The Mythologies of Faculty Productivity: Implications for Institutional Policy and Decision Making

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The Mythologies of Faculty Productivity

Implications for Institutional Policy and Decision Making

Research accomplishment, the most "cosmopolitan" academic function, has social and economic value. Research visibility certainly enhances institutional stature among peers (Alpert, 1985). Political and public support for academic institutions, however, rests on the perceived institutional commitment to "local functions," especially teaching and learning (Ewell, 1994; Hearn, 1992). Legislative calls for accountability and effectiveness, and public concern about increasing costs and the potential adverse consequences for access clearly focus on the teaching mission. Many state legislatures have focused on faculty commitment to teaching often in terms of instructional productivity. Efforts to eliminate tenure by the governing boards in Arizona and Florida, legislation in Ohio to mandate an increase in the time faculty spend on teaching, and growing legislative interest in post-tenure review are specific expressions of this concern. The focus of this reform movement is not limited to public institutions. The National Science Foundation, which supports and influences both public and private institutions, recently required grant applicants to state how their research work will affect their teaching effort.

Much of the policy debate about the nature of faculty work is

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shrouded in myth, opinion, and conjecture. Critics of the perceived lack of emphasis on teaching in research universities may assume that this criticism applies equally well to teaching-oriented colleges, a questionable assumption at best. Parents, potential students, and even state legislators often overestimate the actual cost of attending college (National Commission on the Cost of Higher Education, 1998).

Yet the perceived inattention to teaching and learning, particularly at the undergraduate level, is not off base (Bok, 1992; Fairweather, 1996). Boyer (1990) acknowledged the legitimacy of this claim when he attempted to encourage institutional responsiveness to public concerns about teaching and learning. He advocated considering teaching as a form of scholarship to increase its status on college campuses. The American Association of Higher Education Forum on Faculty Roles and Rewards took Boyer's concepts a step further, encouraging institutional teams to foster changes in local faculty rewards.

The willingness and ability of academic institutions to respond effectively to these challenges is influenced by what Clark (1972) calls institutional sagas. These sagas contain a variety of beliefs or myths that help perpetuate organizational culture by socializing new participants (students, administrators, and especially the faculty) by establishing norms for their behavior. Among the set of beliefs held by many academic administrators and faculty members about the nature of faculty work and productivity are that (a) teaching, research, and service are activities imbedded in some form within each faculty member's work effort, (b) teaching and research are mutually reinforcing, and as a consequence (c) faculty can simultaneously be productive in teaching and research.

Other than hiring new faculty members, the principal expression of academic values about faculty work lies in the promotion and tenure decision. It is here rather than in institutional rhetoric that the faculty seek clues about the value of different aspects of their work. It is here that productivity is most meaningfully defined and evaluated. Yet promotion and tenure decisions are both individual and private in nature. These characteristics make it difficult to identify the cumulative effects of individual decisions within an institution, much less identify patterns across types of institutions and disciplines. The purpose of this article is to identify these larger patterns by examining national data that represent criteria often used in local promotion and tenure decisions or in annual faculty reviews. I am particularly interested in the belief that all aspects of faculty work—particularly teaching and research—can be equally (or somewhat equally) addressed by the work of each faculty member. This tenet asserts that each faculty member is expected to be (and can be) the *complete faculty member*—simultaneously productive in both teaching and research.

I created a decision model based on how a hypothetical promotion and tenure committee might judge a faculty member's teaching and research performance. For this model I developed productivity norms by discipline within type of institution using national survey data. Although even liberal arts colleges increasingly value traditional scholarship (Fairweather, 1997), the decision model is primarily applicable to master's, doctoral, and research universities. The quantitative model is limited because every promotion and tenure or annual review decision also takes into account qualitative assessments and judgment. Nevertheless, most reviews of faculty performance rely heavily on quantitative measures of productivity, especially ones having meaning across the disciplines.

Beliefs About Faculty Work

Teaching and Research: Mutually Reinforcing

As Crimmel (1984) points out, the teacher-scholar represents the ideal in American higher education. This ideal is purportedly perpetuated in the socialization and psychological predisposition of faculty members to pursue both teaching and research (Finkelstein, 1984). Blackburn and Lawrence (1995) epitomize this perspective in their model of faculty productivity. Their model places the greatest emphasis on self-knowledge, which includes personal interest, commitment, efficacy, psychological characteristics, satisfaction, and morale. Less important, according to Blackburn and Lawrence, is social knowledge, which includes social support, perceived institutional preference, and institutional values (e.g., rewards). Environmental influences have a tertiary role in their model.

