

TvsR Notes

NSF

Symbolic role of NSF

Teaching awards comparable to Waterman

Concerns

Increasing concern about the distortion of the culture by sponsored research policies.

We hear time and time again that there is a strong and possibly accelerating change in the culture of the professoriate that has led to an increasing withdrawal from undergraduate and often also formal graduate teaching by beginning as well as fully established researchers.

Attention to the impact on education of the dominant portion of the NSF budget, that for research, deserves at least equal attention to that devoted to SEE activity.

Present NSF policies

Important that NSF research policies actively encourage rather than passively discourage attention to teaching by the researchers NSF supports

Research with students is clearly part of the teaching function at the graduate level and is or should be becoming increasingly so at the UG level.

Excessive use of postdocs in research is just as bad as excessive use of GSTAs in undergraduate teaching.

Concern about overwhelming pressure now placed on beginning faculty as well as established faculty researchers to obtain support for a significant portion of their academic year salary from research grants can cause great distortion in their choice of research directions.

Proposals by the faculty and research performed by their students reflects primarily the amount of money available rather than the scientific value.

Excessive pressure to obtain funding absorbs enormous amounts of faculty time and pushes the teaching function into a secondary role.

Renewal proposals should be judged in large measure by the output of well educated and highly qualified graduate students.

Helpful also would be a limitation on the fractional percentage of funds permitted for postdocs for an academic program at a university.

The drive for the highest level of research productivity not only leads to the avoidance of formal teaching at any level, it often biases research teams to prefer postdocs to inexperienced graduate students who need so much informal instruction and nurturing...not to mention tuition.

What can NSF do?

NSF sets the tone for basic research support.

Hence NSF should be an integral part of the process of improvement of education at both the UG and graduate level...otherwise teaching will be thought of as an inferior activity instead of as the natural key accompaniment to research in a college or university setting.

Perhaps NSF should experiment with a variety of approaches to involve the research community in

the improvement of education and to discourage the cultural trends that are so disturbing.

Should we attempt to reach a consensus on whether or not NSF should attempt to intervene explicitly on this cultural issue to counter the effect now implicit in NSF policies.

Examples of interventions:

- i) Require each PYI to teach a one semester UG course each year, a one semester grad course, and serve as the research advisor for 2 graduate students as a minimum on average over 3 to 5 years.
- ii) Could also have a minimum educational commitment to instruction and the guidance of graduate students of PIs.
- iii) Might also encourage increased instructional participation by giving preference to instructional proposals by highly qualified research, in an effort to send the strongest possible signal that research and education are an integrated whole in the view of NSF.

An appropriation fraction of total support channeled directly to the better graduate students by means of sizable grants given through departments would help to produce an environment where the scientific challenge of the research program would be the attraction to the better students rather than the availability of larger amounts of funding from one agency or another for one purpose or another.

STIA Studies

Peter House, Division of Policy Research and Analysis
Study

Sample: Over 50,000 students majoring in S&E whose 1987 GRE score (quantitative and verbal) could be matched by ETS with SAT score

Variables: GRE, SAT, gender, race, UG major, UG school

Value Added: Average addition to a student's total GRE score associated with going to a particular school, irrespective of SAT, gender, minority, or UG major.

Taxonomy of Academic Institutions:

Doctoral 1: 20 largest R&D Performers

Doctoral 2: next 40 R&D performers

Doctoral 3: 125 remaining doctoral institutions

Education 1: 24 highly rated liberal arts colleges

Education 2: 80 largest feeders into NS&E PhD pipeline

Education 3: 1112 remaining 4-year colleges

Raw Results of Value Added

Doc 1: 43

Doc 2: 37

Doc 3: 19

Edu 1: 37

Edu 2: 12

Edu 3: 0

Results:

1. The most prominent research institutions have the highest average scholarly quality rating.
2. Doc 1 had the highest value-added, followed by Doc 2 (Note that even Doc 2 were higher than Edu 1)
3. Average education index is positively related to average number of S&E bachelors degrees awarded,

except for institutions granting more than 3,000 degrees annually (note that UM awards about 2,500, so it peaks for UM and UCB)

