Defining Research Productivity: It Depends Upon Who You Are

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Definitions of "research productivity" vary, depending upon a person's position within a university. University administrators and the deans, department chairs, and faculty in a college of agriculture at a northeastern university agree that "ideal" productive scientists are self-directed, do research that answers important questions, communicate results in appropriate ways, and are recognized by the scientific community and others they serve. However, Respondents differ about how productivity should be measured. University administrators tend to emphasize the importance of a national reputation and publication in refereed journals; whereas college deans, department chairs, and faculty tend to support a variety of outputs and practices. Administrators and faculty must negotiate an acceptable definition, complete with institutional support, rewards, and sanctions.

Introduction

The dean of a college of agriculture at a northeastern university was told that his faculty had received a low rating for "research productivity" from the central administration. The dean decided his faculty needed training to improve their writing skills, and so he approached the college research editor for help.

The editor suggested that they first determine what was meant by "research productivity" and identify how it was measured, by whom, and with what consequences. Only then could appropriate action be taken, she suggested. The dean agreed to this approach.

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This article describes some of the findings from a larger study that resulted from the editor's questioning. We will briefly explore literature related to research productivity and organizational communication, analyze the definitions of productivity used by four different audiences, and then discuss what options (in addition to writing workshops) are available for enhancing productivity.

Literature Review

Scientists at universities are evaluated for their research productivity; however, the question remains as to what, exactly, is meant by that term. Research productivity usually is defined in terms of publications (Fox, 1983; Reynolds, 1971). Many studies have shown that tenure, promotion, and salary decisions at universities depend heavily on the quantity and quality of publications (Crane, 1965; Gaston, 1970; Hagstrom, 1971; Meltzer, 1956; Siegfried & White, 1973; Zuckerman, 1967). However, quantity of publications usually has been chosen over quality as a measure of productivity. As Abdel-Ghany (1982), who studied academic home economists, articulated: "In an operational sense, quality is someone's subjective evaluation, for there is no way of objectively measuring or assessing what is an attribute of value" (p. 121).

Teaching ability and public service tend not to be included in definitions of research productivity because they are more likely to receive only local recognition. Thus, the price paid for these latter skills may be low (Abdel-Ghany, 1982).

Our approach to the topic of research productivity was predicated on the assumption, to paraphrase Putnam (1983), that the college of agriculture is not a monolithic entity but a coalition of individuals with differing priorities. We believe that these individuals, as Weick (1979) has observed, can negotiate their goals, actions, and meanings to achieve a common direction not by abandoning their different aims but by subjugating them to the immediate needs of the group.

In this case the dean initially perceived the need to increase research productivity. In a university where productive scientists are rewarded, individual researchers might reasonably be expected to want to be productive. One might also assume that the definition of productivity and the criteria for evaluating it are well understood and shared by administrators and faculty. To test this hypothesis, we decided to survey the opinions of administrators and faculty from one particular college (agriculture) at a northeastern university.

This report will present the responses to two questions that we posed to administrators and faculty:

1. How would you define a productive scientist?
2. What standards of scientific productivity are currently being applied to the faculty of the college of agriculture?

Another study addresses the question of what factors influence the writing productivity of college of agriculture faculty (Donnellan & Ross, 1990).

Methodology

Population

We surveyed four different groups involved in the tenure and promotion process: (1) university-wide administrators (the vice president for academic affairs and the chair of the faculty-led academic affairs committee), (2) college-level administrators (the dean and associate dean of the Agricultural Experiment Station, the research branch of the college), (3) department chairs, and (4) faculty. Nine department chairs were interviewed, including the current chair of eight departments and the incoming chair of one department.

Land-grant colleges of agriculture are set apart in that they, unlike other colleges, are mandated to do research that solves local, regional, and national problems in agricultural and family-related arenas. As a result agricultural researchers frequently do applied research for specific audiences and tend to deal with the public more directly and more frequently than do their colleagues in other colleges, which may influence how they spend their time and thus how they measure their productivity.

We approached all 78 faculty on the college of agriculture mailing list, including faculty without any assigned research time. One goal of this study was to determine whether a person's major job responsibility affected the evaluation of his or her productivity.

Sampling plan and data collection

We started by interviewing the department chairs, college deans, and university administrators to determine existing standards of productivity in the college of agriculture and the university. As a result of these interviews and a review of the literature, we designed a questionnaire and pilot tested it on two different groups of faculty before administering the final version to the agriculture faculty.

