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ABSTRACT

Presented are statistical data from the National Science Foundation fall survey of Graduate Science Student Support. This survey included graduate schools with master's and doctoral programs in science, engineering, and medicine. (SA)

SCIENCE RESOURCES STUDIES HIGHLIGHTS

NATIONAL SCIENCE FOUNDATION WASHINGTON, D.C. 20550 NOVEMBER 30, 1979 NSF 79-321

S.E.

Graduate Science Enrollment in Doctorate-Granting Institutions Leveled Off in 1978

The statistical data presented in this report are the results of the National Science Foundation's (NSF) fall 1978 Survey of Graduate Science Student Support. The survey universe included 8,242 graduate science and engineering (S/E) departments at 316 doctorate institutions. In all, 418 schools or reporting units were surveyed—285 graduate schools and 133 medical schools. Both master's- and doctorate-level departments participated in the survey. Estimates for nonrespondent departments represent only 2 percent of the total graduate S/E population at doctorate institutions. The term "science" as used here is understood to include engineering and the term "graduate enrollment" refers to the total of full- and part-time students.

Highlights

- Total graduate enrollment in S/E programs increased less than 1 percent at doctorate-granting institutions in fall 1978. A sample of university officials and representatives of the higher education community contacted by NSF attribute this slowdown to a number of factors: (1) increases in tuition rates have made it more difficult for self-supported students to bear the cost of graduate school; (2) declines in G.I. benefits have reduced the number of veterans who enroll in graduate programs; and (3) increased job offers to bachelor's-degree candidates in some fields have made graduate S/E programs less attractive.

- The most significant change in graduate science enrollment occurred among first-year graduate students who declined by 7 percent—a drop three times as large as that reported for first-year graduate students in all fields of study. This drop can be partially explained by the decrease in the number of baccalaureate degrees conferred in science fields during the 1976-77 academic year, down 4 percent from the previous year. As a result of the first-year enrollment decline, overall full-time enrollment in S/E programs declined by less than 1 percent. Continuation of the large first-year decline, however, will produce more significant decreases in full-time graduate S/E enrollment in the ensuing years.

- The number of full-time graduate science students primarily supported by Federal funds increased 2 percent in 1978, continuing the pattern of slow but steady growth since 1974. This increase occurred when doctorate institutions were experiencing a 5-percent rise (in constant dollars) in federally supported R&D expenditures, continuing a 4-year trend in which Federal support increased an average of 3 percent per year.

- Part-time enrollment in graduate S/E programs at doctorate-granting institutions increased by 3 percent between 1977 and 1978, continuing a trend that has shown a 32-percent growth since 1974; this pattern occurred during a period in which continuing adult education has been encouraged at all institutions of higher education.

Graduate Enrollment Patterns

Graduate science enrollment at doctorate institutions showed relatively little overall growth in the fall 1978 semester from the previous year. Surveys of total graduate enrollment in all fields conducted by the National Center for Education Statistics (NCES) and the Council of Graduate Schools (CGS) indicate a similar no-growth period; in fact, total graduate enrollment at all institutions of higher education was reported to have declined slightly according to both surveys.[1] When data were examined by type of institution, however, the CGS survey showed that its Ph.D. member institutions experienced an increase of less than 1 percent in all programs, similar to that measured in science programs by the NSF survey (table 1).

Several data sources reveal some significant contributing factors to the leveling off of graduate science enrollment in 1978. For example, G.I. benefits were reduced and a 13-percent drop was reported in total graduate veteran enrollment in all programs in fiscal year 1978.[2] Also, the College Placement Council reported

[1] Department of Health, Education, and Welfare, National Center for Education Statistics, *Survey of Opening Fall Enrollment*, annual series (Washington, D.C.) and Council of Graduate Schools, *CGS Communicator Special Report #15* (Washington, D.C., December 1978.)

[2] Veterans Administration, *Information Bulletin: Fiscal Year 1978 and November 1978*, IB 04-79-2, appendix II, table 1 (Washington, D.C., April 1979.)

