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# Performance Evaluation of Academic Research

Congressmen and administrators are responsible for seeing to it that government R & D funds are spent effectively and that misuse does not occur. Since it is not possible for them to judge the value of the output of scientific research, they have tended to emphasize what they can understand, namely monetary accountability for funds.

Performance measurement in research, even by experts, is difficult and controversial. The difficulty in evaluating performance in federally supported R & D has led, step by step, to the present unsatisfactory state of effort reporting. Although it is easy now to see that things are not right, no consensus has developed on how to correct them.

Three classes of evaluation instruments exist for measuring the effectiveness of research, namely effort planning, indirect performance measures such as the citation index, and direct performance evaluation. For those who have not had their fill of effort reporting, the new federal regulations contained in Office of Management and Budget Circular A-110 provide a surfeit.

Effort reporting is fundamentally flawed as an instrument for measuring either the quality or the quantity of research. What reputable academic scientist would permit students to count hours spent in the classroom or used in attempts to do assignments as an indication of readiness for a degree? What scientist, when refereeing a journal paper or an NSF research proposal, cares how many hours it took to do the research or to prepare the document? Only performance should count in scientific research.

Undoubtedly, there is resistance in the research community to the concept of direct evaluation of the quality of research. Such a suggestion may raise the spectre of a corps of federal bureaucrats who evaluate research results and control funding. But this is highly unlikely. There is ample evidence that peer evaluation is a practical and effective basis for continued funding. The peer review process would permit disassembly of the costly government bureaucracy that deals with effort reporting and a reduction in the indirect cost (overhead) now added by universities to contracts.

Peer review is not only fair and in the best tradition of science, but it has several ancillary benefits. Membership on a review board serves to keep members in touch with current trends and with promising young scientists. One of the problems recognized by NSF is that investigators sometimes pay insufficient attention to final reporting requirements. If the investigators know that reports will be evaluated by a panel of their peers, with a view toward continued funding, final report quality will immediately improve.

Since this concept is an obvious extension of current best practice and apparently has few, if any, drawbacks, why has it not been tried? The answer is that it has, and it works very well. In the 1960's, the Department of Defense initiated an electronics research program with about a dozen outstanding university electrical engineering departments. Each principal investigator participated in site visits to the other grantees to evaluate progress and to recommend on renewal. On the average, four 2-day visits would take place in a year. During these visits, graduate students and postdoctorals were encouraged to make their own presentations, and the sharp grilling that followed was more challenging than many Ph.D. orals. This keen honing improved the quality of electronics research throughout the nation. The 3-year, step-funded grants and the lack of programmatic restrictions made the program very attractive, and applications for admission mounted.

Why is this program not functioning today? All parties were satisfied with its cost effectiveness, and undoubtedly it would have been expanded and utilized in other Defense Department research programs, but in 1969 the Mansfield amendment forbade the defense agencies to support basic research, and the program had to be discontinued.—JOHN E. GIBSON, *Commonwealth Professor and Dean, School of Engineering and Applied Science, University of Virginia, Charlottesville 22901*