The final questionnaire contained three parts: background questions (e.g., age, sex, rank), short answers and a review of past accomplishments, and short statements followed by Likert-type scales on which the respondents could indicate their opinions about certain topics. Of the 78 questionnaires distributed to faculty, 65

(or 83%) were returned; 62 questionnaires were usable. Reasons given for not participating included lack of time, illness, and questions about the results of the study.

Data analysis

Data were analyzed statistically and textually. Essay responses were reviewed and a master coding sheet prepared, thus reducing the responses to a number or series of numbers. Each questionnaire was then coded independently by two research assistants, and cross checked by a principal investigator. Responses were nominal-, ordinal-, or interval-level data. Measures of central tendency were determined, and the following tests were performed: Spearman's rho, Kendall's tau, Mann-Whitney, Kruskall-Wallis, and Wilcoxon Rank. Some of these results are reported here, but not all.

We categorized written and spoken messages produced by our respondents according to a taxonomy of "indicators and displayers of organizational sense making" suggested by Pacanowsky and O'Donnell-Trujillo (1982). Their taxonomy includes relevant constructs, facts, practices, vocabulary, metaphors, stories, and rites and rituals. We found our richest data in four categories: relevant constructs, facts, practices, and metaphors. Therefore, we decided to concentrate our analysis upon those categories.

Pacanowsky and O'Donnell-Trujillo (1982) define the four categories in the following manner:

1. Relevant constructs, in a grammatical sense, are a set of nouns—names given to persons, places, and things—in organizational life. The two most important constructs for our study are "productivity" and "productive scientist."
2. Facts "explain how and why the organization operates as it does" (p. 124). Two facts that surfaced from our study were "the community of scientists is national and international," and "recognition [for research] is what's important."
3. Practices are the tasks that accomplish organizational work. In our study, practices included "sharing information," "testing ideas," and "publishing results."
4. Metaphors are comparisons used by members of the organization to explain organizational life. Examples of metaphors from our study include the analogies of productive scientists as "stars in the network" or "conduits."

Definitions of Productive Scientists and Standards of Productivity

We identified four different perspectives of research productivity. These represented university-wide administrators, college deans, department chairs, and faculty.

Perspectives of university-wide administrators

The academic vice president at the studied institution was the highest official responsible for evaluating research productivity. He pointed out that current university productivity standards were outlined in the *Faculty Handbook*, which stressed the importance of high-quality teaching, research, and service. The *Handbook* did not quantify how productivity should be evaluated; rather, it stated that such qualities as "intellectual competence, integrity, and independence," "work in progress," or "genuine scholarship, productivity, and creativity" in the form of published research, recognized artistic production, or engineering designs must be present.

The vice president described the problem of measuring productivity this way:

> Historically, there is a general consensus in the academic world of what standards of productivity are. They are not written down anywhere. The expectations are more specific in some departments—for example, a book is expected or perhaps refereed articles.

We asked the vice president to define "a productive scientist." He distinguished a nonproductive scientist from a productive one:

> You could have a person as busy as hell in the lab but who never shares information or tests his or her ideas in the peer editorial review system or in terms of getting grants or support. This person is not productive because he or she is not contributing to the body of knowledge. One of the traditional ways the social attributes of a productive scientist are manifested is through the review and publication process and the willingness to expose ideas to review by experts. A nonproductive person either is not willing to expose ideas to scrutiny or has nothing to expose.

This definition focuses so completely on the importance of communicating and testing results that the activity leading to those results is justified only by their communication. The quotation makes a claim of fact: The overworked but unpublished lab scientist is not productive. A productive scientist must perform two tasks (practices): sharing information or testing ideas in the editorial review system—i.e., seeking publication or grant support.

The university-wide administrators in our study typically agreed that to be productive someone must be continuously engaged in "significant and quality research," as measured by a review of the product. Similarly, recognition by peers, particularly those outside the university, was considered important. The vice president said:

> The community of scientists is national and international. In the literature on scholarly communication you find that if there are 1,000 biochemists working in colleges, there is an informal network among them nationally. The stars in this network are the major conduits of information. A productive scientist is generally viewed as being a part of this net-

In general, department chairs expressed confusion or dismay about what is expected of their faculty:

> There is not a precise standard. We need a better idea from the deans.... Does [someone whose appointment calls for] 20% research time mean one publication per year?...These figures could come from a broad survey of the college. I need such a standard so I can say to my faculty, "You've met expectations...."