Other authors also have emphasized the psychological and behavioral implications of faculty experiences. Bess (1978) claims that experiences during graduate school help shape the future faculty member's attitudes and behavior. Alpert (1985), Baldwin and Blackburn (1981), and Boice (1992) claim that the experiences during the early part of the faculty member's career also affect psychological development and orientation and thereby influence behavior.

The evidence in support of the intrinsic model of faculty behavior is less convincing than the arguments made in its behalf. Blackburn and Lawrence (1995), the leading proponents of this model, found that the most important factors in faculty research productivity were demographic characteristics (e.g., rank) and "behaviors," including external research funding. In other studies of faculty teaching and research behavior, respectively, Fairweather and Rhoads (1995) and Diamond

(1993) found rewards to be the strongest correlate of faculty behavior, not socialization or attitudes.

The belief in the teacher-scholar rests on several tenets:

> Teaching and research are seen as mutually reinforcing. From this perspective, the best scholars are the best teachers; the best teacher is a scholar who keeps abreast of the content and methods of a field through continuing involvement in research and who communicates knowledge and enthusiasm for a subject to students. (Fairweather, 1996, p. 100)

Feldman (1987) examined the theoretical bases for believing that research and teaching are mutually reinforcing behaviors. Most are versions of Linsky and Straus's (1975) "spillover effect," where, for example, faculty who conduct research are supposedly more likely to introduce research-based material into their classroom instruction. Feldman's review of more than 200 research studies found little relationship between student ratings of teaching excellence and various forms of research productivity (overall correlation coefficient of 0.12). Hattie and Marsh (1996) expanded Feldman's analysis and found an even smaller cross-study correlation (0.06). As I did before them (Fairweather, 1993), Hattie and Marsh found a negative relationship between faculty time allocated to teaching and time allocated to research.

In contrast, using in-depth investigation of a small number of faculty members, Colbeck (1997) found that teaching and research activities can overlap. For example, research is much more likely to overlap with independent study instruction or dissertation committee work than it is to influence classroom teaching. By implication, Feldman's and Hattie and Marsh's analyses did not find a relationship between teaching effectiveness and research productivity because they focused on only one aspect of the instructional work effort (i.e., classroom instruction). In any case, "the common belief that research and teaching are inextricably intertwined is an enduring myth" (Hattie & Marsh, 1996, p. 529).

The Complete Faculty Member

The ultimate tenet about faculty work, which is influenced by beliefs about the importance of intrinsic motivation and the overlap of teaching and research, is that faculty members can be productive in all aspects of faculty work. This belief is codified in promotion and tenure dossiers where faculty members are required to demonstrate their productivity in teaching and research (with some emphasis on service as well).

The belief that the typical faculty member can simultaneously achieve high or at least above average levels of productivity in both research and teaching is largely unexamined. Feldman (1987) and Hattie and Marsh

(1996) examined ratings of teaching effectiveness, which is one measure of quality but not of productivity. Much of my work (e.g., Fairweather 1993, 1996) focuses on time allocation and rewards rather than on specific measures of productivity. Massey and Wilger (1995) discuss faculty perceptions of both teaching and research productivity, but they do not demonstrate empirically how this relationship plays out among a national sample of professors. Even less is known about the variation in expectations and norms for faculty working in distinct types of institutions or by discipline within an institution.

Study Purpose and Research Questions

The purpose of this article is to examine empirically the principal beliefs about faculty work to inform the debate about how to increase faculty productivity, enhance the attention paid to teaching, and preserve the parts of academic life essential to carry out the multiple missions of teaching, research, and service. I examine two research questions:

Research Question 1: What percentage of the faculty are productive in teaching or research?

Research Question 2: What percentage of the faculty are simultaneously productive in both teaching and research?

The Study

Data for this research were gathered in the 1992–93 National Survey of Postsecondary Faculty 1992–93 (NSOPF 1993), sponsored by the National Center for Education Statistics. NSOPF 1993 examined a nationally representative sample of 29,764 part-time and full-time faculty in 962 two- and four-year colleges and universities. In all, 25,780 full- and part-time faculty from 817 institutions responded (respective institutional and individual response rates of 84.9% and 86.6%). The institutional sample was stratified by source of control (public or independent) and by type of institution. Based on the Carnegie Foundation classification scheme (Carnegie, 1987), types of institution ranged from *research universities*, whose faculty train the majority of doctorates in the United States and which house most of the funded research; *doctoral-granting universities*, whose faculty also train doctoral students and conduct research but whose production of doctorates and research dollars generated are less than those of the research universities; *comprehensive colleges and universities*, which focus on liberal arts and professional programs at the undergraduate and master's-degree levels; *liberal arts*

colleges, which focus on teaching undergraduates (although the majority now also offer some type of masters-degree program); *other 4-year institutions*, which in this study primarily focus on separate medical and engineering schools; and *2-year colleges*. For this research, I used weighted data[1] on *full-time, tenure track* faculty from 4-year institutions (n = 7,835, weighted n = 269, 789). I omitted department chairs because their work allocation patterns are usually distinct from those of regular faculty members. The weighted distribution of faculty by type of 4-year institution is as follows: 35.0% from research universities, 15.3% from doctoral-granting universities, 34.9% from comprehensive colleges and universities, 8.4% from liberal arts colleges, and 6.4 percent from other 4-year institutions.

