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ABSTRACT

This study examined the allocation of time college faculty give to various research tasks. Case studies were conducted of 12 faculty members in four departments selected for variation by university type (research and comprehensive) and discipline (Physics and English). The work of each faculty member was observed on five non-consecutive days for a total of 60 days and respondents tracked work activities performed outside of the university. Time spent on research was categorized as either: inquiry, scholarship, writing, presenting, logistics, grants, or other research. Among findings were that physicists at both institutions spent more time on research than the English professors and that there was much variation in the amounts of time spent on research activity categories. Faculty tended to enact one of two alternative contextually-shaped roles as researchers, either as developers or as synthesizers. The time spent on the combined activities of logistics, grant work, and other research tasks was similar whether or not the professor had external research funding. Nine of the 12 spent more time on teaching than on research. The faculty spent from 8 to 34 percent of their time on integrated teaching and research (mostly in informal training of student researchers). Data tables detail the study's findings. (Contains 20 references.) (JLS)

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THE MAIN RECIPROCAL FOR TEACHING LOAD: FACULTY USE OF RESEARCH TIME

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THE MAIN RECIPROCAL FOR TEACHING LOAD: FACULTY USE OF RESEARCH TIME

In his study of faculty work, *The Academic Life*, Burton Clark (1987) contrasts faculty members' "institutional obligation" to spend time teaching with their "discretionary time" to conduct research. Clark calls research time "the main reciprocal for teaching load" (Clark, 1987, pp. 72, 76). We know little about what faculty actually do with their research time for several reasons. First, policy makers and administrators are focusing more attention on ways to make faculty more accountable for their teaching than their research efforts. Ironically this concern with accountability for teaching arose because of widespread concern that faculty scrimp on teaching to save time for research, (Edgerton, 1993; Massy & Zemsky, 1994; Mingle, 1993). Even as they wish to recognize effective teaching, however, administrators still want faculty to maintain research excellence (Kennedy, 1990), and administrators reward faculty more for production of published research than for evidence of teaching effort (Fairweather, 1996).

Another reason why we know little about the process of research is because studies about research in the higher education literature usually focus on the products rather than the process of conducting research. Publication of research findings in academic journals is the accepted way to measure research productivity (Creswell, 1985; Fox, 1985). Perhaps this method is used because the eventual worth to society of new knowledge generated by research is impossible to evaluate, and because new knowledge has no current worth until it is communicated to others. Publication counts, however, provide no information about the ways that faculty actually spent their time to produce the research findings. Third, until recently, the favorable economic and political climate for research may have reduced the perceived need to account for the time and effort that faculty put into the research process. Moreover, when Federal funders requested such accounts, institutions and faculty resisted, suggesting that self-reports of time allocation were inaccurate and that reporting itself took time away from the actual conduct of research (Kennedy, 1985).

In the 1990s, the climate has changed. The U.S. Congress Office of Technology Assessment's report, *Federally Funded Research: Decisions for a Decade*, calls for data about how research is done "that would aid in understanding the opportunities and stresses on the Federal research system and in planning how the research system can adapt to changing conditions" (U.S. Congress, 1991, p. 240). The report expresses concerns that administration of increasingly large research groups is taking faculty time away from the actual conduct of research, and that research activities may interfere with faculty teaching responsibilities. Therefore, the report authors call for data about how "researchers spend their time on research (collecting data and analysis), proposal writing, teaching (classroom and one-on-one) travel, presenting results to scientific colleagues, and other pursuits (U.S. Congress, 1991, p. 241). This study responded to that call, using direct observations of faculty at work to address the following questions:

1. How do faculty spend time on research activities?
2. What variations exist in faculty research activities? How do differences in disciplines and universities influence this variation?
3. In what ways do faculty research activities interfere with teaching responsibilities?

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is derived from literatures about contextual influences on faculty productivity and about the content and characteristics of work.

