

## **Sustaining Research Productivity throughout an Academic Career: Recommendations for An Integrated and Comprehensive Approach**

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Faculty roles and rewards surfaced as a national issue in the early 1990's following the publication of Ernest Boyer's seminal book *Scholarship Reconsidered: Priorities of the Professoriate* [1]. Emerging from this examination of the academy were numerous task forces, conferences, and publications focused on faculty career development and enhancement. The recognition of the need for a continuous investment in faculty was an important outcome of this discussion. In an essay on "Faculty: Our Greatest Investment" [2], James Gentile, Dean of the Natural Sciences at Hope College, stated "Resources need to be provided on a continual basis throughout the career cycle of faculty members so as to sustain vitality....While it is important to recruit the best individuals possible to join the faculty ranks at an institution, it is perhaps even more important to implement and develop programs targeted towards retraining these faculty and sustaining the professional energies and expertise that caused them to be identified as key individuals to bring into our institutional communities." In its report *Investment in Faculty: Ways and Means* [3], Project Kaleidoscope advocates for the same commitment: "Colleges and universities must develop policies and practices that recognize the long-term contribution that each individual faculty member makes to the education of students and the service of the institution."

Is there cause for concern over the sustained research productivity of faculty at primarily undergraduate institutions (PUI's)? Certainly the lagging "proposal pressure" at foundations and agencies that support undergraduate research has been the subject of many discussions and presentations [4-6]. Two funding programs likely to be the focus of more established faculty - the National Science Foundation's Research at Undergraduate Institutions (RUI) Program and the American Chemical Society's Petroleum Research Fund Type B Grant Program - have shown either stagnant or declining numbers of proposals over the period 1986-2000 [7]. Clearly, there are many factors that may contribute to the shortfall in proposals, suggesting that this global parameter might not be indicative of low research productivity of post-tenure faculty. Considerable discussion on this issue, however, has been sparked by an analysis of research productivity by faculty rank in the recent comprehensive study of the research environment in the natural sciences at PUI's, *Academic Excellence: The Sourcebook* [7]. One commentary [8] on this report by Dr. Thomas R. Tritton, president of Haverford College, enumerates a "surprising" result from the study with regard to research productivity. In particular, he notes the "associate professor syndrome", as reflected in an annual publication rate comparable to assistant professors and a grant funding level lower than such junior faculty. In particular, while full and assistant professors had comparable annual research grant dollars (about \$27,000 per faculty member averaging over all institutions from 1991-2000), associate professors averaged only slightly over \$17,000 per year. The low funding level for associate professors exists independent of type of institution, with the disparity of the associate rank even greater for public institutions and those PUI's awarding an advanced degree. Annual research publication rates of faculty at all PUI institutions were highest among full professors (about 0.6 per year) with associate and assistant professors averaging about 0.48 and 0.46 publications per year. At institutions where

only baccalaureate degrees are awarded, associate professors actually trail assistant professors in annual publication rates.

A first reflection on these data might suggest no cause for alarm. Clearly a linear career trajectory is an unrealistic expectation. Faculty who are actively engaged in scholarship will generate new ideas and expand into new lines of inquiry that will necessarily take time to develop. Quantitative measures of research productivity such as publications and grant funding will experience peaks and valleys throughout a faculty member's career.

Nevertheless, are there other reasons for the apparent reduced level of productivity following the achievement of tenure? A possible explanation might be extracted from a review of the institutional commentary submitted by institutions surveyed in the *Academic Excellence* report in response to the question, "What are the major barriers to the performance of research at your institution?" Over 80% of the responses focused on the lack of time, specifically in terms of the multiple demands on faculty at primarily undergraduate institutions. Most respondents cite the presence of heavy teaching loads and the expectation by students and institutions alike that faculty will provide significant amounts of individual attention to students. How do junior faculty, then, accomplish the research that contributes to their earning tenure? Reductions in teaching loads and often service requirements are necessary to enable new faculty to achieve tenure. One respondent noted, "New faculty are essentially 'required' to have reduced teaching assignments to enable them to establish a research agenda" [7]. Another indicated that research programs were effectively initiated by "granting new faculty two years of reduced teaching load in order to start up their research study, apply for grant support, and, once funded, facilitate release time for research" [7]. Sabbaticals for junior faculty in their third, fourth, or fifth years of service are common to provide uninterrupted time to focus on research. Some institutions provide an extensive array of support mechanisms for junior faculty: "Junior faculty receive start-up funding, a course reduction in the first year of teaching, entitlement funding for travel to professional meetings and for research assistance, a special assistant professor leave following a third-year departmental review, and two further course reductions in the fourth and fifth year of their pre-tenure appointment" [7]. Even the popular guidebook [9] by SUNY emeritus professor of psychology Robert Boice, "Advice to New Faculty Members: Nihil Nimus" advocates by its title the approach of "nothing in excess", a strategy for handling the time demands of classroom teaching in order to pursue other professional activities.