This chairperson wanted a simplification of evaluation criteria that amounted to metonymy. Such criteria would allow the chair to see a productive scientist as a specific number of publications. That number would vary with the percentage of research time specified in a scientist's job description. A quantity of the construct "research time" is equated with a quantity of the construct "publications," without reference to the process or practices that are needed to bring about those publications.

Perspectives of the faculty

On the faculty questionnaire we received 159 different answers to the question, "What are your department's standards for productivity?" "Publication" was cited most frequently in five of the eight departments; in one department, however, it was not one of the top three criteria.

About 83% of the faculty believed that publishing the results of their research for their peers is important. In addition, 50% believed it is important to publish the results of their research for lay readers, which may reflect the college of agriculture's special mission to serve the needs of the people of the state.

About one-third of the faculty believed that it was possible for someone to be a productive scientist without publishing the results of his or her research. Another 56.9% said that this was not possible, and 10.3% gave qualified responses (e.g., "I suppose it's possible, but I don't know how."). Those who answered "yes" tended to cite teaching, consulting, other forms of communication, or being a non-writing member of a research team as ways to be a productive scientist without publishing. Those who answered "no" generally insisted that research was incomplete without the published dissemination of results.

Faculty within the college of agriculture tended to define productive scientists in terms of the research they do (e.g., important topics, good methodology, useful findings) and their personal qualities (e.g., well-organized, motivated), and not so much in terms of measurable output.

Nearly two-thirds (63%) of the faculty responses to the question, "What constitutes a productive scientist?" referred to the nature of

the scientists' research and to the scientists' personal qualities. Far fewer responses dealt with output. For example, only 18.6% of the faculty responses dealt with publications. If we add in presentations, grants, and other activities (such as consulting), the total only reaches 32.6%. In other words, when defining a productive scientist, some faculty appear to place less emphasis than do university and college administrators and department chairs on output and more on the importance of the research and a scientist's personal characteristics. To quote one faculty member:

> [A productive scientist] continues to develop hypotheses and test them, relates the results of experiments to others...[and] keeps up [with scholarship] in the field or fields of his or her choice.

The metaphor in this quotation draws upon the image of a farmer's field when discussing a researcher's area(s) of expertise. By Extension, and consistent with the images offered by deans, department chairs, and other faculty, this metaphor evokes another comparison—this time between the traditional work style of the farmer and that of the researcher, from the planting of the seed to the harvesting and distribution of the crop.

Conclusions

Judgments of productivity ultimately are subjective evaluations by human beings who are influenced by subtle and not-so-subtle pressures to maintain certain, often undefined, standards of excellence. The best that can be expected (without having rigid, quantitative measures that may be in no one's best interest) is to encourage constant dialogue among administrators, department chairs, and faculty concerning their expectations and their evaluations of how well people are fulfilling them.

Clearly there is not a consensus—as was suggested by the academic vice president—about what the standards of academic productivity are. Depending upon a person's place within the university or college hierarchy, different standards of productivity and different definitions of a productive scientist exist.

University administrators viewed the university and its scientists as part of a global community linked by the communication of research findings. Deans saw their college not only as part of this global community but also as answerable to constituents who fund their work at this public, land-grant institution. At the department-chair level, a breakdown in communication became apparent. The chairs expressed confusion and in a couple of cases rebellion about what is and ought to be expected of their faculty. Faculty responses indicated emphasis on process as well as product; activity of all kinds

was part of the picture of a productive scientist. Some even said a scientist could be productive without publishing—through teaching or as a nonwriting member of a research team.

If discourse related to productivity is to be promoted in this college of agriculture, the dynamics that fostered the development of a false consensus will need to be confronted. By juxtaposing the metaphors used at four distinct levels of the university hierarchy, we can see that the apparent agreement on an image of what constitutes a productive scientist masks substantial disagreement. Lakoff and Johnson (1980) have argued that one's set of metaphors largely constitutes one's reality.

However, becoming aware of different definitions of productivity may not necessarily lead to a negotiated consensus of what the term should mean. If the goal of increasing research productivity is important enough to all concerned, fundamental reform in university administrators' management of professional research scientists is necessary. The "publish or perish" dictum that still reigns supreme on university campuses today must be reexamined and realistic expectations negotiated, clearly expressed, and fairly enforced. A first step is to negotiate the meaning of "research productivity." Writing workshops might eventually be appropriate, but only after faculty and administrators agree as to their importance in achieving personal and institutional goals.

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