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Merging in a Seamless Blend: How Faculty Integrate Teaching and Research

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Merging in a Seamless Blend

How Faculty Integrate Teaching and Research

By continuing the research tradition of looking at faculty in the same fragmented way, we are sustaining the view that their work activities are not integrated and leaving open the door to the academic debate that the work they do conflicts with the needs of students and the expectations of the public. (Ludwig, 1996, pp. 74–75)

The way faculty allocate time to their teaching and research roles is the focus of much debate as higher education policy-makers and administrators seek to improve faculty productivity (Jacobson, 1992; Mingle, 1993). Many states require faculty to report the time they spend accomplishing teaching, research, and other goals; several states have enacted substantive measures designed to change the way faculty allocate their time (Hines & Higham, 1996). Policy decisions about faculty work, however, may be hindered by inadequate information about the ways faculty actually spend time engaged in teaching and research (Ludwig, 1996).

Many scholars and administrators believe that the achievement of teaching and research goals requires faculty to engage in separate and distinct activities (Barnett, 1992). In this view, faculty teaching and research roles are always *fragmented*; the time that faculty spend accomplishing research goals is necessarily time that faculty are not achieving teaching goals (Massy & Zemsky, 1994). In contrast, some scholars and policy analysts assert that faculty members' teaching and research roles do not always involve separate and distinct uses of time. Clark's interviews with college and university faculty, for example, reveal that professors find their own teaching and research activities "merging in a

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seamless blend" (Clark, 1987, p. 70). In other words, faculty sometimes jointly produce teaching and research (Layzell, 1996; Romney, 1971). In this view, faculty teaching and research roles are sometimes *integrated*: faculty occasionally engage in activities that accomplish teaching and research goals at the same time.

Prior research shows that joint production of teaching and research can be efficient and cost effective for colleges and universities (Hopkins, 1990; Cohn, Rhine, & Santos, 1989). Similarly, faculty may improve their efficiency if they sometimes allocate time to activities that achieve both teaching and research goals (Becker, 1975). To illustrate, a faculty member might spend two hours reading source material and drafting notes for a paper she will present at an upcoming conference, then spend another two hours reading additional materials and writing the outline for her afternoon undergraduate lecture course. In this example, the faculty member's research and teaching efforts are fragmented, and the activities required to accomplish both goals take four hours. The same faculty member might spend two hours reading source material and drafting notes that she will use for both the conference paper and the undergraduate lecture. In the second example, the faculty member integrates teaching and research, and the activities required to accomplish both goals take only two hours. Efficiency is improved because both goals have been accomplished. By integrating teaching and research, the faculty member has two additional hours to accomplish other goals.¹

Although many studies have been conducted about faculty work, there is little evidence about the ways or the extent to which faculty integrate teaching and research. Indeed, most existing studies assume faculty work roles are always fragmented. Faculty workload studies, for example, ask faculty to estimate the time they allocate to teaching, research, service, and administrative goals separately (Yuker, 1984; Jordan, 1994). Because the categories are predefined as mutually exclusive, faculty members' reports necessarily indicate that whenever faculty are doing research, they are not teaching.

Similarly, investigators who explored whether faculty teaching and research roles are complementary or conflicting have not explored the extent to which faculty engage in teaching and research activities at the same time. Instead, previous faculty role conflict studies have operationalized faculty teaching and research roles in terms of performance outcome measures—usually student evaluations of teaching and publication counts. Meta-analyses of such studies found little relationship—positive or negative—between teaching and research outcome measures (Braxton, 1996; Feldman, 1987; Hattie & March, 1996). The time faculty report spending

on teaching and research activities, however, is a poor predictor of teaching and research outcomes. Studies that explored the relation of faculty time allocation to teaching and research outcomes found that time faculty reported teaching had no influence on teaching outcomes and only a small negative effect on research outcomes. Similarly, time faculty reported doing research had only a small positive effect on numbers of publications and little effect on teaching evaluations (Feldman, 1987; Fox, 1992; Hattie & Marsh, 1996). Individual factors (such as ability and motivation) and contextual factors (such as available resources, disciplinary norms, and students' and editors' behavior) are likely to mediate between the amount of time faculty spend on teaching or research and the outcomes measured by student evaluations and publication counts.

Thus, even though scholars, policymakers, and administrators are concerned with whether research interferes with teaching, little systematic evidence is available about the ways and the extent to which the time faculty spend on research is also time that faculty spend teaching. This study explored teaching-research integration by seeking answers to the following questions: (1) For what proportion of their work time do faculty accomplish teaching and research goals simultaneously? (2) What kinds of faculty activities are most likely to include integration of teaching and research? (3) How do university, departmental, and disciplinary contexts influence the ways and the extent to which faculty integrate teaching and research?

Relevant Theory and Prior Research

Social role theory provides a theoretical framework for understanding how faculty might integrate teaching and research. A role can be defined as the set of behaviors that belong to a specific office or position (Sarbin & Allen, 1968). An individual in a single position can perform multiple roles (Katz & Kahn, 1966). Faculty, for example, have traditionally been described as performing teaching, research, and service roles. Role expectations anticipate how individuals performing a specific role are supposed to behave. One's actual role behaviors, however, may not necessarily conform to one's own or others' expectations for that role (Secord & Backman, 1974). Individuals experience role strain when they are confronted with conflicting or competing expectations. Role conflict arises when one role expectation is incompatible with another role expectation. Role competition happens when an individual cannot meet two expectations because of limited time (Secord & Backman, 1974).