For mid-career and senior faculty, however, the added pressures of administrative responsibilities, university governance, and advising duties pull them in multiple directions. Many faculty speak of the need at undergraduate institutions to "balance" teaching, research, and college service. Others see the multiplicity of faculty roles in a far more negative light: "...research nearly always detracts from...teaching" [7]. "In our department ... undergraduate teaching is paramount and an emphasis on research nearly always detracts from the teaching mission. ...[T]he desirability of increasing research...is a self-serving desire [7]." For those that hold research and teaching as conflicting enterprises competing for a fixed amount of time and resources, the "immediate pressures" of teaching win out. "As a faculty we must understand that we cannot do everything [7]." Still others see the institution's reward system as the source of research stagnation following tenure: "[One barrier is] the perception that after promotion and

tenure decisions have been made there are not clear rewards for continued research activities (nor clear penalties for the lack of such activity)” [7].

Maintenance of faculty vitality in terms of professional expertise, enthusiasm, and engagement is the primary responsibility of the faculty member. However, the multiple demands facing faculty make it increasingly challenging to find the time and resources for professional development. Viewing the situation solely in these terms suggests a seemingly hopeless situation for sustaining faculty research productivity throughout a career. Indeed, there are many successful faculty who develop and sustain vibrant research programs involving substantial numbers of undergraduates in research of high scientific merit and productivity. Assuming that these successful faculty have not found a way to increase the 24-hour day, can we perhaps identify some reasons for their success that we might emulate? In other words, putting funding, laboratory space, and instrumentation and computational needs aside, are there other impediments that restrict research productivity?

Two such hindrances to sustaining faculty research productivity throughout a career come to mind.

\* Obstacle #1: The perception of a dichotomy in faculty roles between teaching and research

The perpetual tension inherent in a description of one’s role as a faculty member as a *balance* between teaching and research conjures an image of an acrobat perched precariously on a narrow or insecure surface. These endeavors - teaching and research - are not mutually exclusive outcomes. Instead, we should speak of our mission as a dynamic *integration* of teaching and research, with each undertaking reinforcing the other. Research activity at the forefront of a field should continually suggest new approaches and new content for our courses. Similarly, the educational benefit of research extends far beyond the added technical expertise, enhanced understanding of disciplinary principles, and further exposure to methods of inquiry gained by students. The interpersonal development in the form of establishing mentoring and collegial relationships and developing skills for effective collaboration, shared responsibility, and interpersonal communication are perhaps far greater educational outcomes for undergraduates. How would such a shared philosophy improve sustaining faculty research productivity throughout a career? From the start, new faculty would be expected to develop the strategies and practices that will enable them to seamlessly integrate teaching and research rather than relying on reduced teaching loads and pre-tenure sabbaticals to conduct research. While post-tenure sabbaticals are essential for the periodic self-renewal needed to maintain professional vitality, no sustained research productivity can result from relying on sabbaticals that occur at the typically low frequency of once every seven (or even five) years. A faculty member must have the passion and discipline to conduct meaningful research during the intervening years. At the same time, institutions must recognize their responsibility in establishing a culture where research is not viewed as an activity done in addition to full teaching and service loads. If research is an expectation of an institution, then administrators must provide the infrastructure and resources necessary to make productive research a reality.

\* Obstacle #2: The unspoken nexus of faculty career development and an institution's success