THE CONTEXTS OF FACULTY WORK

Faculty work is embedded in a master matrix: faculty perform their work in the organizational contexts of their colleges or universities and in the professional contexts of their disciplines (Clark, 1983; Alpert, 1985). National faculty surveys indicate that university and disciplinary work contexts influence aspects of faculty work. For example,

the type of higher education organization¹ predicts variations in faculty research productivity (Creswell, 1985), teaching practices (Clark, 1987; Finkelstein, 1984), and stated preferences for teaching or research (Boyer, 1989). Other studies suggest possible ways university contexts shape faculty work. In colleges and universities, formal authority structures range from bureaucratic to professional, and the variation is related to the prestige of the organization. Prior research has shown that the less prestigious the type of higher education organization, the more faculty behavior is controlled by formal bureaucratic rules (Baldrige, et al., 1978; Clark, 1987). In high prestige organizations such as research universities, faculty tend to be more like professionals who set their own work agendas and participate in setting organizational direction and purpose (Finkelstein, 1984). In institutions with lower prestige, such as comprehensive universities, faculty are more like employees and therefore are held more accountable to the institution for the work expected of them (Clark, 1987).

Previous studies show disciplinary differences are related to variations in publication rates (Creswell, 1985; Fox, 1985) and involvement in teaching (Zuckerman & Merton, 1973). Other research suggests possible reasons for disciplinary influences on faculty work. In disciplines where the nature of knowledge is considered “hard,” knowledge is perceived as cumulative, and concerned with universals, quantification, and discovery. In disciplines where the nature of knowledge is considered “soft,” knowledge is 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). The fast-paced communication patterns of hard disciplines contribute to competition for recognition and funding; in soft disciplines, publication and funding rates are low (Becher, 1989).

¹Researchers frequently distinguish colleges and universities according to the Carnegie Classification types (Boyer, 1989). Amount of external research support, type of academic program and numbers of students are the primary distinguishing characteristics between institutions offering at least a four-year degree program, including research universities, doctoral-granting universities, comprehensive colleges and universities, and liberal arts colleges.

FACULTY WORK ACTIVITIES

Faculty work is usually described in terms of three roles: teaching, research, and service. Often defined as mutually exclusive, these roles obscure both the variety of activities subsumed under each role and ways that some activities may serve more than one purpose. While conducting this study, I considered the commonly-accepted teaching, research, and service roles, but I also empirically examined the activities and interactions that faculty engage in as they pursue their work on a daily basis.

This examination of faculty work activities is modeled on Mintzberg's landmark study of managerial work (1973). Mintzberg challenged taken-for-granted notions of the work roles performed by chief executive officers of organizations. His historical perspective on the prior literature on managerial work showed how an early set of descriptors of managers' functions persisted and influenced public perceptions of managers. The acronym POSDCORB, coined in 1937, called attention to the supposed managerial functions of planning, organizing, staffing, directing, coordinating, reporting and budgeting. Researchers adopted or only slightly modified POSDCORB when designing studies of managers' work; therefore the results appeared to validate the usefulness of these descriptors. Well-trained by their business schools and management literature, managers used POSDCORB to describe the work they felt they should be doing, even when the functions did not give an accurate picture of what they actually did.

Just as acceptance of POSDCORB constrained perceptions of managerial work, perceiving faculty work only as research, teaching, and service limits our understanding of what faculty actually do. Therefore, following Mintzberg's example, I observed faculty on the job and induced conceptual categories to describe faculty work during and after observing their activities. Eight aspects of faculty work activities relate to the questions posed by this study about faculty use of research time:

1. the general academic *purpose(s)* accomplished (undergraduate or graduate education, research, administration, or service)²
2. the specific *task* performed (e.g. for research: inquiry, scholarship, logistics, grants work, writing, presenting)
3. the *substance* involved in the activity (ideas, information, people, or materials)
4. the *action* taken with the substance (e.g., for ideas: analyze, develop, assimilate, synthesize, compose, convey)
5. the *medium* of the activity (e.g., desk work, meeting, email, phone, computer, or manipulation of materials or equipment)
6. the *location* where the faculty member conducted the activity
7. the *number of participants* involved
8. the actual *allocation of time* to each activity to the nearest minute.