Marks (1977) questioned whether time to fulfill multiple roles is inevitably limited. He asserted that traditional role theory has been grounded in metaphors which suggest that performing a role must result in a net loss of time and energy. Plumbing and economic metaphors used in role theories suggest that time and energy "drain away," "dribble," or "leak out," or that they are "consumed," "spent," "invested," and "saved," as individuals perform roles. According to this economic *scarcity* perspective, the time a faculty member consumes when conducting research is no longer available to invest in teaching.

Many empirical studies of role conflict reveal, however, that a sizable minority of individuals who perform multiple roles do not feel drained of time and energy (Marks, 1977). Therefore, Marks proposed an *expansion* perspective to improve understanding about the conditions under which individuals perform multiple roles without net energy loss. He suggested that one way individuals may make time to fulfill multiple roles is by doing two or more things at once (Marks, 1977). Similarly, Turner (1962) proposed that individuals might reduce role strain by merging two apparently conflicting or competing roles. Applying this expansion or merger perspective to academic work, faculty members might expand available time and energy by engaging in behaviors that simultaneously satisfy expectations for both research and teaching roles.

Faculty members' opportunities to integrate teaching and research, however, are likely to vary with the relative compatibility of expectations for the two roles and the rigor with which expectations for the two roles are defined (Getzels & Guba, 1954; Secord & Backman, 1974). Work role expectations are defined by the contexts within which individuals perform their roles (Katz & Kahn, 1966). Faculty face expectations from two work contexts about how to accomplish teaching and research goals: the organizational contexts of their colleges and universities and the professional contexts of their disciplines (Clark, 1983). Faculty who work in institutions or disciplines that rigorously define faculty roles might have fewer opportunities to integrate teaching and research than faculty who work in institutions or disciplines that have less rigid or clearly defined role expectations.

Prior research has shown that faculty behavior is less likely to be controlled by formal bureaucratic rules in research universities than in comprehensive universities (Baldrige, Curtis, Ecker, & Riley, 1978; Clark, 1987). In research universities, faculty tend to be treated like professionals who set their own work agendas and participate in setting organizational direction and purpose (Finkelstein, 1984). In comprehensive universities, faculty are treated more like employees and are therefore held

more accountable for expected work than research university faculty (Clark, 1987). In addition, faculty in comprehensive universities are more likely to be unionized than their counterparts in research universities. Collective bargaining agreements may contribute to the documentation and standardization of faculty work (Baldrige, et al., 1978). Faculty in comprehensive universities may face more rigidly defined and differentiated expectations for their teaching and research roles than their counterparts in research universities. As a result, comprehensive university faculty may find fewer opportunities than research university faculty to integrate teaching and research.

Disciplines vary in the degree to which there is consensus about paradigms. Paradigms are defined as the theories, methodologies, techniques, and problems addressed within a discipline (Braxton & Hargens, 1996; Lodahl & Gordon, 1972). The degree of paradigm consensus influences social relations among faculty and expectations for faculty behavior within a discipline (Becher, 1989). In high paradigm consensus or “hard” disciplines, knowledge is perceived as cumulative and concerned with universals, quantification, and discovery (Becher, 1989; Biglan, 1973). Hard disciplines are characterized by widespread agreement about curriculum content, research collaboration, competition for recognition and funding, clearly defined intellectual boundaries, and gatekeeping of those boundaries by a powerful elite (Becher, 1989; Lodahl & Gordon, 1972). In contrast, low paradigm consensus or “soft” disciplines consider knowledge as recursive; scholars use new lenses to explore intellectual territory already mapped by others. Knowledge is also concerned with particulars, qualities, and understanding (Becher, 1989; Biglan, 1973). Soft disciplines are characterized by idiosyncratic curricula, weak boundaries, independent research efforts, and tolerance for unusual ideas or methods (Becher, 1989; Biglan, 1973). The knowledge and social structures of hard disciplines appear to define faculty work behavior more rigorously than the knowledge and social structures of soft disciplines. Faculty in hard disciplines, therefore, may have fewer opportunities to integrate teaching and research than faculty in soft disciplines.

Other elements of university and disciplinary contexts may also enhance or constrain faculty opportunities to integrate teaching and research. Previous studies show that availability of resources (Martin, Schermerhorn, & Larson, 1989), co-workers’ values (Scott, 1998) and communication patterns (Maehr & Braskamp, 1986) influence individual work performance. This study explored how governance structures, paradigm consensus, policies, resources, communication patterns, and

colleagues' values influenced the ways and the extent to which faculty integrated teaching and research.

Methods

Because there is so little systematic information about how faculty integrate teaching and research or the contextual conditions that enhance or constrain integration, this exploratory study used a research design that included direct observation of faculty activities and interviews with faculty and administrators. To explore how university and disciplinary contexts influence teaching-research integration, I observed faculty work in four departments selected for university and disciplinary variation. Faculty were deeply involved in professional governance at Vantage University, an elite research university. In contrast, the unionized faculty at Cosmopolitan State perceived a great distance between themselves and the administrators of their public comprehensive university.² (Institution and faculty names are pseudonyms.) At Vantage and Cosmopolitan State universities, I observed faculty at work in physics, a "hard" or high consensus discipline, and in English, a "soft" or low consensus discipline (Biglan, 1973; Braxton & Hargens, 1996).