The attainment of tenure is generally viewed as an individual's accomplishment, with the accompanying rewards regarded as a career-long commitment of employment by an institution. Rarely do we express to new faculty the expectation that their personal growth be aligned with institutional goals and that the receipt of tenure implies a reciprocal career-long responsibility of a faculty member to the (often changing) needs of the institution. Tenured faculty members, including those with sustained, successful academic careers from a personal perspective, may not have the incentive, receive the encouragement, or perceive the necessity to undertake substantially different challenges that would more closely ally their goals with their institution's current goals. By the same token, institutions place substantial focus and resources on junior faculty, without a comparable level of commitment to faculty throughout the whole of their career. To best serve as a role model for students and as a mentor for new faculty, faculty must remain engaged as educators and contributors to the scholarship of their discipline. An investment by an institution in the continuous development of a faculty member's career will have a broad impact on the faculty member, his/her students, and on the ability of the institution to attract and retain excellent faculty. As noted by Professor Nancy Mills, coordinator of the Council on Undergraduate Research's Institute "The Vital Faculty: Issues after Tenure", "Faculty development programs tend to focus on the needs of junior faculty, reasoning that habits created during this period will last an academic lifetime. In fact, a more assured investment of resources would be on recently tenured faculty because they are more certain to remain with the institution in the foreseeable future [10]." Nevertheless, to put substantial resources into faculty development for mid-career faculty would require many institutions to make "a philosophical shift" [10]. As James Gentile advocates in the aforementioned essay "Faculty: Our Greatest Investment", "The costs for sustained excellence in faculty must be embraced within the overall institutional framework for human resource development and with the understanding that, indeed, the investment is large and important"[2]. The Andrew W. Mellon Foundation's Faculty Career Enhancement Awards program is one example of this broad attention to faculty development. Over the last four years this initiative has enabled small clusters of liberal arts colleges to take a multi-institutional approach to addressing concerns about time, intellectual growth and professional development among faculty members at different stages of their careers. As the needs of a new faculty member initiating a research program at a primarily undergraduate institution (PUI) are addressed in a number of initiatives at foundations and funding agencies [11], institutions must recognize their imperative to support mid-career and senior faculty.

In summary, as we formulate recommendations to enable faculty to sustain research productivity at PUI's, a comprehensive approach is needed. The integration of research and teaching responsibilities must be an expectation of faculty at all ranks. Furthermore, we must devise strategies that consider faculty needs over an entire academic career and that are based on the synergetic interrelationship between faculty and an institution. The dual commitment of both faculty and an institution to the goal of excellence through the pursuit of high-quality, sustained undergraduate research will ultimately produce the most successful results.

## References

- [1] Ernest L. Boyer, *Scholarship Reconsidered: Priorities of the Professoriate*, The Carnegie Foundation for the Advancement of Teaching, Princeton, NJ, 1990
- [2] James Gentile, "Faculty: Our Greatest Investment", *Academic Excellence: The Sourcebook*, Research Corporation, Tucson, 2001, pp. 64-69.
- [3] Project Kaleidoscope, *Investment in Faculty: Ways and Means*, 2001.
- [4] Robert Finn, "Scientists at Four-Year Colleges Strive for Research Quality", *The Scientist* 11[21]:13, Oct. 27, 1997
- [5] John Stevens and David Reingold, "The Role of Research in Undergraduate Chemical Education", CONFICHEM Spring 2000, <<http://www.chem.vt.edu/confchem/2000/a/stevens/researchrole.html>>
- [6] Kelsey D. Cook, "NSF Sponsored Programs for Research Sabbaticals: Why, Where, and How", *Council on Undergraduate Research Quarterly*, September 2000.
- [7] *Academic Excellence: The Sourcebook, A Study on the Role of Research in the Physical Sciences at Undergraduate Institutions*, edited by Michael P. Doyle, Research Corporation, Tucson, 2000.
- [8] Thomas R. Tritton, "The Environment for Scientific Research by Undergraduates: Some Thoughts on Reading the *Academic Excellence* Study", Research Corporation Special Report, Tucson, April 2002.
- [9] Robert Boice, *Advice for New Faculty Members*, Allyn & Bacon, Boston, 2000.
- [10] Nancy S. Mills, "Now that I'm Tenured, Where do I go from Here? The Vitality of Mid-Career Faculty", *Council on Undergraduate Research Quarterly*, June 2000.
- [11] The Camille and Henry Dreyfus Foundation provides unrestricted grants in its New Faculty Awards Program as well as additional Supplemental Awards to those Fellows completing their two-year position in their Scholars/Fellows Program for Undergraduate Institutions. The American Chemical Society's Petroleum Research Fund provides two-year "Starter Grants" to new faculty within the first three years of their appointment. Research Corporation's Cottrell College Science Awards focus on beginning faculty within the first three years of a first appointment and more established faculty with proven records of maintaining research productivity who are initiating research in a new area. While not specifically focused on PUI's, the National Science Foundation's prestigious Faculty Early Career Development (CAREER) Program is aimed at supporting the early career development of untenured assistant professors. The Camille and Henry Dreyfus Foundation has two programs directed toward more established faculty: the Scholar/Fellow Program for faculty with at least 10 years of experience and the Senior Scientist Mentor Program for emeritus faculty.