METHODS

I conducted case studies of twelve faculty members in four departments selected for variation by university type and discipline. They included physics (hard) and English (soft) departments at a research university and a comprehensive college. I observed the work activities of three male full professors in each department on five non-consecutive days each for a total of 60 days, or 442.5 hours. During the observations, I documented the purposes, tasks, substance, actions, media, location, number of participants, and duration of faculty activities. I observed the work of each faculty member across days of the week, across beginning, middle and end of terms, and across more than one term. I also collected information about work activities done by the faculty members at home, after regular working hours, or off campus in detailed interviews with the faculty members the evenings

²Activities that fulfilled more than one purpose were coded for all appropriate purposes. For example, when an English professor drafted notes for an undergraduate lecture that he also planned to use for a conference presentations four weeks later, the purposes were *undergraduate education* and *research*.

or weekends prior to scheduled observation days. The data includes records of 587.2 hours of such immediately reported activities.

I collected data about university and disciplinary contexts from site documents (catalogs, published speeches, newspapers, faculty handbooks), and from 51 interviews. These interviews included two formal interviews with each of the twelve observed faculty members, with four to five faculty colleagues in each department, with their department chairs, and with their deans.

Analysis proceeded in three stages. Inductive analysis of what faculty do involved coding more than 1500 pages of field notes describing details of 4049 faculty activities. Quantitative analysis involved computing descriptive statistics of faculty time allocated to purposes, tasks, substance, actions, media, number of participants, and location. Qualitative analyses of 51 interview transcripts were compared with quantitative analyses of work activities to yield patterns that suggested institutional and disciplinary influences on faculty work activities.

FINDINGS

I present the findings in three sections. The first section describes how the faculty in each department allocated time to research tasks. In the second section, I discuss how their work contexts influenced faculty member's conduct of research inquiry. The third section focuses on the ways that faculty members' research efforts complemented and conflicted with their teaching efforts.

PROPORTION OF TIME ALLOCATED TO RESEARCH TASKS

Faculty members' allocation of time to research tasks observed and reported for this study are presented in Table 1. Throughout this section and in Table 1, I discuss the activity data in terms of "proportion of total time." This refers to the combined total of observed and reported work time that I recorded during five days of observation and informal interviews with each individual professor. Total research time includes time allocated to activities that solely fulfilled research purposes as well as activities that fulfilled research and teaching, or administration or service. The three Vantage University physicists

whose work I observed spent more total time on research (mean = 60%) than the physicists I observed at Cosmopolitan State University (mean = 49%). As a group, the six physicists at both universities allocated more time to research than the six English professors (mean = 33% at Vantage and at Cosmopolitan State).

Table 1						
Percent of Total Faculty Time Spent on Research Tasks						
	<i>Cosmopolitan State Physics</i>			<i>Cosmopolitan State English</i>		
	Hank	Gary	Ryan	Aaron	Darryl	Mike
Inquiry	22	5	30	7	0	6
Scholarship	4	1	6	6	24	5
Writing	3	32	15	3	12	7
Presenting	0	1	2	5	0	7
Logistics	6	6	5	11	1	3
Grants	0	0	2	0	0	0
Other Research	1	0	2	0	0	0
TOTAL RESEARCH	36	45	62	32	37	28
	<i>Vantage Physics</i>			<i>Vantage English</i>		
	Sam	Paul	Ted	Rich	Jim	Blake
Inquiry	38	41	18	17	14	16
Scholarship	5	4	22	3	6	5
Writing	2	0	6	0	8	4
Presenting	6	0	1	2	1	7
Logistics	3	4	9	0	2	3
Grants	1	1	5	0	0	0
Other Research	11	1	6	0	8	1
TOTAL RESEARCH	66	51	63	22	39	36

I triangulated analyses of observed and reported time allocation with information about faculty overall work patterns from interviews. Usually, the interviews confirmed that the distribution of time recorded was a reasonable reflection of a professor's overall work pattern. In the following descriptions of how individual faculty spent their time on research

tasks, I note when interviews revealed that my observations over sampled or under sampled certain aspects of a faculty member's activities.