Observations of Integration

Using methods developed by Mintzberg (1973) to analyze managerial work, I conducted structured observations of a purposive sample of twelve faculty members: three faculty in each of the four departments. All were white male full professors nominated by their chairs as being excellent at both teaching and research.³ I observed the work of each professor on five non-consecutive work days, for a total of 60 days (442.5 hours) for all twelve. Observations of each faculty member occurred across days of the week; across beginning, middle, and end of terms; and across more than one term. On observation days, I interviewed participating faculty members to obtain specific and fresh information about confidential meetings and work activities accomplished at home, after regular working hours, or off-campus the previous day or weekend. The data include records of 587.2 hours of immediately reported activities.⁴

During the observations, I recorded the duration of each faculty activity.⁵ Activities were the tasks actually performed by faculty members and involved three factors: (1) the academic *goals* that were accomplished by doing the activity, (2) the specific *action* performed, and (3) the actual *allocation of time* to one or more purposes and actions (Mintzberg, 1973). Goals of faculty work included teaching, research,

administration, and service. Actions were the specific tasks performed that accomplished one or more goals. Teaching actions included classroom instruction, class preparation, informal instruction, advising, developing new courses, grading, and participating in meetings about teaching (Braskamp & Ory, 1994; Yucker, 1984). Research action categories included conducting inquiry (investigating or developing new knowledge), scholarship (engaging in tasks that contribute to professional development or general expertise in one's field), working on logistics (tasks that indirectly support inquiry), writing, presenting, and doing grant work (Braskamp & Ory, 1994; Creswell, 1985; Yucker, 1984).

A total of 4049 activities were recorded in an EXCEL data base with fields for the time each activity began, the duration in minutes, the goal(s) served, the action(s) taken, and whether the activity was reported or observed. I coded activities that fulfilled more than one goal for all appropriate goals. Goals were determined from professors' own descriptions, or from evidence in the verbal, temporal, or physical context of the activity. I coded research and teaching integration conservatively: research was coded as integrated with teaching only when the activity involved the faculty member's current research or when he used research in his teaching that had been completed within the previous year.

To analyze ways and the extent to which each faculty member integrated teaching and research, I calculated the proportion of total reported time that the faculty member allocated to each goal and action of work. I analyzed the extent to which each faculty member integrated teaching and research, and what kinds of actions occurred during the periods of integration. I then compared similarities and differences in patterns of integration across disciplines and universities.

Interviews about Contexts

To obtain information about university and disciplinary contexts, I interviewed the observed faculty ($N = 12$), four to five of their faculty colleagues ($N = 18$), the chairs and deans in each of the four departments ($N = 9$). Faculty and administrators shared their perceptions of how their university and disciplinary contexts affected the work activities of all faculty in their department and their own work in particular. The interview guides included questions such as: "What resources are available at [university] to help faculty accomplish [teaching/research] goals?" "How do formal policies at [university] affect work done by faculty?" "What are the activities valued [most/least] at [university]? How do you know?" and "How do [discipline] professors communicate with each other within and across university boundaries?"

Data Analysis

I followed guidelines suggested by Miles & Huberman (1984), Strauss (1987), and Yin (1989) to analyze faculty members' and administrators' perceptions of how contexts influenced faculty work. When coding interview transcripts, each time an informant described a support or constraint of faculty work, I tabulated: the context from which the support or constraint originated (university or discipline), the goal(s) of work supported or constrained (teaching, research, or a combination), the means by which the faculty member perceived the support or constraint, and the attitudinal or described behavioral response to the support or constraint. I conducted a within-case analysis of each department, looking for supports and constraints that were salient to most of the faculty and administrators in each department sample. A cross-case analysis revealed similarities and differences in elements of contexts across the two disciplines and the two universities. Finally, I related data from interviews about contextual influences on integration with the various ways that faculty integrated teaching and research.

Contextual Influences on Teaching-Research Integration

The English and physics faculty whose work I observed at Vantage and Cosmopolitan State Universities integrated teaching and research between 8% and 34% of their total time recorded for this study. The mean proportion of integrated teaching and research time for the sample of twelve faculty was 19%. The sample of twelve faculty is too small to generalize findings about the extent of teaching-research integration to larger populations of faculty in their departments, universities or disciplines. That does not affect the power of this study, however, to identify the types of teaching and research activities most likely to be integrated and the characteristics of contexts that enhance or constrain such integration. Patterns that emerged from comparing and contrasting activities and contexts suggest that the nature and opportunities for teaching-research integration differ according to the purpose of the teaching effort, disciplinary paradigm consensus, disciplinary norms for training students to conduct research, university evaluation and reward policies, and faculty involvement in decision making.

Purpose of Teaching

Scholars and institutional researchers usually categorize faculty members' teaching according to the level of students taught: undergraduate or graduate. This study revealed, however, that the ways faculty integrated

teaching and research was influenced less by the level of students taught than by whether the purpose of their teaching efforts was classroom instruction or training students to conduct research. Classroom-oriented teaching activities involved conveying knowledge and skills in regularly scheduled courses to students of all levels from freshmen to advanced graduate students. Research training activities involved empowering undergraduate and graduate students to pursue independent inquiry according to disciplinary standards. Table 1 shows the proportion of total time recorded for this study that faculty integrated classroom-oriented teaching and research, research training and research, and all teaching with research.