Methods

For Research Question 1, I calculated the medians for productivity measures by program area within type of institution. Based on the decision model I used these data to define "high teaching productivity" and "high research productivity" groups. I calculated weighted percentages for these productivity groups. *T*-tests were used to examine results by type of institution, gender, race/ethnicity, and academic rank. For Research Question 2, I determined the weighted percentages of faculty simultaneously achieving high teaching and research productivity. I examined the differences in percentage distributions by type of institution, gender, race/ethnicity, and academic rank.

Defining Faculty Productivity

Massy and Wilger (1995) define productivity as the ratio of outputs to inputs, or of benefits to costs. Meyer (1998) distinguishes productivity from workload and time allocation: "Workload . . . captures how their [the faculty] time is spent, while productivity is a measure of what is produced with that time" (pp. 45–46). Massy and Wilger (1995) assert that some accounting for quality is necessary in any definition of faculty productivity. They found that faculty members from all types of 4-year colleges and universities typically defined productivity as outputs, not the ratio of outputs to inputs. These faculty respondents also were strongly influenced by institutional rewards:

> When asked for a definition of the term [productivity], respondents tended to provide broad and complex answers usually involving both teaching and research. . . . However, when asked to tell "what matters," . . . respondents

> were more likely to [say] . . . research and publication (Massy & Wilger, 1995, p. 12).

Across all types of institutions faculty respondents most often defined their own productivity by refereed publications and research grants (Massy & Wilger, 1995, pp. 15–16). Winston (1994) attributes this finding to a national labor market for faculty members that reinforces "the use [of] similar research-oriented criteria in hiring and rewarding existing faculty" (p. 43) across institutional type.

Consistent with Massy and Wilger's respondents, I define productivity in terms of individual faculty member outputs. I include measures of both teaching and research output. According to Meyer (1998, pp. 48–49), clarifying research and especially teaching outputs represents a step forward in the study of faculty productivity even though they represent only partial measures of productivity (i.e., they do not include inputs). Most previous studies of faculty research output (hereafter productivity) focused on quantity, especially the number of refereed publications and competitive research grants. Peer review for both publications and grants was assumed to ensure some aspect of quality (Blackburn & Lawrence, 1995; Fairweather, 1996; Konrad & Pfeffer, 1990). Promotion and tenure procedures often include qualitative assessments, such as external review, to assess quality and impact.

Less agreement exists about appropriate measures of instructional productivity. Researchers and policymakers often confuse teaching productivity, quality, effectiveness, and time allocation and mistake faculty input (e.g., hours spent teaching) for student learning outcomes. Classroom instruction is often the only form of instructional output examined (Meyer, 1998, pp. 53–56).

Measures of instructional productivity serve two purposes. The first is to address internal and external accountability (Graham, Lyman, & Trow, 1995). Demonstrating that faculty members teach undergraduate courses, spend an acceptable amount of their time on teaching, and so forth, are essential to maintain or restore public confidence in higher education (Gaither, Nedwek, & Neal, 1994). Relevant measures here include counts such as student contact hours generated per semester.

Johnstone (1993) argues that instructional productivity should also serve as a proxy for student learning. He points out that measures such as student contact hour production may not reflect student learning productivity. Menges (1981) argues that the measures of instructional productivity should include the use of teaching methods found effective in promoting student learning. Most of these instructional practices encompass active and collaborative teaching and learning in the classroom

(Angelo, 1993; Chickering & Gamson, 1991; Johnstone, 1993; Pascarella & Terenzini, 1991; Sorcinelli, 1991).