Table 1. Graduate science enrollment in doctorate-granting institutions by area: 1978

Area of science	1978	Percent change 1977-78
Total, all areas	312,000	0.7
Engineering	69,200	−.6
Physical sciences	25,000	−.9
Environmental sciences	11,900	1.1
Mathematical sciences	21,600	2.9
Life sciences, total	85,300	2.6
Agricultural sciences	12,200	−.2
Biological sciences	42,800	−.6
Health sciences	30,300	6.7
Psychology	27,900	−1.3
Social sciences	74,000	−.5

Note: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation.

that bachelor's-degree candidates received 17 percent more job offers in 1978-79 than they received in 1977-78, while students at both the master's and doctoral levels had fewer offers than the previous year.[1] Based on national survey data on degrees awarded there were reductions in the number of baccalaureate degrees granted in S/E fields, resulting in smaller numbers of students in the "pool" eligible to enter graduate school.[2]

On the other hand, a number of factors acted as counterforces to those mentioned above. For example, Federal obligations in support of fellowships, traineeships, and training grants increased by 11 percent between fiscal years 1977 and 1978.[3] The 2-percent rise between fall 1977 and fall 1978 in the number of full-time graduate S/E students receiving some form of Federal support at doctorate institutions can be associated not only with increases in these obligations but also with the 5-percent rise (in constant 1972 dollars) in federally funded R&D expenditures at these same institutions in fiscal year 1978.[4]

Full-time Enrollment

Doctorate-granting institutions reported a very small (less than 1 percent) drop in full-time enrollment in fall 1978 (chart 1). Engineering and the life and environmental sciences were the only areas that increased in full-time graduate enrollment, while psychology and the social sciences showed the largest relative declines—down 4 percent and 2 percent, respectively, from the previous year (chart 2).

There has been considerable variation in annual percent changes in full-time first-year graduate S/E students—up 8 percent in 1974-75 and 3 percent in 1976-77 compared with a 2-percent decline in 1975-76. This cyclical pattern of growth and decline continued into fall 1978 when first-year full-time graduate S/E enrollment declined 7 percent to the lowest level since 1974. Students enrolled beyond the first year in full-time S/E programs continued to increase, up nearly 4 percent. This growth is consistent with the findings of a related study which reported on efforts universities and colleges are making to retain students in programs once they are enrolled. Among the study findings was that retention of students is a top priority of institutions because of the predicted decline in the college-age population.[5]

Support Patterns

The pattern of diminishing Federal support that began in the early seventies forced students to turn to institutional, family and self-support to fund their graduate studies. By 1975 Federal sources were the primary support for only 23 percent of the full-time graduate S/E students (down from 32 percent in 1971) while the primary source of support for 37 percent of the students came directly from the institutions and through the institutions from State and local government

[1] The College Placement Council, *CPC Salary Survey: A Study of 1978-79 Beginning Offers*, Final Report. (Bethlehem, Pa.: The College Placement Council, July 1979.)

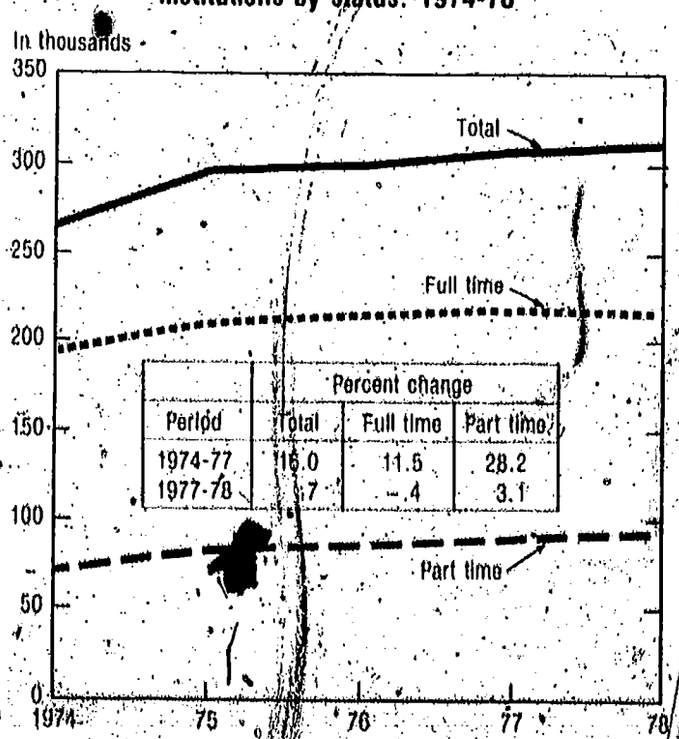
[2] Department of Health, Education, and Welfare, National Center for Education Statistics, *Survey of Degrees and Other Formal Awards Conferred*, annual series (Washington, D.C.)

[3] National Science Foundation, *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1978*: preliminary data.

[4] National Science Foundation, *Academic Science: R&D Funds, Fiscal Year 1978* [Detailed Statistical Tables] (NSF 79-320) (Washington, D.C.) In press.