Classroom-oriented teaching actions were similar in both English and physics departments at both universities, whether faculty were teaching undergraduate, master's, or doctoral students. These actions included formal teaching during scheduled class hours, class preparation, informal out-of-class teaching about course-related material with one or more students, advising, course development, grading, and informal and formal meetings with colleagues or teaching assistants about scheduled courses. Faculty were more likely to integrate classroom-oriented teaching with research when their teaching actions involved formal teaching, preparation, and course development and when their research actions involved presentation, inquiry, or scholarship. For example, Vantage English professor Jim Gabriel prepared for a class composed of graduate

TABLE 1
Proportion of Time Faculty Integrated Teaching and Research

Institution/ Name	Classroom Teaching w/Research	Research Training w/Research	All Teaching w/Research
<i>Cosmopolitan Physics</i>			
Hank Powell	2	9	11
Gary Byrne	34	0	34
Ryan Neumann	0	8	8
<i>Cosmopolitan English</i>			
Aaron Chase	17	2	19
Darryl Allen	24	0	24
Mike Easton	15	1	16
<i>Vantage Physics</i>			
Sam Youngman	14	19	33
Paul Zepeda	3	25	28
Ted Klein	0	11	11
<i>Vantage English</i>			
Rich Jeffers	16	1	17
Jim Gabriel	8	0	8
Blake Saxon	14	9	14

and undergraduate students by reading a manuscript that he was reviewing for a publisher on a topic related to his current research. Jim opened class discussion that day by reading several pages from the manuscript to the class. He pointed out several of the intriguing arguments made in the manuscript and used them to stimulate class discussion.

Research training actions were similar in both disciplines at Vantage and Cosmopolitan State Universities, whether the students involved were undergraduates, master's, or doctoral students. When faculty trained students to conduct research, teaching actions often involved informal instruction or formal meetings with research teams. Integration of research and research training occurred most often when faculty members' research actions involved inquiry (investigating or developing new knowledge) or working on logistics (such as procuring source texts or making a list of parts needed to build experimental equipment.) For example, much of theoretical physicist Sam Youngman's teaching efforts at Vantage consisted of exploring ideas with students. Sam and one or more graduate and undergraduate students would discuss concepts and work through mathematical analyses of theoretical alternatives. During discussions that might last two hours, students came and went to attend classes or to other responsibilities; Sam would continue developing theory with whoever was available. The purpose of faculty members' teaching efforts interacted with elements of their disciplinary and university contexts to shape the ways and the extent to which they integrated teaching and research.

Disciplinary Paradigm Consensus and Knowledge Structures

Disciplinary differences in paradigm consensus and knowledge structures provided English faculty with more opportunities than physics faculty to integrate research with classroom-oriented teaching. English faculty described research in their discipline as understanding the complexity of particular written works. Interviews conducted for this study confirmed earlier research findings (Biglan, 1973; Becher, 1989) that faculty in soft disciplines disagree about which texts should be studied, and about the theories or methods by which the texts should be interpreted. Consequently, knowledge expands horizontally in English; new developments are added alongside existing research traditions. I observed that the flat and expansive nature of knowledge development made it relatively easy for English faculty to teach their current research to undergraduate as well as graduate students. In addition, lack of consensus about appropriate curriculum and course content gave English faculty flexibility to design courses related to their research. According to Cosmopolitan State English professor Aaron Chase:

We have very few titles for classes here. The class title is the same, for instance, "The Theory of Literature." But under that umbrella, the possibilities are endless, and individual instructors will conceive that class with a tremendous degree of variability. That's one of the things that I think people like about here. Here we teach too much, but what we teach is able to bear a strong personal imprint.

Jim Gabriel described a similar flexibility in course design in the Vantage English department. He said, "The wonderful thing about Vantage is that you can teach—provided that you can get people interested in it and get enough people—you can teach what you're working on. . . . I certainly find that is the best teaching I do." English faculty integrated their research with class preparation and instruction for undergraduate as well as graduate courses. Rich Jeffers, Jim Gabriel, Blake Saxon, and Mike Easton used materials for teaching undergraduate or graduate courses that they were also reading and analyzing for books they were writing. Cosmopolitan English professors Darryl Allen and Aaron Chase taught undergraduate literature courses that dealt with themes or language similar to the themes and language the professors wrote about in their fiction.

In contrast, the physicists with whom I spoke described their discipline as having a high level of agreement about content and method, confirming prior research that faculty in hard disciplines agree about "accepted knowledge" in their fields (Lodahl & Gordon, 1972). They also told me that the cumulative and hierarchical knowledge structure of physics required students to master fundamental concepts and methods before progressing to the next level of understanding. Most undergraduate students and many beginning graduate students were unlikely to understand the details of a faculty member's frontier-level research. As a result, most of the physics faculty I observed found it difficult to integrate their research with their classroom-oriented teaching. Five of the six physicists I observed were conducting research at or near the frontiers of knowledge in their specialties. In undergraduate and many graduate classes, however, they were teaching students the fundamental principles of the discipline. A Vantage physicist said that physics is "so hierarchical that you get locked into this and you have to cover this and you have to cover this, and this, and this. There's just no time . . . to develop things that are a little out of the mainstream." As will be discussed in subsequent sections, university and departmental policies moderated the disciplinary influences, however, providing opportunities for some physicists to integrate classroom instruction with their research.