Productivity Measures

The first step in identifying faculty members who are highly productive in teaching and research is to select appropriate productivity or output measures. The measures selected must have meaning across all types of 4-year institutions, permit comparison with previous research, and be commonly used in promotion and tenure decisions at many, perhaps most, colleges and universities. The principal measure of *research productivity* that meets these criteria is the *number of refereed publications during the previous two years*, where "publication" includes articles in refereed journals; published reviews of books, articles, or creative works; books; textbooks; monographs; and chapters in edited volumes. Limiting the time period for the measure of research productivity to the preceding two years was necessary to compare it with teaching workloads and productivity during Fall term, 1992. Although Hattie and Marsh (1996) argue that weighted scales for publishing productivity may be preferable to simple numbers of publications, selecting weights that are applicable across disciplines and types of institutions is impractical and can be misleading. For example, a book may be valued more highly in history whereas a refereed article in a top journal may be valued more highly in engineering. For this reason, I estimated number of publications with a simple count of eligible publications. Publishing productivity has the advantage of having similar meaning and value across types of institution, at least as reflected in faculty rewards (Fairweather, 1996). It also has been widely used in previous research, ranging from Ladd (1979) to Blackburn and Lawrence (1995).

Local promotion and tenure or annual review decisions typically use a broader definition of scholarly output than refereed publications. Being a *principal investigator* on an externally-funded research project during at least part of the 1992–93 academic year can be highly valued, especially in engineering, the natural and social sciences, and the health sciences (Konrad & Pfeffer, 1990; Massy & Wilger, 1995). The *total research funds* generated by a faculty member during the 1992–1993 academic year adds useful information about his or her contribution to the department. A less prestigious but commonly considered form of scholarship is the *number of conference presentations or workshops during the previous two years*. For faculty members in the fine arts, a related measure is the *number of exhibitions or performances during the previous two years*.

For *instructional productivity* I first selected a true productivity measure, *student classroom contact hours per semester*. This measure equals the number of hours the faculty member taught in a specific class per week times the number of students enrolled in that class, summed over all the classes taught during Fall term 1992. Student classroom contact hours reflect an individual's gross instructional contribution to the program or department. It does not reflect nonclassroom instructional output. Nor does it adequately reflect the instructional output of faculty members who primarily teach smaller graduate seminars. To measure out-of-class contributions to instructional productivity I have included the *independent study contact hours per week* during Fall term 1992. I also have included the *number of thesis or dissertation committees* served on during Fall term 1992. This measure includes both undergraduate theses and graduate dissertations and theses. It reflects an important instructional contribution made by graduate faculty members.

A proxy for instructional quality focuses on classroom teaching methods. Another proxy commonly used in promotion and tenure decisions, student ratings of faculty teaching, is not on NSOPF 1993. The emphasis here is on the use of best practices found indicative of student learning. Recent literature indicates that students exposed to collaborative or active learning experiences may learn more than those whose classroom experience is passive (Bottrill & Borden, 1994; Bruffee, 1993; Goodsell, Maher, & Tinto, 1992; Svinichi, Hagen, & Meyer, 1996; Weimer, 1990). Based on this literature, I created a measure of whether or not a faculty member *used collaborative or active learning as the primary instructional approach in any course taught in Fall term 1992*. Using the NSOPF 1993 categories, I classified a faculty member as using collaborative or active instruction if the primary instructional approach in any class employed discussion group and class presentations; apprenticeship, internship, field work, or field trips; role playing, simulation, or other performances; group projects; or cooperative learning groups. Lectures and TV were defined as noncollaborative forms of primary instructional approaches. To this group I added faculty members who used both student presentations and student evaluations of each others work—both tenets of active and collaborative teaching—regularly in their courses.

The Decision Model

I created a decision model to represent how a hypothetical promotion and tenure or annual review committee might combine productivity measures to identify *highly productive researchers* and *highly productive teachers*. For each measure other than instructional method (a

dichotomy) I developed within-discipline-within-institutional-type norms by calculating the quartiles and medians separately by program area within type of institution (Carnegie, 1987). For research, doctoral-granting, and comprehensive universities I used all ten NSOPF 1993 program areas: agriculture/home economics, business, education, engineering, fine arts, health sciences, humanities, natural sciences, social sciences, and other fields. The relevant program areas for liberal arts colleges were fine arts, humanities, natural sciences, social sciences, and other fields. For other 4-year institutions the relevant program areas included health sciences, natural sciences, and other fields.

The decision model appears a bit mechanical, a set of "equations" driven by quantitative standards. It ignores the qualitative assessments and judgments inherent in the promotion and tenure or annual review processes. The model employs a modest standard to define "highly productive," using above the median rather than substantially above the median (i.e., the top quartile). Yet the decision model reflects many commonly held beliefs about the nature and importance of faculty work. It is also adequate to determine whether or not the percentage of faculty members simultaneously achieving high levels of research and teaching productivity is consistent with conventional beliefs.

