ChE letters

Survey Relates Quality Ratings to Teaching Load

Sir:

We have made a survey of the graduate education effort of the 58 departments of chemical engineering in the United States that were evaluated in the Roose-Anderson report on Graduate Education. Thirty replies were received and the Roose-Anderson rating of each department was used to divide the departments into groups of departments whose ratings are 17 and below (best), 18 to 38 (better), and 39 to 58 (good). Use of the Roose-Anderson rating was merely a convenient means of making the division into groups and is no indication of *our* judgment of the quality of the departments involved.

The summary table shows average values for the requested information within each rating group (good, better, or best) and an overall set of averages. The survey

Averages of Reported Values (Spring 1973)

Roose-Anderson Rating	39-58 (good)	17-38 (better)	1-16 (best)	Overall
Number Responding	9	11	10	31
Number of:				
Professors	5.3	8.4	7.5	7.0
Associate	2.5	4.0	2.5	3.0
Assistant	1.4	2.8	2.3	2.2
Average Class Load	6.3	5.9	4.7	5.6
Number of:				
Ph.D. Candidates	15.4	20.7	28.9	21.7
M.S. Candidates	15.2	26.2	20.5	20.6
Number of Degrees granted:				
Ph.D. (5 yrs)				
M.S. (5 yrs)	43.0	63.8	73.4	62.7
B.S. (5 yrs)	106.0	166.3	176.3	157.1
Fellowships:				
Fed., Number	1.3	2.2	5.2	3.2
$	3,357	6,395	35,914	15,216
Ind., Number	2.9	5.7	5.2	4.6
$	9,962	21,904	33,016	22,005
Other, Number	0.3	1.6	2.0	1.3
$	986	7,650	8,412	5,714
Number of:				
Research Assts.	13.8	18.2	28.2	20
Teaching Assts.	4.0	6.2	7.7	7
Research Grants (1972-73 exp.):				
Fed., $	70,898	248,233	231,357	187,485
Ind., $	24,578	46,216	44,842	38,437
Other, $	1,111	5,555	53,365	20,153
Papers Presented (5 yrs)	40	52	72	53
Journal Pub. (5 yrs)	86	86	188	120
Max. Allow. Stipends:				
Teaching Assts., $	3,500	2,853	4,603	3,460
Research Assts., $	3,525	3,066	3,977	3,521

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. . . graduate work offers specialized training which can result in a high degree of productivity. In addition there is some opportunity to get acquainted with the hardware for doing research and the hardware of a production plant . . . especially . . . when the graduate is required to do a research thesis.

The larger companies often have sophisticated organizations of specialists. Those companies prefer to provide needed specialized training and on-the-job training. By so doing, the company is able to better set standards for applying fundamentals according to proven methods. Supervisory training is certainly best obtained on the job.

The starting salary is greater for a man with an advanced degree. In the case of the PhD, the starting salary is quite often a restriction. The PhD has another difficulty in being able to fit into a training program at a company which might feel awkward in assigning the man to a young supervisor of lesser degree.

Possible Ways to Improve the Image of Graduate Level Training

I believe the university must depart from an emphasis on peer group ratings and accreditation institutions and turn an ear towards the needs of industry. On the other hand, industry must express its needs to the universities and supply ratings of the industries based on their ability to turn out the type of people that are needed by industry. This could occur in the way of participation in accreditation institutions. To encourage more emphasis on applied fundamentals, industry should participate more actively in providing temporary work for professors during sabbaticals and summer vacations. Industry should continue to participate and encourage cooperative programs for undergraduate students to produce graduate students with some practical experience, whereas the universities should provide more exposure to industrial hardware and practical use of new fundamental tools.

Summary

Some graduate level work is valuable for making an employee productive sooner. It provides a better understanding of how to apply fundamental concepts; it tends to aid in building professional maturity and job satisfactions through better pay and job preparedness.

On the other hand, there seems to be a trend away from practical applications of fundamentals which are of primary concern to an employer. As a result of this trend and the higher starting pay offered to graduate students, the Master's level appears to be an optimum level to this author. There are added social problems related to the hiring of a PhD which limit his opportunities.

It is believed that the image of graduate level training would be improved and its value enhanced if industry would more clearly state its needs to the universities. Joint participation by industry with the universities in accreditation institutions might be a start in this direction.

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indicated, for instance, the general levels of degree output, fellowship support, grant support, and paper and publication production for schools in the three rating categories. The distribution of support among federal, industrial, and private foundation sources was also indicated. A few especially interesting statistics are (1) the inverse relation of teaching load to graduate quality, (2) the large average number of federal fellowships held by the best departments, (3) the relatively low level of research support given all departments by industry, (4) the relatively high rate of publication by faculty at the best departments, and (5) the relatively high stipends for teaching and research assistants at the best departments.

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