Role theory suggests that the more rigorously expectations for two roles are defined, the less likely individuals will be able to integrate the two roles (Secord & Backman, 1974). My observations and interviews

revealed that high levels of paradigm consensus in physics did indeed define both classroom-oriented teaching and research roles more clearly than low levels of paradigm consensus in English. Widespread agreement about course content and teaching methods rigorously defined physicists' classroom-oriented teaching actions. Moreover, the hierarchical structure of knowledge in physics dictated that physics researchers pursue inquiry at a level of understanding beyond the understanding of all but the most advanced students in the classroom. In contrast, low paradigm consensus gave English faculty more latitude to design the content and methods of their courses. The horizontal structure of knowledge in English allowed faculty to pursue research across a broad array of topics that students in all levels of collegiate courses understood. These findings lead to the empirically grounded Proposition 1, testable with larger populations: *Faculty in low paradigm consensus fields integrate classroom-oriented teaching with research more than faculty in high paradigm consensus fields.*

Disciplinary Norms for Research Training

Normative expectations for faculty members' research training roles provided physicists with more opportunities than English faculty to integrate research with training students to conduct research. Physicists integrated research and teaching as they worked alongside undergraduate and graduate research apprentices. Physics faculty perceived the process of exploring physical reality as something that could be enhanced by sharing and subdividing experimental tasks. Paul Zepeda scheduled weekly meetings with his six-person student research group. He also often conducted experiments or analyzed data alongside students in the lab. Hank Powell frequently worked with one or more students, perhaps writing code on one computer while a graduate student performed calculations on another computer and an undergraduate read articles relevant to the project. When a physicist reviewed a research student's paper, the paper usually contributed to the professor's research project, and the professor was a coauthor. The norm for collaborative research training prevailed in physics even when the work could not be easily subdivided. Vantage physicist Sam Youngman and his undergraduate and graduate apprentices worked together on the conceptual development of holistic theoretical problems.

In contrast, English faculty counseled individual undergraduate and graduate research students about the students' work. English students' research efforts seldom contributed directly to faculty research. English professors talked about research as personal involvement with literary texts or with their own lived experience. Most used the word "engagement" when discussing their strengths as researchers. English faculty

felt that this sense of personal engagement was something that individuals must discover for themselves. Professors could model, demonstrate, and encourage students, but not participate in the process with students. As Vantage English professor Jim Gabriel said, "I try to point out the beauties, the complexities, and joys that exist in [literature]. And I try to engage the students in their own interactions and reading which produce exciting new meaning for them. I hope." In their one-on-one meetings with students, English faculty asked facilitating questions, offered information about references, made suggestions for content and structure of theses, and counseled students on career and personal issues related to the topic or the conduct of the student's research. Then faculty sought time and office space away from students to engage their own writing efforts. The norm for training by individual counseling prevailed among the faculty I observed and their department colleagues despite evidence that some English faculty use a master-apprentice model elsewhere. Vantage English professor Blake Saxon told me that some of his disciplinary colleagues in Europe subdivided research tasks with student apprentices. He acknowledged that he might produce more research if he followed their model, but added, "That might be nice, but I like doing a lot of the work myself."

My observations confirmed results of previous studies, showing that faculty in hard disciplines are more likely to engage in research collaborations with peers and students than faculty in soft disciplines (Becher, 1989). I observed that physicists taught students how to conduct research according to a master-apprentice model while English faculty used a counselor model. Scholars have theorized these differences occur because researchers in hard disciplines, such as physics, investigate subdividable problems, whereas researchers in soft disciplines, such as English, explore holistic issues (Lodahl & Gordon, 1972; Becher, 1989). I found, however, that physicists may work together with students on holistic problems and that it is possible for English faculty to subdivide tasks among members of a research team. Thus, the contrasting methods of research training in physics and English did not appear to be a natural consequence of disciplinary paradigm consensus or knowledge structures, but of taken-for-granted social norms within each discipline. Whatever the cause, role expectations for research training appeared to be defined with equal rigor in both disciplines. Role compatibility, however, differed between physics and English. The master-apprentice model for research training was compatible with physicists' role expectations for conducting one's own research. In contrast, the English counselor model for research training was incompatible with disciplinary role expectations for conducting one's own research. This finding is

consistent with role theory that opportunities for integrating two roles will vary with compatibility of role expectations (Secord & Backman, 1974), and leads to the empirically grounded Proposition 2: *Faculty who use a master-apprentice model to teach students how to conduct research will integrate research and research training more than faculty who use a counselor model to teach students how to conduct research.* Furthermore, because of disciplinary social norms, faculty in hard disciplines are more likely to use a master-apprentice model, and faculty in soft disciplines are more likely to use a counselor model for research training.

University Research Evaluation Policies

University policies for evaluating faculty research provided Cosmopolitan State faculty with more opportunities than their Vantage University colleagues to integrate classroom-oriented teaching with research. Cosmopolitan State University standards for what counted as valuable research were more specific but also more broad than Vantage University standards. The Cosmopolitan State faculty handbook listed fourteen specific categories of “Research, Creative, and Professional Activities.” The list began with “articles or creative work published in refereed professional or trade journals,” but also included textbooks, newsletter articles, and creative works published in popular media. Thus, the Cosmopolitan State policy suggested that a range of activities, even those that might not be considered frontier-level research within a discipline, should be considered when evaluating the professional work of faculty. In contrast, the Vantage University faculty handbook section about evaluating research for promotion, tenure, and salary focused not on *what* should be included in faculty research evaluation but on *how* a professors’ publications should be evaluated: “The evaluation will normally include outside evaluation of the candidate in comparison with the very best persons in his or her field at the same level of professional development.” Thus, the Vantage University faculty knew they were expected to produce research that would be considered among the best by other leaders in their disciplines. The difference in university policies had more potential to influence integration of research and classroom-oriented teaching for physicists than for English professors. As described earlier, low levels of disciplinary paradigm consensus and horizontal knowledge structures facilitated such integration for English faculty at both universities.