The Highly Productive Researcher

I deemed a faculty member a *highly productive researcher* if his or her refereed publications during the previous two years—the gold standard for research productivity—exceeded the median for the relevant program area and institutional type. The median is the best measure of central tendency when the distribution is skewed, which was true here. To take into account other ways of achieving high levels of research output, I also designated faculty members as *highly productive researchers* if they fell in the second quartile (the quartile immediately below the median) of refereed publications, were a principal investigator on a funded research project, and achieved any one of the following:

- in the top quartile of total research dollars generated during 1992–1993
- in the top quartile of conference presentations (or exhibitions and performances if in the fine arts)
- above the median in both total research dollars and conference presentations.

Consider the education faculty in research universities as an example. I designated faculty members with three or more publications in the previ-

ous two years (the median) as highly productive researchers. To this group I added faculty members with between one and three publications (the second quartile) who were principal investigators *and* who obtained more than $300,000 in annual research funds (the top quartile) *or* who had more than nine conference presentations (the top quartile) *or* who had at least $25,000 in research funds and five presentations (the respective medians).

The Highly Productive Teacher

I designated any faculty member above the relevant median in student classroom contact hour production as a *highly productive teacher*. To this group I added faculty members in the second quartile of student classroom contact hour production if they were also in the top quartile of generating independent study contact hours *and* in the top quartile of serving on dissertation and thesis committees. As a separate measure, I used evidence of collaborative or active instruction as a proxy for effective teaching or instructional quality.

Results

Research Question 1: What percentage of the faculty are productive in teaching or research?

Tables 1 and 2 demonstrate substantial variation in teaching and research productivity by type of institution and program area, respectively. As examples, publishing productivity ranged from a high of about six refereed publications during the previous two years for faculty members in research universities, to a low of less than two publications during the same time period for faculty in liberal arts colleges.[2] Faculty members who work in liberal arts colleges produced the least number of total student contact hours in Fall term 1992 (signifying smaller class sizes), whereas faculty members in other four-year institutions produced significantly larger numbers of contact hours.[3]

Similarly, across all types of 4-year institutions publishing productivity ranged by program area from 1.49 publications per two-year period in fine arts to 5.08 in health sciences. The faculty in business, education, the fine arts, humanities, and other fields produced below average numbers of publications; faculty in engineering, health sciences, and natural sciences were above average.[4] Student contact hours ranged from a high of about 537 student contact hours for faculty in health sciences to a low of about 223 in engineering. Faculty in the health sciences produced a much greater number of contact hours than did their counterparts in other program areas.[5]

These results support the more detailed breakdown by program area

TABLE 1

Productivity Measures by Type of Institution

	All 4-Year		Research		Doctoral		Comprehensive		Liberal Arts		Other	
	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
Research Productivity												
Publications, 2-year	3.850	0.068	5.780	0.179	3.840	0.128	2.060	0.072	1.741	0.142	4.890	0.338
Principal investigator (%)	28.840	0.557	47.300	1.374	27.470	1.209	12.140	0.601	11.110	1.316	35.910	2.375
Research dollars ($)	172,655	10,509	198,654	17,391	176,052	28,244	70,840	7,690	77,929	20,339	179,123	24,485
Conference presentations, 2-year	4.060	0.084	5.440	0.218	4.160	0.182	2.940	0.103	1.990	0.193	4.300	0.350
Teaching Productivity												
Student contact hours	328.940	5.665	317.650	15.241	328.300	12.778	335.330	6.655	249.760	10.576	470.500	31.471
Independent study contact hours	6.500	0.131	7.560	0.273	6.140	0.229	5.600	0.214	4.720	0.495	8.070	0.574
Thesis/dissertation committees	4.730	0.108	7.290	0.296	5.070	0.211	2.820	0.133	1.860	0.173	2.460	2.510
Instructional Approach												
Proportion using collaborative/active instruction	0.252	0.005	0.189	0.011	0.227	0.011	0.317	0.009	0.342	0.020	0.171	0.021

SOURCE: NSOPF 1993

TABLE 2
Productivity Measures by Program Area

	Agriculture/Home Economics		Business		Education		Engineering		Fine Arts	
	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
Research Productivity										
Publications, 2-year	4.740	0.383	2.800	0.177	2.750	0.182	4.630	0.300	1.490	0.168
Principal investigator (%)	67.240	3.981	8.110	1.221	18.480	1.643	56.940	2.658	7.070	1.292
Research dollars ($)	116,176	11,707	124,758	42,286	214,784	61,248	184,848	13,841	26,150	8,062
Conference presentations, 2-year	7.420	0.656	2.940	0.231	6.030	0.396	6.180	0.641	2.720[a]	0.270
Teaching Productivity										
Student contact hours	241.610	21.304	295.880	8.863	285.190	19.202	223.270	13.651	247.460	13.404
Independent study contact hours	9.040	0.890	3.600	0.392	5.100	0.298	8.920	0.637	7.440	0.480
Thesis/dissertation committees	8.160	0.784	1.630	0.169	8.590	5.400	8.100	0.639	4.150	0.387
Instructional Approach										
Proportion using collaborative/active instruction	0.190	0.036	0.265	0.019	0.508	0.215	0.050	0.010	0.563	0.025

