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13 August 1968

Teaching Effectiveness and Research Productivity

Bresler, in his article "Teaching effectiveness and government awards" (*1*), has presented data that seem to explode the myth, current in some quarters, that research productivity (as measured by publications and receipt of support from both external and internal sources) somehow detracts from teaching effectiveness in the classroom. The trends in general indicate that faculty members, whether in the sciences or the humanities, who are active and productive in research are perceived as more effective in their classroom performance than their colleagues who are not so active in research.

Notwithstanding the reasonableness of Bresler's final conclusion, there are several deficiencies in the data that seem to dilute the force of his argument. Some of these are deficiencies in the methods of collecting data—or at least in these methods as presented in the article—and others are deficiencies in the analysis of the data. (i) It is well known that many students take two or more courses within their own field in any given semester; hence, the returns used as the basis of computing means and standard deviations for faculty receiving research support as compared with those receiving no support, and so on, are not independent of each other. The degree of overlap between, or among, the samples should have been reported and discussed before any conclusions were drawn. (ii) No attempt was made to analyze the differences between means for various possible contrasts through use of a suitable statistical test. Although several of the differences are substantial, it is difficult for the reader to judge how dependable they are. (iii) On the basis of the information presented in Bresler's Tables 1 and 2, it is not possible to run any appropriate statistical tests, since it is not known whether the standard deviations Bresler reports represent variation within classes, variation across teachers' means, or some other estimate. Even if one assumes that Bresler's statistics are based on all ratings for all faculty in a category, it is still difficult to compute exact significance tests for contrasts across faculty groupings, since ratings in these categories concern unequal, and often highly disproportionate, numbers of faculty.

Thus, despite the fact that trends in the descriptive data tend to favor the conclusion that the college faculty active in research are judged by their students as superior in classroom performance to those of their colleagues who are less active in research, one can hardly consider this any more than a reasonable hypothesis worthy of proper experimental scrutiny and very likely to win confirmation.

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10 June 1968

My comments on Quereshi's three points, in order, are as follows: (i) His hypothesis of a departure from statistical independence is based on the assumption that there was systematic inter-rater bias. We cannot now determine whether or not such a bias was actually operative in the Tufts study. The summary student evaluations per course were available to me in a form which did not permit determination of the intercorrelation between the ratings given different courses by the same student. However (ii), the lack of independence—if there really was such a lack—would not affect the expected value of the mean scores but would affect the variance of the distribution of estimates. Since some students undoubtedly rated both supported and nonsupported faculty, the variance of the differences in means would be much less affected by correlated observations than by the variances of the means themselves. The data ought to be viewed as a descriptive case study of the performance of Tufts University. A significance test would not add much. (iii) It is not clear whether Quereshi uses the word *classes* to represent courses or statistical groups. If the latter, the answer, of course, is variation within classes. In Table 1 of my article, 640 represents the number of student returns for 15 courses taught by 13 faculty members.

Quereshi's sympathetic concluding statement about "experimental scrutiny" prompts these further comments. Reflection will show that a study such as the one undertaken at Tufts cannot be made in the overwhelming majority of American universities and colleges because at most such institutions there are simply not enough faculty members holding government awards to provide an adequate test. Conversely, in the top-ranking 20 or 30 universities, such a large number of the faculty members hold such awards that it would be equally difficult to make adequate tests in these institutions.

One should have at least 15 faculty members in each cell under evaluation in a two-by-three arrangement representing support versus no support, and representing sciences, social sciences, and arts and humanities.

This by no means exhausts the conditions for a "proper experimental scrutiny." Yet, due to Tufts University's position in the select company of the 100 institutions receiving the most government funds, even these basic requirements were not totally met.

There are very few institutions in the United States where a study under "proper experimental scrutiny" could be made at this time. Hence, I, like Quereshi, would welcome further data, even though fragmentary, on a problem which has evoked much heat.

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22 July 1968