Contrasting experiences of physicists at the two universities illustrate the impact of the differing research evaluation policies on physicists’ opportunities to integrate classroom-oriented teaching. Cosmopolitan physicist Gary Byrne integrated classroom teaching and research more

than any faculty I observed. Gary's research involved writing an introductory physics textbook incorporating new pedagogical techniques. The textbook evolved from Gary's experiences teaching introductory physics to Cosmopolitan State's diverse student population course every term. Even though high duplicating costs prevented Gary from distributing copies of the draft for students' use, his lectures often included explanations that had been carefully crafted for the textbook. In contrast, Vantage physicists faced university-reinforced disciplinary expectations that research should involve developing new knowledge. Paul Zepeda found that meeting such expectations left little time for synthesizing existing physics knowledge in textbooks or educational materials. Paul showed me a text for a computer-aided physics course he had written three years previously. He had enjoyed writing the text and continued to receive many inquiries from faculty at other universities about it. Although he had been asked to write a sequel, Paul would not; he knew his department colleagues would not recognize the value of such a project.

Although role expectations for research were defined with more clarity and specificity at Cosmopolitan State than at Vantage University, Cosmopolitan State standards actually recognized a broader range of activities as counting for faculty research. Vantage University policies were nonspecific, but they effectively constrained faculty research activities to fit each discipline's definition of excellence. In 1990 Carnegie Foundation president Ernest Boyer called for "a more inclusive view of what it means to be a scholar," to include scholarships of inquiry, integration, application, and teaching (Boyer, 1990, p. 24). In effect, Vantage research evaluation policies limited research to the scholarship of inquiry, whereas Cosmopolitan State policies embraced scholarships of inquiry, integration, application, and teaching. The broader definition fostered more compatibility between faculty members' research and classroom teaching roles and, therefore, the potential for greater role integration. These findings lead to Proposition 3: *The broader the university definition of what counts for research, the more faculty are able to integrate research and classroom-oriented teaching.* This may be especially true for faculty who work in hard disciplines with hierarchical knowledge structures.

Faculty Involvement in Department Decision Making

Having a voice in decisions about teaching assignment enhanced faculty members' opportunities to integrate research and classroom-oriented teaching. English faculty at both universities requested the courses they wished to teach. The chairs did their best to honor faculty requests. Sometimes chairs asked faculty to teach less desired courses to cover the

required curriculum. Faculty felt their requests were met often enough to enable them to design some courses to complement their current research interests. Vantage physics faculty also chose which courses they taught. Although the hierarchical knowledge structure in their discipline restricted opportunities for integrating classroom-oriented teaching and research, Vantage physicists could choose to teach upper division or graduate courses that provided the foundation knowledge for their specialties. In such cases, Vantage physicists showed students how the principles taught in class might be applied with examples from their current research. Vantage physicist Sam Youngman integrated classroom-oriented teaching and research when he taught a course on what he called “the edge” of his research to advanced graduate students and postdoctoral fellows. Vantage physicist Paul Zepeda described the occasions when he brought his research into the classroom:

Normally I would say that you know there is one thing once a week, one out of every three lectures, there will be some topic that comes out of the more recent [research]. . . . So it gives the students a chance to look into some things and directions that are very closely related to current research activities. . . . It brings the topic into somewhat more life rather than a dust-covered textbook.

Except for Gary Byrne, Cosmopolitan physicists found fewer opportunities than their colleagues at Vantage to bring their research to life in the classroom because they had little say in which courses they taught. The chair made all teaching assignments. Both the Cosmopolitan dean of science and the physics chair endeavored to foster a supportive environment for research by minimizing classroom teaching responsibilities for active researchers. The dean reduced their teaching loads. The chair reduced active researchers’ class preparation time by assigning them to teach the same courses term after term. Star researcher Ryan Newmann appreciated the opportunity to focus on his research but also said that the classroom teaching and research aspects of his work were “totally separate.”

Based on prior research, I expected that the top-down bureaucratic structure and faculty union contract at Cosmopolitan State might lead to rigidly defined and differentiated role expectations for faculty teaching and research. I also expected that active faculty participation in governance at Vantage University might foster faculty autonomy and, hence, more opportunities for integrating teaching with research. Findings from this study, however, suggest that faculty participation in department decision making may be a more important influence on teaching-research integration than university governance structures. Even though paradigm consensus and hierarchical knowledge structures constrained inte-

gration of research with classroom instruction for most of the physicists who participated in this study, participation in decision making about course assignments provided Vantage physicists with more integration opportunities than their physics colleagues at Cosmopolitan State. Moreover, even though they worked at the same university, Cosmopolitan English faculty had more voice about their classroom teaching assignments than did Cosmopolitan physics faculty. This leads to Proposition 4: *The more that faculty are involved in departmental decisions about teaching assignments, the more able they are to integrate teaching and research by teaching courses about their current research topics or incorporating information about their current research in existing required courses.*

Perceived Benefits of Integrating Teaching and Research

Despite differing university and disciplinary contexts, all faculty whose work I observed for this study felt that they had more work to do than they could reasonably accomplish. Some faculty responded to overwhelming administrative expectations for both teaching and research by focusing on one goal at the expense of another or by trying to accomplish both goals separately. Other faculty responded to the same expectations by integrating teaching and research. Cosmopolitan physicists illustrate the alternative responses to integrating classroom-oriented teaching with research. Ryan Neumann acknowledged that he sometimes neglected classroom teaching in the effort to accomplish his research goals. He told me that the chair and dean “pull strings in the background to make sure that I teach the same courses and that I’m not overly burdened with teaching; that allows me to stay competitive in research. . . . The good news is that the research is going well. The bad news is that teaching is becoming too hard just to fit in.” Hank Powell told me that his main strategy for achieving both classroom teaching and research goals was “working long hours.” Gary Byrne was used to long hours in order to teach four courses and conduct frontier research. He told me that after a few years, he “discovered that there was a week in bed ill each term, and I decided that was stupid. And so I began cutting corners.” Gary “cut corners” by redirecting his research efforts to writing an introductory physics textbook, a project that integrated research more effectively with his classroom teaching responsibilities.

