

### Activities for 2000

The COE focused this year on reinforcing the two main initiatives it began last year (A and B), on advising the APS leadership on the issue of science education lobbying (C), and on monitoring and assessing a variety of other issues and developments in physics education (D):

#### A Preparation of K-12 Science Teachers

The COE had already made the pre-service training of science teachers a high priority with its endorsement of the 1999 Intersociety Statement urging the physics community to become more active in this area. The COE was encouraged to see the same theme emphasized in two important 2000 reports: the National Research Council's (NRC) [Educating Teachers of Science, Mathematics, and Technology: New Practices for the New Millennium](#), and the Glenn Commission's [Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century](#). Out of the 1999 statement grew the APS/AIP/AAPT PhysTEC program, which aims to improve the training of science teachers by promoting joint efforts between physics and education departments. The COE continued to support [PhysTEC](#) this year by keeping abreast of its progress, suggesting improvements, and initiating complementary activities. To help identify best practices, the COE compiled a list of NSF-supported programs for K-12 science teachers and delved more deeply into three prominent physics content courses for elementary education majors: [Physics By Inquiry, Powerful Ideas in Physical Science, and Workshop Science](#). In the process, the COE gained a greater appreciation of the lack of adequate techniques for assessing the effectiveness of such programs. The COE also explored the hiring practices of four high schools with national reputations for excellence in science (e.g., New York's Bronx HS of Science) and concluded that even these

schools tend to hire locally and cannot identify either any exemplary science teacher training programs or the ingredients of one.

A more ambitious COE effort focused on surveying the requirements for K-12 science teacher certification in all 50 states. This effort was led by Ted Hodapp, who had recently been instrumental in helping the state of Minnesota move to a competency-based system and ensuring that the new requirements were aligned with the latest understanding of physics pedagogy. At the COE's urging, Ted documented his experiences in Minnesota for publication as a "how to" guide in the FEd newsletter (Fall 2000 issue). Initial inquiries by the COE in other states revealed an anticipated diversity of requirements in different states and at different levels within K-12, as well in the accessibility of information. The COE thus decided to narrow its full survey to the certification requirements for high school physics. The COE's goal is to identify those states where the requirements are currently being reexamined or changed and where a proactive intervention by APS members might be particularly welcome and effective. The state of Washington, for example, intends to establish a high-quality route to alternative certification; the COE has thus begun to mobilize and educate a grassroots effort in that state to try to influence the process and outcome. The assessment of the current situation in all 50 states will be completed by early 2001. With that information as a guide, the COE hopes to work closely with the FEd to recruit local volunteers and to develop effective strategies for proactive statewide intervention by the physics community. The COE believes that the teacher certification requirements represent a high-leverage focus area that may be particularly susceptible to APS influence. Activity in this area tends to be less publicized and political than the well-known controversies over statewide science education standards.

## **B Information Brokering**

The other major COE initiative begun in 1999 was a more concerted effort to fulfill the COE's charge (in the APS Bylaws) to "improve cooperation between the education community and other parts of the physics community." The COE routinely encounters education information that should be more widely discussed throughout the physics community, but actively engaging the entire APS membership (~90% of which is not affiliated with the FEd) in those discussions has been challenging. Toward that end, the COE stepped up efforts this year to establish and experiment with different mechanisms for brokering information more effectively between the physics education and physics research communities. It first identified the need for a more comprehensive listing of physics education resources and an associated search engine on an APS web site. This recommendation was quickly acted upon by the APS Education and Outreach Department and webmasters, and the COE has continued to suggest improvements and additions.

The COE also initiated contact with and attempted to identify education liaisons in all APS Divisions and Sections. The response from these units was encouraging. Many Divisions already have active education committees and activities of their own and were receptive to the idea of participating in a broader education network to enhance the flow of information and the sharing of best practices. Similarly, many Sections have a strong interest in education, but expressed a need for guidance on suitable topics and speakers for local meetings and on other ways in which they might contribute. The COE encouraged these units to work with the FEd to sponsor joint education sessions at meetings (preferably at times that don't conflict with unit technical sessions) and to recruit volunteers for unit education activities (e.g., from the database generated

by the FEd membership survey discussed below in section D). The COE also put in a plea for all physicists to become more active in the politics of science education (section C below) and promised to maintain contact with unit liaisons in 2001.

