Science Education—Déjà Vu Revised

A lineup of top Administration officials at a convocation at the National Academy of Sciences (NAS) joined a consensus that deterioration in science and mathematics education is a serious national problem, but reaffirmed President Reagan's stand that the federal government should not take a leading role in meeting the crisis.

The dilemma thus posed for would-be reformers was the central issue in both the National Convocation on Precollege Education in Mathematics and Science sponsored by the academies of science and engineering and a conference of AAAS-affiliated organizations seeking to lay the groundwork for a coalition to work on science and math education. Both meetings were held in mid-May in Washington.

Administration recognition of the importance of the problem was indicated by the presence at the opening session of the academy convocation of two Cabinet officers, Defense Secretary Caspar W. Weinberger and Education Secretary Terrel H. Bell; the director of the National Science Foundation (NSF), John B. Slaughter; and White House assistant Edwin L. Harper, who delivered a message to the convocation from President Reagan.

The key portion of the President's message was that "This administration has deliberately suspended what had become a proliferation of small federal programs which—taken together—showed themselves to be ineffective in stemming the slide in science and math performance that has been evident for at least a decade. Today's situation didn't develop overnight, but over a period of many years—in spite of all of these federal programs." Improvement depends on the involvement of business, labor, and universities and a change in public attitudes, said Reagan. "The answer lies in the imaginative initiatives undertaken to bring together all levels of the private and public sectors to achieve the goal we all share."

It was clear in comments from the 600 attending the convocation—largely representing education, labor, and business—that most saw the federal initiatives prompted by the launching of the first Soviet sputnik in 1957 as a model for action. Allusions to the National Defense Education Act of 1957 and, especially, NSF programs of curriculum reform and teacher retraining abounded. The Administration's advocacy of a grass-roots approach to reform drew a skeptical if generally polite reaction from those who argued, for example, that the high stakes in international competition and the mobility of American society make necessary a strong federal role in assuring improvement nationally.

Diagnosis of a crisis in science and mathematics education met with no disagreement. In recent years, the decline in achievement scores on student tests and the drop in enrollments in high school science and math courses have been well documented (*Science*, 7 Nov. 1980, p. 615). Although teacher shortages have been reported, less detailed information has been available on the supply and quality of teachers of science and math. In a background paper for the academy convocation, Stanford professor emeritus Paul D. Hurd provided data on present and future teacher shortages. A survey of 600 teacher training programs in the 1970's revealed "1) a 77 percent decline in the number of secondary school mathematics teachers being trained and a 65 percent decline in science teachers; 2) of those trained to teach science or mathematics, a decreasing number go into teaching, choosing business or industry instead. Nationwide, of the teachers employed by high schools to teach mathematics or a science for 1981–1982, 50 percent were unqualified and were teaching with emergency certificates."

If the task of improving the quality of science and math education were not sufficiently formidable, problems of equity also arise. Test scores of children of college-educated parents and those who attend suburban schools have held up quite well over the past decade. In science and mathematics, scores lag for girls, members of minority groups, and the physically handicapped.

NAS president Frank Press said in his introductory remarks that the convocation was not concerned primarily with preparing children to be scientists and engineers but rather with "educating a citizenry that is scientifically literate, that is numerate, that understands the nature of engineering." To accomplish this, many of those who spoke at the convocation noted that reform measures will have to take into account what Hurd called "socioeconomic and cultural factors" and the serious financial plight of many urban and rural school districts.

On the question of a federal role in reform, or the lack of it, Press expressed the view that the Administration had not completely shut the door but was open to "good ideas." He noted that national commissions formed by the Reagan Administration to advise both the Department of Education and NSF would shape future federal policy on precollege education. *Scientific American* publisher Gerard Piel, as convocation summarizer, perceived a sharper conflict between Administration officials' view of a limited federal role and that of the convocation majority, in whom he detected "strong sentiment that the [postsputnik] partnership should be revived."

The AAAS meeting was aimed at exploring the possibility of establishing a coalition of affiliates for science and mathematics education. Interest in the effort was attested by attendance of representatives of some 60 association affiliates. F. James Rutherford, AAAS chief education officer, said that the conference had produced agreement that creation of a short-term communication system to serve the affiliates on education questions was desirable as well as establishment of a coalition to take longer term action on science and mathematics education. Rutherford noted that many "pragmatists" at the conference were inclined to take at face value Administration opposition to an expanded federal role in reform of science and mathematics education and wanted to "get on with it at the state and local level."

Certainly, plenty of nostalgia persists for the federal initiatives of the sputnik era. But the situation has changed, for example, with the presence of new players in the game such as state governors and business executives concerned about a work force competent to staff high-technology industry. Those concerned with salvaging science and math education must decide whether to seek a new formula for reform or simply, so to speak, to reinvent the wheel.

—JOHN WALSH

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