Faculty comments revealed benefits they derived from integrating research with research training. Hank Powell said, “Having people that you do research with that you also teach is an efficient thing.” Sam Youngman told me, “my closest colleagues are my students” and “the

best thing about being here at Vantage is the students. They are the best students in the country. That is why a lot of faculty are very successful.” Faculty also talked about the benefits they derived from integrating research with classroom-oriented teaching. When English professor Darryl Allen took a sabbatical from Cosmopolitan State, “little new work emerged. Part of the reason was that I was not working with something else.” Time away from teaching hurt rather than helped his writing. Darryl described how teaching invigorated his fiction writing:

There are ways the memory works through the immediacy of teaching that gets into the writing. . . . Then there is the pressure of talking to others, the energy that comes from talking to others. The importance of the work and the language has to be in you in a more complete way than if you were just reading it for yourself.

Thus, faculty observed for this study found that integrating research and teaching enhanced their research as well as helped them to manage the demands of classroom teaching, training research students, and producing publications.

Discussion

This study challenged assumptions about fragmentation of faculty roles by literally looking at what faculty do and provided evidence that faculty do occasionally integrate teaching and research. On average, the faculty observed for this study accomplished teaching and research goals simultaneously during one-fifth of their work time. The empirical evidence that faculty integrate their teaching and research roles is consistent with Marks’s (1977) expansion perspective on individual performance of multiple roles. Observations revealed that individuals are not continually faced with decisions about fulfilling the expectations of one role at the expense of others. The faculty who participated in this study sometimes chose to engage in activities that simultaneously satisfied expectations for two roles. They integrated teaching and research, or in Turner’s (1962) terms, they “merged” the two roles.

Faculty members’ opportunities to integrate teaching and research were shaped by the ways expectations for the two roles were defined by their disciplinary, university, and departmental contexts. Consistent with Getzels and Guba (1954) theory of severity of role conflict, differences in rigor and compatibility of role expectation definitions corresponded with differences in levels of teaching-research integration. Disciplinary paradigm consensus and knowledge structures were more rigorously defined in physics than in English. As a result, physicists integrated re-

search with classroom teaching less than English faculty. Relative compatibility of role expectations for research and teaching students to conduct research enhanced physicists' opportunities to integrate the two roles. In contrast, English disciplinary expectations for a counselor role as faculty taught students to conduct research seemed incompatible with expectations for how faculty should conduct their own research.

Rigorously defined role expectations may not, however, reduce opportunities for role integration, if the clearly defined role expectations are broad in scope. Although expectations for research were more clearly defined at Cosmopolitan State University than at Vantage University, the Cosmopolitan State expectations permitted a specific but broad range of research activities corresponding to Boyer's (1990) scholarships of inquiry, application, integration, and teaching. The Vantage University research role expectations were vaguely defined but in practice allowed only for the scholarship of inquiry. Finally, departmental differences in faculty participation in decisions indicated that role expectations are socially negotiated. Some contexts provide more opportunities than others for individuals to negotiate actively the definitions of their role expectations.

Limited expectations for faculty members' teaching role may have restricted some scholars' and observers' perceptions of teaching-research integration. The distinction between classroom-oriented teaching and research training is seldom noted by faculty members themselves or by those who study their work. Indeed, most scholars who have discussed or investigated the relationship between teaching and research have focused either on classroom-oriented teaching or on research training, but not both. As a consequence, each scholar's conclusion about whether teaching and research conflict, are not related, or are complementary has been influenced by the type of teaching on which the scholar has focused. Barnett (1992), for example, discussed higher education in terms of teaching students in courses and concluded that "the roles of teacher and researcher are distinct" (p. 633). Faculty role conflict studies usually measure teaching outcomes with students' evaluations of faculty members' classroom performances (Feldman, 1987; Hattie & Marsh, 1996; Braxton, 1996). Thus, the research training aspect of faculty teaching endeavors has been omitted from these investigators' discussions, and they conclude that there is little or no relationship between teaching and research. In contrast, Clark (1997) and Kolson and Yuen (1993) advocate hands-on teaching in and out of the classroom that should be rooted in research activity; they encourage and expect high levels of teaching and research integration. Scholars' definitions of the teaching role influence their expectations for role conflict or integration.

The results of this study reveal the inadequacies of investigating con-

flict or complementarity of teaching and research when teaching is considered either as primarily oriented toward the classroom or as primarily oriented toward training students to conduct independent inquiry. All of the faculty I observed engaged in classroom-oriented teaching and in research training with both undergraduate and graduate students. Their disciplinary, university, and departmental contexts, however, shaped how they integrated the two types of teaching with research. Integration of classroom-oriented teaching and research appeared to be facilitated by low levels of disciplinary paradigm consensus, horizontal and expansive knowledge structures, a broad university definition of research, and faculty participation in decisions about course assignments. Integration of research training and research appeared to be facilitated by disciplinary norms for collaborative work.