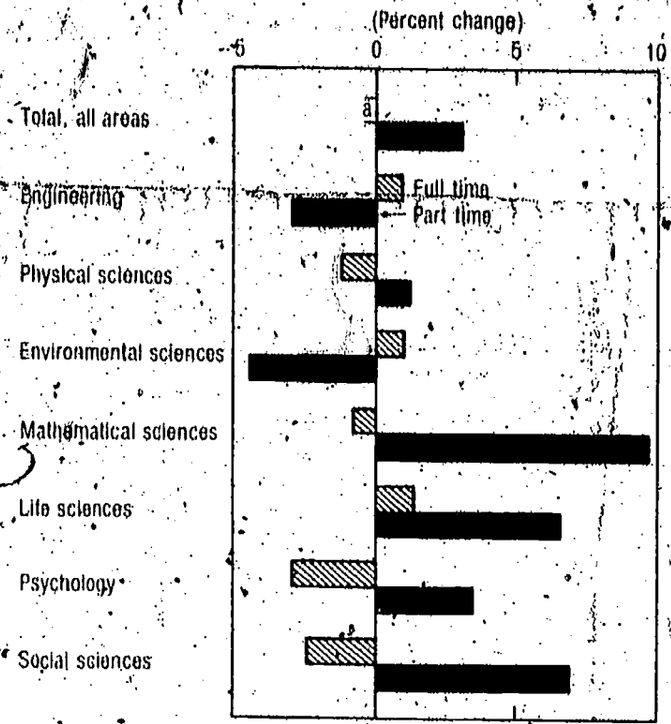
[5] American Council on Education, *Adapting to Changes in the Characteristics of College-Age Youth* (Washington, D.C., December 1978.)

Chart 1. Graduate science enrollment in doctorate-granting institutions by status: 1974-78



SOURCE: National Science Foundation.

Chart 2. Graduate science enrollment in doctorate-granting institutions by area of science and status: 1977-78



[a]Less than 0.5 percent change
SOURCE: National Science Foundation

sources. Another 32 percent were self-supported, and the remaining 8 percent received support from outside sources such as private industry, foundations, and foreign governments. These proportions have not changed markedly in the last half of the seventies despite fluctuations in the number of students supported by each source on a year-to-year basis.

The number of federally supported full-time graduate science students rose nearly 2 percent to 51,400 in 1978 (chart 3). The majority (42 percent) received their financial assistance from the various institutes or divisions of the Department of Health, Education, and Welfare (HEW) with over one-half of the HEW support coming directly from the National Institutes of Health (NIH). The health sciences realized the largest growth in both relative and absolute terms—up 6 percent to 7,500 students in 1978.

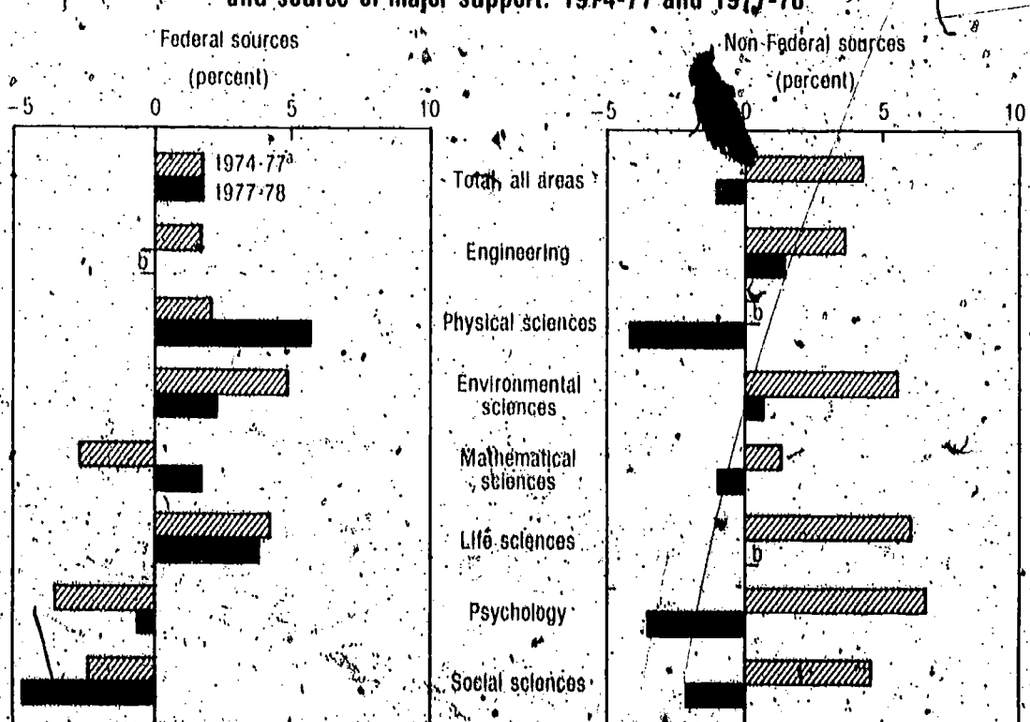
Increases were also reported in the number of graduate students receiving their major support from other outside sources including industry, private foundations, and all other U.S. and foreign sources. The 6-percent growth in the number of students in this group in 1978 covered all areas of science except the physical sciences, bringing their total to 19,300.