SOURCE: NSOPF 1993
[a]In addition the fine arts faculty averaged 17.02 exhibitions or performances (SE = 1.894)

within type of institution. Again, substantial variation exists. For example, the median for publishing during the previous two years in research universities ranged from a low of 0 in agriculture to a high of 6 in the health sciences. In doctoral-granting universities fine arts faculty members published the least, engineering faculty members the most. In comprehensive institutions the social sciences faculty published the most. In liberal arts colleges the top publishers were in the humanities and social sciences. In other 4-year institutions the natural sciences faculty published the most.[7]

In research and doctoral-granting universities the business faculty produced the highest median student contact hours. In comprehensives it was the social sciences faculty. In liberal arts colleges the natural sciences faculty generated the most student contact hours; in other 4-year institutions it was the health sciences faculty.

Based on the decision model criteria, about 50% of the faculty are highly productive teachers regardless of type of institution (see Table 3). The percentage of highly productive researchers ranged from about 39 in liberal arts colleges to almost 50 in research universities. It is slightly higher in research-oriented institutions than in teaching-oriented colleges.[6] The faculty in bachelor's- and master's-level institutions were

TABLE 2 (*Continued*)

Health Sciences		Humanities		Natural Sciences		Social Sciences		Other	
Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
5.080	0.273	3.490	0.142	4.890	0.197	4.090	0.162	2.790	0.145
39.160	1.906	8.470	0.805	46.440	1.396	23.940	1.482	19.600	1.574
175,064	23,640	49,668	13,139	173,314	15,740	179,063	25,866	202,375	76,471
5.410	0.289	2.820	0.143	3.560	0.147	3.710	0.186	3.390	0.211
557.190	39.467	254.680	6.354	389.790	15.190	317.810	10.830	300.920	10.549
9.680	0.571	4.200	0.249	7.900	0.342	4.730	0.285	5.640	0.315
2.520	0.241	3.230	0.153	5.230	0.295	5.340	0.259	4.280	0.307
0.236	0.019	0.370	0.014	0.098	0.008	0.141	0.012	0.326	0.018

more likely to use collaborative or active instruction than their counterparts in research-oriented universities.[8]

Women were less likely than men to be highly productive teachers ($t = 2.67$, $p < .01$) or researchers ($t = 3.43$, $p < 0.001$). They were much more likely than men to use active or collaborative teaching ($t = 10.77$, $p < 0.001$). Minority faculty members were as likely as majority faculty members to be designated highly productive researchers, less likely to be highly productive teachers ($t = -4.09$, $p < 0.001$). Slightly fewer minority faculty members employed active or collaborative instruction in their classrooms ($t = -2.40$, $p < 0.05$). Full professors were the most likely to be designated highly productive researchers,[9] assistant professors the least likely to be highly productive teachers.[10] Assistant professors used active or collaborative instruction more often than their senior colleagues.[11]

Research Question 2: What percentage of the faculty are simultaneously productive in teaching and research?

I defined two groups of high research/high teaching productivity. Group 1 consists of the faculty who were designated both highly productive teachers *and* researchers. Group 2 consists of the faculty who were highly productive teachers and highly productive researchers (Group 1), *and* who used collaborative or active teaching approaches in their classes. Table 4 presents the results by type of institution, gender, race/ethnicity, and academic rank.

TABLE 3

High Research or Teaching Productivity by Institutional and Demographic Characteristics

	Institutional Type											
	All 4-Year		Research		Doctoral		Comprehensive		Liberal Arts		Other	
	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
% Highly productive researchers	45.260	0.618	49.090	1.393	46.670	1.364	41.590	0.915	39.480	2.068	46.030	2.483
% Highly productive teachers	53.600	0.630	52.290	1.449	54.620	1.378	54.520	0.930	52.800	2.117	53.970	2.711
Proportion using active/collaborative instruction	0.252	0.005	0.189	0.011	0.227	0.011	0.317	0.009	0.342	0.020	0.171	0.021

	Gender			
	Female		Male	
	Mean	*SE*	Mean	*SE*
% Highly productive researchers	41.880	1.067	46.370	0.756
% Highly productive teachers	50.910	1.099	54.490	0.770
Proportion using active/collaborative instruction	0.347	0.010	0.221	0.006