Implications

This study shows that important information about faculty work is missing from much prior research on faculty workload and faculty work role conflict. As noted above, the results of workload studies that asked faculty to estimate the time they allocated to purposes of work defined as mutually exclusive did not, by their design, allow for reporting of the time that faculty work fulfilled more than one purpose. As a consequence, the proportion of time allocated to some purposes of work was probably underestimated. Two workload studies conducted at single institutions allowed faculty to estimate time that their activities contributed to more than one institutional objective (teaching, research, service, administrative, or clinical), and found that faculty accomplished multiple goals as much as 45% of their work time (University of California, 1970; Lee & Kutina, 1974). Future studies should explore the extent of research-teaching integration for larger populations of faculty.

This study's findings are limited by the nature of the study and the sample. The faculty who participated in this study constitute a purposive sample of faculty in two disciplines at two universities rather than a representative sample of all faculty. I have described these particular faculty and their particular university and disciplinary contexts so the reader interested in applying the analyses to other individuals and contexts can judge which findings are transferable to a new situation (Lincoln & Guba, 1985). The concepts and propositions generated by this analysis are testable in other situations and with other groups of faculty. Women, minorities, not-yet-tenured, and part-time faculty are likely to experience their university and disciplinary contexts differently from full professors. Moreover, even in the same department, tenured full professors

whose interests and abilities in teaching and research vary are likely to integrate teaching and research at varying levels. Future research might explore the ways that gender, race, rank, and ability influence the ways and the extent to which faculty integrate teaching and research.

Policies designed to reward faculty only for teaching or only for research may encourage faculty to focus their attention on one aspect of work at the expense of the other. Instead, increases in faculty productivity may be more likely to occur when working conditions are fostered that encourage integration of teaching and research (Layzell, 1996). The patterns of teaching-research integration identified in this study have a number of implications for faculty members and administrators.

Faculty who work in disciplines where the counselor model of research training predominates should be encouraged to collaborate more frequently with undergraduate and graduate research students. Faculty who work in disciplines such as English, where researchers typically work alone, could explore interpretations of texts or cultural analysis with their student apprentices, thereby training students to conduct research while simultaneously making progress on their own research. Theoretical physicist Sam Youngman demonstrated that research can be accomplished in groups even if tasks cannot be easily subdivided. Some research tasks can be subdivided, even in soft disciplines. English professor Blake Saxon described how research tasks were divided among assistants by his disciplinary colleagues in Europe. As Blake acknowledged, working collaboratively with students more often might increase faculty productivity.

Faculty who work in hard disciplines with hierarchical knowledge structures should be encouraged to invigorate their classroom presentation of elementary principles with examples from the faculty members' current research. As noted above, Vantage physicist Paul Zepeda showed that even a physicist conducting research on the frontiers of the field can bring aspects of his current research into undergraduate lectures and discussion. Faculty will have more opportunities to integrate research and classroom-oriented teaching if they have a voice in decisions about teaching assignments. Furthermore, the experience of Cosmopolitan physicist and textbook writer Gary Byrne indicates that broadening a university's definition of research, especially to include the "scholarship of teaching" (Boyer, 1990) may be another way to increase faculty opportunities to integrate research and classroom-oriented teaching.

Notes

¹The argument that integration improves efficiency of time use makes no claim about the quality of students' learning or knowledge produced as a result of faculty members' teaching or research efforts.

²According to the Carnegie Foundation for the Advancement of Teaching (1994), Vantage is a Research University I, and Cosmopolitan State is a Master's Level University I.

³Because of the small number of faculty observed for this study, I attempted to limit variance in faculty demographic characteristics to the issues salient to the research questions: university type and discipline. Therefore, I controlled for rank, race, gender, and ability. All twelve faculty were full professors in the prime of their careers. None were considering retirement within the next five years. Because there were a total of three women and minorities across both physics departments, I only asked white men to participate in the observation phase of the study. Chairs' recommendations of capable faculty in all departments reduced the possibility that integration findings might be confounded by comparing faculty "stars" with "deadwood."

⁴These self-reports of faculty time use differ from traditional methods of self-reported time allocation in two important ways. First, the data are specific. Faculty were describing details of activities rather than estimating overall allocation of time to purposes of work over the period of an academic year. Second, the data are fresh. Faculty experienced little trouble remembering work activities for one or two days. Two professors even jotted down details about their previous day's work so their accounts to me on the observation day would be more accurate. Because the accounts faculty gave me of weekend, evening, and confidential activities are specific and fresh, they are also probably more reliable. I took as another indicator of the reliability of faculty accounts the details they shared about their personal activities. For example, one professor gauged how much time he spent preparing for class one Saturday in relation to the time he spent paying bills, working in the garden, and going out to dinner. Another faculty member knew that he finished work on a report to a funding source precisely at 9:37 P.M., because that's when he left the office to go to a movie that began at 9:45 P.M.

⁵Observer effect on work activities might have affected the internal validity of this study. Internal validity would have been threatened to the extent that faculty modified their activities when I was observing them. In fact, one faculty member who was concerned about observer effect declined to participate in the study. Evidence that my presence had some, but minimal, effect on faculty work came from three sources. First, professors talked to me only 4.5% of the total amount of time recorded for all participants in this study, and 1.9% of that time they were also accomplishing purposes of work, such as walking to class. Second, a few of the activities I observed were not exemplary; faculty were comfortable enough with my presence to engage casual conversations or attend to personal affairs. Finally, during our last interviews, several of the faculty volunteered that my presence had not changed their work patterns.

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