For the first time since 1974, the number of graduate students supported primarily by institutional sources, including support from State and local governments, declined slightly. A decline was also reported in self-supported students, following two years of stability and a 23-percent rise in the 1974-75 period.

Part-time Enrollment

The number of students enrolled part time in graduate S/E programs continued to increase, up 32 percent since 1974. Although the 3-percent rise in 1978 was one-

Chart 3. Full-time graduate science enrollment in doctorate-granting institutions by area and source of major support: 1974-77 and 1977-78



[a]Average annual percent change [b]Less than 0.5 percent change. SOURCE: National Science Foundation

half the rate of the previous year, it indicates a continuing trend that started in the early seventies. Part-time students in graduate science programs have become an increasingly important segment of the graduate student population; at doctorate-granting institutions, part-timers have increased from 23 percent of the total in 1971 to 30 percent in 1978.

Those increases are part of the overall change in enrollment patterns realized at all levels of education. NCES recently reported comparable growth in all fields at all institutional levels. Nearly 41 percent of the 11.4 million students enrolled in 1978 in all institutions of higher education attended part time, up from 38 percent in 1974 and 32 percent in 1971.[1]

Increases in 1978 part-timers were reported in all areas except engineering and the environmental sciences which experienced gains of 6 percent and 10 percent, respectively, in 1977. The largest absolute change occurred in the social sciences, up 1,600 to a total of 24,400 students in fall 1978. Mathematical sciences showed the largest percentage increase as computer science programs continued to attract large numbers of part-time students.

Public vs. Private

There was relatively little difference in the overall growth at public and private institutions; both realized small increases of less than 1 percent. When examined on a full- and part-time basis, however, some significant differences are noticeable. Full-time enrollment at public institutions declined 1 percent in 1978 following three years of successive increases; in private institutions, full-time enrollment continued to increase although at a slower rate than in previous years (up only 1 percent in the 1977-78 period).

The part-time segment took an opposite turn. In public institutions, part-time enrollment jumped 6 percent following a 5-percent rise the previous year; while privately controlled institutions declined 1 percent after a 10-percent increase the previous year.

[1] Department of Health, Education, and Welfare, National Center for Education Statistics, Survey Of Opening Fall Enrollment, op. cit.

Ranking of Institutions

The same 10 institutions led the Nation in total graduate enrollment in 1977 and 1978. The only change in rank occurred when New York University (NYU) dropped from fifth place in 1977 to ninth this year. The University of Southern California led in the total number of graduate science students for the second straight year. Their large part-time enrollment (55 percent of the total) significantly affected their ranking. Rutgers and NYU also had a large number of part-timers (table 2).

Table 2. Top 10 doctorate-granting institutions ranked on the basis of total graduate science enrollment: fall 1978

Rank	Institution	Total	Full time	Part time
1	Univ. of Southern California	7,000	3,200	3,800
2	Univ. of Calif.-Berkeley	5,500	5,300	200
3	Univ. of Wisconsin-Madison	5,100	4,500	600
4	Univ. of Minnesota	4,900	4,100	800
5	Ohio State Univ.	4,600	3,700	900
6	Univ. of Michigan	4,600	4,100	500
7	Univ. of Washington	4,400	3,400	1,000
8	Rutgers, The State Univ.	4,200	1,700	2,500
9	New York Univ.	4,200	1,600	2,600
10	Univ. of Illinois-Urbana	4,100	3,900	200

Note: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

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Academic Science: Graduate Enrollment and Support, Fall 1978 (Detailed Statistical Tables) (NSF 79-316) are available from the National Science Foundation, Washington, D.C. 20550. These tables present data collected from doctorate-granting institutions only. In alternate years, beginning in fall 1979, both master's- and doctorate-granting institutions will be surveyed. Analysis of those findings will be combined with those of two other university surveys in an integrated report that will appear biennially.

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