To further expand its influence and awareness, the COE maintained regular contact in 2000 with the CCPD, NTFUP, and a Panel on Public Affairs (POPA) subcommittee on the "Health of the Profession." The COE endorsed the latter group's proposal of either a special issue or ongoing series with that title in APS News, with a strong emphasis on education issues. If that effort proceeds, the COE will most likely assist in the selection of suitable topics and authors. The COE also discussed the possibility of initiating one or more online listservers or moderated discussion groups to promote further discussion of specific education issues within the broader physics community. No action was yet taken, but the idea of establishing a pilot project of finite duration, ideally to follow some significant event that sparks interest in the topic (e.g., a department chairs' conference or new faculty workshop), continues to be viewed as the most promising way to proceed.

### **C Science Education Lobbying**

With input from the COE and the FEd, the mission of the APS Public Affairs Department was expanded this year to include lobbying for improved K-12 science education in addition to lobbying for federally-funded research. The COE is very pleased with this development and expects to play a major role in establishing future APS priorities in this area. The COE spent considerable time at its fall meeting redrafting the APS Statement on K-12 Science and Math Education that had been proposed by POPA as an initial APS platform for education lobbying. Most of the COE revisions were motivated by a perceived need for the APS to recognize and respect the sensitivities of teachers and others in the education community to implied criticism and other language subtleties. The COE also helped to expand and prioritize the document's specific recommendations to federal legislators and presidential transition teams. Looking forward, the COE hopes to work closely with the Public Affairs and Education and Outreach Departments to pursue a proactive agenda and to react quickly to other proposed legislation. (At its spring meeting, the COE did endorse a proposed APS response to the science education bills submitted by Rep. Vern Ehlers, but the committee felt that the information provided to it and time allowed for deliberation were less than adequate.) Should the Public Affairs Department desire additional background information on any of the recommendations in the above-mentioned Statement, the COE would be happy to prepare supporting "one-pagers" and/or to gather and forward other relevant material.

As already mentioned in A and B, the COE has also begun to explore mechanisms for promoting grassroots political involvement by APS members in federal, state, and local education issues. The COE views this as an important complement to lobbying by the APS Washington office. With the transition to a Republican Bush administration, action at the state and local levels is likely to be even more essential in the fight for high quality science education for all citizens.

### **D Other**

The COE and the FEd interacted very effectively this year, and neither seemed to suffer from the 1999 decision to forego joint meetings. With three FEd Executive Officers on the COE, the two organizations continued to exchange essential information and suggestions, but the COE had

more time to focus on its own agenda. The COE was particularly pleased to see the rollout of the FED membership survey and contributed ideas on its content. The resulting database will be a valuable resource for future APS political and other physics education activities. As one example, the COE proposed using this database to recruit volunteers to satisfy the expressed needs of local science museums. To identify those needs, the COE initiated contact with the American Society of Science-Technology Centers.

The COE looked briefly into the issue of physics Ph. D. revitalization. Andrea Palounek represented both the COE and the APS at a cross-disciplinary April conference on this subject at the University of Washington, sponsored by the Pew Charitable Trusts. To support the same study, the COE solicited feedback on innovative physics Ph.D. programs, but received little response. A few universities have established mechanisms for combining some type of business training with a traditional physics Ph. D., but for the most part, physics Ph. D. programs have been considered much more successful than undergraduate or K-12 physics programs in the US, so there has been little incentive to tamper with them. The COE looks forward to being briefed next year on the results of an ongoing AIP study of professional physics masters programs, where there is much more activity at present.

Another issue the COE began to examine is the value of high school Advanced Placement (AP) courses in physics. The COE is concerned by the growing tendency for high schools and states to use the number of AP courses offered and numbers of students taking them as measures of success. Some COE members expressed concern on two fronts about the Physics B AP test: first that few colleges accept it as a replacement for any physics course, and second that, by its nature it limits the teacher to a rigid test-preparation style of teaching which does not serve well to enhance students' interest in physics. The COE plans to continue gathering and assessing data on this issue before recommending a specific APS role or position.

Finally, the COE responded as usual to a number of miscellaneous developments as they arose. For example, after learning of a soon-to-be-released decadal NRC report on physics education, the COE consulted with the report's authors to satisfy itself that most recent issues of concern to the COE (e.g., physics education research, changes in the physics requirement for "[ABET](#)" accreditation of engineering programs) were adequately addressed.

Respectfully submitted,  
Kenneth C. Hass  
Chair, Committee on Education