4. Average education index is positively related to R&D intensity as measured by R&D spending per undergraduate
5. Average education index is positively related to scholarly quality of faculty

Other points:

1. Doctoral institutions are only 13% of all institutions, but account for:
 - ...45% of total enrollment
 - ...nearly 50% of total degrees
 - ...over 90% of academic R&D
2. There does not appear to be much difference in undergraduate enrollment-to-bachelors degree conversion ratios among most institutional types (although a very modest advantage to Edu 1 institutions...but very modest)...
E.g:
 - Cornell: 90%
 - UM: 80%
 - Reed: 80%
 - T A&M: 80%
3. Within each institution type, per student spending declines from type 1 through type 3 (although Edu 1 is slightly higher than Doc 1).

Rosovsky

University college:

That part of a UNIVERSITY that offers undergraduate instruction and grants a bachelors degree.

At most institutions, UGs are outnumbered by grad and professional students... but they attract more attention to themselves...they like to leave the impression that they speak for all.

Key point: graduate, professional, and undergraduate education coexist in universities, and ordinary college students are a minority in a larger setting.

Contrasts:

Lib Arts Colleges

Faculty does less research.

Elementary presentations of an academic subject change slowly, and the pressure to remain up to date and to understand the frontiers of a subject is weaker

In colleges, the setting in which instruction takes place is intimate: small faculty, small classes, small student body.

Concerns about personality are magnified.

This yields teaching faculties of great competence, strongly motivated to help and support the undergraduate.

However there is little opportunity for instruction in lib arts colleges to rise above the elementary or intermediate level

University College

University colleges are the most exciting of all alternatives for those students

able to handle the challenge.

University professor is a different breed of cat.

He teaches UGs and graduates...

Universities are large, busy places.

Faculty range is very wide...clinicians,

layers, architects mingle with

scientists, economics, and philosophers

What matters greatly is the need or opportunity to coexist with a graduate school, the training ground of future generations of scholars.

Teaching and Research

Top university colleges share the strong and sometimes controversial belief that research and teaching are complementary activities;

That university-level teaching is difficult without new ideas and inspiration provided by research;

That than an ideal intellectual balance for the professor includes undergraduate and graduate instruction.

In general, university social contract is well understood:

Professors spend 50% of time on research, 25% on graduate, and 25% on UG instruction.

Combination of teaching and research is part of the university faculty identity.

The university professor is not a teacher who is expected to confine himself to the transmission of received knowledge to generations of students. He is assumed to be a PRODUCER of new knowledge, frequently with the assistance of apprentice graduate students, who transmits state-of-the-art knowledge to students at all levels.

Why would an UG want a research-oriented teacher?

i) Research is an expression of faith in the possibility of progress...a form of optimism about the human condition. Persons who have faith in progress and therefore possess an intellectually optimistic disposition are probably more interesting and better professors. They are less likely to present their subjects in excessively cynical or reactionary terms.

ii) By far the healthiest and most efficient methods of fighting burnout is research. A research-oriented faculty is less likely to be the home of intellectual deadwood. Active, lively, thoroughly current minds that enjoy debate and controversy make better teachers.

iii) It is difficult to evaluate the quality of teaching. It is far easier to evaluate the quality of research, and to base faculty selection primarily on research performance to lead to fewer mistakes. Both teaching and research should be taken into account, but research ability is a better long-term indicator.

iv) Besides teaching, the university professor does much else, writing, consulting, testifying, etc....but this can enliven teaching

Environment

At their best, university colleges are among the most exciting places on earth. Their professors have written the books that people talk about; they have

engaged in public controversies and have held vital public post.

They are at the center of the action.

Further, in leading university colleges, student bodies are national and international in scope. They are also contentious and accomplished, mirroring the faculty in the diversity of its interests and the range of political and social views. This

This is important since students learn a great deal from each other.

A distinguishing feature of university life is the presence of graduate students. Sometimes you hear the familiar refrain that while big names and famous professors are at top universities, most UG contact will be with graduate teaching assistants; callow and inexperienced youths, not infrequently foreigners who can barely speak English.

Rosovsky notes three of his TAs were Henry Kissinger, Zgibniew Brzezinski, and James Schesinger.