TABLE 3 (*Continued*)

	Race/Ethnicity			
	Nonminority		Minority	
	Mean	*SE*	Mean	*SE*
% Highly productive researchers	45.060	0.696	46.690	1.346
% Highly productive teachers	54.380	0.709	48.040	1.378
Proportion using active/collaborative instruction	0.256	0.006	0.226	0.011

	Academic Rank							
	Professor		Associate		Assistant		Lecturer	
	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
% Highly productive researchers	49.750	1.071	44.650	1.114	42.420	1.072	18.060	2.908
% Highly productive teachers	54.070	1.087	56.360	1.130	49.520	1.106	58.110	3.762
Proportion using active/collaborative instruction	0.231	0.009	0.243	0.010	0.283	0.010	0.336	0.040

SOURCE: NSOPF 1993

TABLE 4

Percentage of Faculty Members Productive in Both Teaching and Research by Institutional and Demographic Characteristics

	All 4-Year		Research		Doctoral		Comprehensive		Liberal Arts		Other	
	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
Group 1	22.09	0.53	21.69	1.21	21.54	1.15	22.79	0.79	20.40	1.73	23.82	2.33
Group 2	5.96	0.31	4.59	0.63	4.05	0.57	7.90	0.52	8.07	1.20	4.54	1.17
	Gender											
	Female		Male									
	Mean	*SE*	Mean	*SE*								
Group 1	20.11	0.89	22.75	0.65								
Group 2	7.10	0.59	5.59	0.37								
	Race/Ethnicity											
	Non-Minority		Minority									
	Mean	*SE*	Mean	*SE*								
Group 1	22.49	0.60	19.23	1.10								
Group 2	6.06	0.35	5.25	0.65								
	Academic Rank											
	Professor		Associate		Assistant		Lecturer					
	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*				
Group 1	24.04	0.94	22.98	0.97	19.58	0.88	9.77	2.30				
Group 2	6.35	0.55	5.90	0.55	5.90	0.54	1.40	0.95				

In 1992–1993 about 22% of all faculty in 4-year institutions simultaneously attained high productivity in teaching and research (Group 1). This percentage did not vary substantially by type of institution. When collaborative/active instruction is added to the definition (Group 2), the overall percentage drops to about 6%. Faculty members in liberal arts and comprehensive colleges were more likely to make this latter designation than their counterparts in doctoral-level institutions.[12]

Slightly more men attained Group 1 status ($t = -2.40$, $p < 0.05$), whereas slightly more women attained Group 2 ($t = 2.17$, $p < .05$). Nonminorities were more likely to attain Group 1 ($t = -2.61$, $p < 0.01$); Group 2 did not vary by race/ethnicity. Lecturers and assistant professors were less likely than their senior colleagues to attain Group 1.[13] Group 2 membership did not vary by academic rank with one exception: lecturers were less likely to be in Group 2.[14]

Discussion

The small percentage of faculty in all types of 4-year institutions who achieved high levels of output in both research and teaching during 1992–1993 belies the common belief that each faculty member can achieve both simultaneously. Even fewer were able to achieve above the norm in teaching and research productivity while using potentially more effective instructional practices. Formal personnel policies for tenure-track faculty that presume simultaneous productivity in research and teaching often do not adequately reflect the difficulty in achieving such a mix. Indeed, dossiers for promotion and tenure and for annual review often require faculty members to document contributions to public service, professional service, and administration in addition to teaching and research productivity. Informal personnel policies do reflect this difficulty. Gappa and Leslie (1993) demonstrate that 4-year colleges and universities increasingly rely on part-time and adjunct faculty and teaching assistants to attain acceptable levels of instructional productivity, thereby freeing time for full-time faculty to focus on research.

Across all types of 4-year institutions, the most common factor in simultaneously achieving high teaching and research productivity is to spend more hours in the classroom (Fairweather, 1999). However, this effort may deter faculty members from using collaborative teaching techniques (Olsen & Simmons, 1996). Faculty members with higher classroom work assignments typically are able to publish at greater than average rates when they also have a research grant, which gives them the opportunity to publish from their ongoing research work. Faculty attitudes and beliefs are also important, especially the fit with institutional

missions and the perception that research should be the primary criterion in promotion and tenure (Fairweather, 1999).

These results help explain why so few faculty are able to achieve above average levels of teaching and research productivity at the same time. Few faculty members are able to publish while carrying above average teaching loads. Few faculty members have externally funded research projects, a resource that increases their ability to publish while teaching above average numbers of students. Even fewer attain above average productivity levels in teaching and research while using active or collaborative instructional techniques. In sum, simultaneously achieving high levels of productivity in teaching and research—the *complete faculty member*—is relatively rare. For most faculty members, generating high numbers of student contact hours diminishes publication rates, and vice versa

Untenured faculty members are the least likely to attain high levels of both research and teaching productivity during a given two-year period. Making certain that the untenured faculty shift their work focus during the pre-tenure period to achieve sufficient productivity in both teaching and research seems especially important. Each annual review should be considered in light of the career to date, not just a snapshot of current productivity. Policies that identify the most valued outputs also seem more useful than ones that imply every activity category is equally important.

Policies meant to encourage teaching productivity and effectiveness might adversely affect individual research productivity, and vice versa. More complex and potentially successful policies might reward teaching and research productivity differently at distinct points in the faculty career. Alternatively, rather than having a single broad institutional expectation for faculty work, academic policies might differentiate individual faculty responsibilities and allocate rewards accordingly. In its most radical form, this alternative might lead to the "unbundling" of faculty work responsibilities with differential work assignments, expectations, and rewards.

For most academic departments, the key to increasing teaching and research productivity may lie in looking for group solutions rather than on relying on each faculty member to increase productivity levels in teaching and research. Viewing faculty productivity as an aggregate across faculty members permits department chairs and departmental committees to combine the efforts of their individual members to achieve acceptable levels of productivity. Faculty who are less productive in research can increase the departmental average teaching productivity, whereas faculty who publish extensively can contribute to aggre-

gate research productivity goals. In any case, the departmental or aggregate view of faculty productivity implies far more interdependence than is currently accepted as the norm for faculty behavior.

Notes

[1]Population estimates from survey data were based on weights derived from the inverse of the probability of a faculty member in a particular type of institution being selected. The probability of selecting a faculty member for the sample was a function of the odds of an institution being selected from the universe of accredited postsecondary institutions and the probability of a faculty member being selected from the population within his or her institution.

[2]t(res/doc) = 8.82***; t(res/oth) = 2.33**; t(oth/doc) = 2.91**; t(doc/comp) = 12.11***; t(comp/lib) = 2.01* where * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.005$. The comparison being made is shown in parentheses. For example, t(res/doc) refers to the mean difference between the publications rate of faculty members in research universities with faculty members in doctoral-granting universities. Only significant t-test results are shown. For a list of all comparisons of mean differences associated with tables 1 and 2 contact the author.

[3]t(res/lib) = 3.66***; t(doc/lib) = 2.08*; t(comp/lib) = 6.85***; t(oth/res) = 4.37***; t(oth/doc) = 4.19***; t(oth/lib) = 6.65***.

[4]t(business) = –6.24***; t(education) = –6.92***; t(engineering) = 2.79*; t(fine arts) = –16.30***; t(health sciences) = 6.06***; t(humanities) = –3.05*; t(natural science) = 5.30***; t(other) = –7.03***. For academic disciplines, t tests were based on comparing the mean for the program area with the overall mean. Bonferroni corrections were used to estimate the level of significance of each test.

[5]t(health sciences) = 6.10***; t(natural science) = 4.03***; t(agriculture) = –3.78***; t(business) = –3.16*; t(education) = –2.75*; t(engineering) = –7.36***; t(fine arts) = –6.39***; t(humanities) = –5.78***.

[6]t(res/comp) = 4.50***; t(res/lib) = 3.86***; t(doc/comp) = 3.10***; t(doc/lib) = 3.67***.

[7]Contact author for the complete table, which is too large to include here.

[8]t(lib/res) = 6.71***; t(lib/doc) = 5.04***; t(lib/oth) = 5.90***; t(comp/res) = 9.01***; t(comp/doc) = 6.34***; t(comp/oth) = 6.40***.

[9]t(full/assoc) = 3.30***; t(full/asst) = 4.48***; t(full/lect) = 10.22***.

[10]t(full/asst) = 2.97**; t(assoc/asst) = 4.39***.

[11]t(full/asst) = –3.85***; t(assoc/asst) = 2.86**.

[12]t(comp/res) = 4.03***; t(comp/doc) = 5.00***; t(comp/oth) = 2.62**; t(lib/res) = 2.57*; t(lib/doc) = 3.05**; t(lib/oth) = 2.11*.

[13]t(prof/asst) = 3.46***; t(prof/lect) = 5.74***; t(assoc/asst) = 2.60**; t(assoc/lect) = 5.83***; t(asst/lect) = 3.99***.

[14]t(prof/lect) = 4.45***; t(assoc/lect) = 4.09***; t(asst/lect) = 4.13***.

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