Graduate students are more thoroughly familiar with their subject. They are more likely to know the latest techniques and current controversies than their counterparts in the colleges.

Bok

Contrast:

A paradox: How can our system of higher education be regarded so highly abroad and still encounter such biting criticism at home.

Even in the most advanced countries, universities are typically overcrowded, overregulated, undercompetitive, and underfunded. Hence it is possible for American higher education to be preeminent in the world and still be open to serious criticism.

Hear repeatedly from foreign sources that American system of higher education is the best in the world in the quality of its research, the inventiveness of its educational progress, its accessibility to all segments of society, and its flexibility in adapting to the differing needs of a vast student population.

At a time when America's ability to compete is being challenged in many spheres, these achievements should be a cause for celebration.

Yet, surprisingly, critics in this country have attacked our universities more savagely during the last decade than at any time in history.

Examples:

"Underaccountable and underproductive"

"Sickening tailspin" and a "national disgrace"

"Undergraduate education is winding down toward mediocrity"

"The professors--working steadily and systematically-- have destroyed the university as a center of learning and have desolated higher education, which no longer is higher or much of an education."

Observers condemn:

Formless nature of UG curriculum

Lack of personal attention from senior professors
High classes broken into sections taught by
inexperienced graduate students
Low teaching loads
Flight from classrooms to research
High priced consulting, businesses, etc.
Cost of education
Gross materialism on part of universities
(fund-raising, lobbying, etc.)

Basic Principles:

What do we want:

- i) We want universities to produce research of a quality second to none so that we can enlarge our knowledge, renew our culture, and produce new insights to help us conquer disease, promote technical progress, and overcome our social problems.
- ii) Give young people an education that will prepare them to live productive lives; to be knowledgeable, critical members of our democratic society; and to appreciate the human experience and the world around them.
- iii) Want our colleges accessible enough so that all who seek education can find opportunities
- iv) Since universities are our principal source of expert knowledge and highly trained people, we need them to offer the kinds of education, advice, and critical analysis that society needs in order to prosper and move forward.

Different segments of higher education pursue these objectives in different ways. Research universities contribute to all of the ends above.

It is clear that America's highly decentralized system of 3,500 institutions accomplishes these goals far better than the government-controlled systems that predominate in the rest of the world.

Unless we are prepared to recommend another system, it makes little sense to condemn the one we have for shortcomings intrinsic to its very nature.

Teaching vs. Research

Next to college curriculum, no aspect of university education has provoked more complaints than the faculty's preoccupation with research at the expense of teaching.

It is widely believed that institutions slight their students when they emphasize research in making appointments and refuse to promote unproductive professors even though they are highly successful classroom teachers.

Those who speak up for teaching tend to dismiss research with hardly a word about the reasons that have led society to devote so many billions of dollars to its pursuit.

Little is said about its importance to society or its potential benefits for teaching.

Instead critics condemn the bulk of scholarly activity either as a sterile product of requirements imposed by philistine administrators or as a form of private pleasure that selfish professors enjoy at the expense of their students.

There are very strong incentives as well as needs for research...visibility, reputation, etc.

The critical question is whether universities are doing what they can to develop incentives and rewards for good teaching that will help to restore a healthier balance between teaching and research.

Contrary to popular opinion, the proper remedy is NOT to promote popular teachers who are undistinguished scholars. A vital part of a professor's job in a research university is to expand knowledge and train graduate students. Neither task is likely to be done well by individuals who have failed to show real talent for research by the time they reach the point of tenure. Besides, professors who publish little are unlikely to thrive in the atmosphere of a research university and often have less to communicate and less enthusiasm for doing so as time goes on.

Real Challenges

How do we create incentives that will produce the results we want.

How do we construct more compelling models of excellence so that different types of institutions pursue a diversity of important goals instead of seeking inappropriately to emulate research universities.

How can we develop measures to evaluate the quality of learning that will encourage universities to improve their educational programs and motivate professors to improve their teaching?

How can we create positive incentives and provide appropriate limits to keep faculty members from spending too much time away from the campus, while respecting the need to share their talents with the rest of society?

In all advanced societies, our future depends to an ever increasing extent on new discoveries, expert knowledge, and highly trained people. Like it or not, universities are our principal source of all three ingredients.