Cosmopolitan State Physics: The process and content of research were very different for the three faculty members I observed in the Cosmopolitan physics department. At 62% of his total time, Ryan Neumann spent almost twice as much time on research as Hank Powell (36%). Most of the difference was related to time spent conducting inquiry and writing.

Even on his two busy teaching days each week at Cosmopolitan State, Ryan spent some time meeting with his graduate students, discussing concepts and exploring ideas for new approaches to their project. On Mondays, Wednesdays, and Fridays, Ryan worked at his alternate office at Flagship University and made occasional trips to Flood Labs or other research facilities. Ryan's work was heavily focused on research, including inquiry (30%), writing papers and articles (15%), logistics, such as arranging travel to present his work (5%) and grant work (2%). Inquiry for Ryan usually involved meetings to explore new ideas with his post doc or graduate research assistants, computer data analysis, or operating experimental equipment and conducting analysis at Flood Labs.

In contrast, Hank was in the midst of changing his research direction, and working every day on campus at Cosmopolitan State. During one day that I observed him, Hank helped a graduate student prepare a conference paper they were co-authoring about Hank's previous line of research. However, Hank had not yet made enough progress on his new line of research to write or disseminate any findings. The proportion of total time Hank spent of writing was 3%. Working on Cosmopolitan State's campus all day every day, Hank's inquiry time (22%) was interrupted occasionally by teaching-related activities. Hank's inquiry typically involved discussing research direction with student research assistants or computer data analysis by himself. Although Hank told me about inquiry he conducted with his student assistants at an off-site lab, he did not engage in these activities when I observed him or during the time periods he reported his activities to me.

Since Gary Byrne's research consisted of writing an introductory physics textbook, inquiry meant time thinking or discussing pedagogically sound ways to communicate physics concepts with his co-author. Since Gary and his co-author were rewriting the final draft, inquiry took far less of Gary's time (5%) than writing (32%). For Gary, inquiry involved discussing major changes in the content of textbook chapters with his co-author or discussing textbook problem set changes with his student assistant. Gary also spent a portion of each morning attending to the logistics (6%) of working with the publisher, including getting permission to use copyrighted material.

Cosmopolitan State English: While the time allocated to research-related activities varied remarkably little between the three Cosmopolitan English faculty members I observed, the ways they go about research varied much. Their allocation of time to research ranged from 28 percent for Mike Easton to 37 percent for Darryl Allen.

Mike approached the field of English as a Second Language from the perspective of an applied linguist. Thus, his scholarly inquiry (6%) was more closely related to social science than to the humanities. He conducted some quasi-experimental studies with the help of two graduate students who worked with him more for the opportunity than for any kind of formal compensation. In addition, Mike did a substantial amount of consulting work that included writing and presenting on issues related to teaching English as a second language and applied linguistics. Inquiry for Aaron Chase (6%) usually involved reading for classes that related to papers or books he was writing for publication. He conducted inquiry alone and at home. In contrast, for Darryl, "research" was writing fiction. During the period I observed his work, Darryl's two primary research actions were immersing himself in literature and language that fed his own creative process (24%) and writing itself (12%).

Like Darryl, Aaron wrote fiction. Aaron also wrote literary criticism. He presented frequently at conferences and edited a refereed journal. Aaron found it difficult to get much writing—especially fiction writing—done during terms when he was teaching. While he was sometimes able to develop conference papers out of topics he covered while teaching classes, Aaron told me that he reserved fiction writing for summers and inter-sessions.

Aaron spent a larger proportion of his time (11%) on logistics than any other professor who participated in this study. A large share of this time was devoted to an assignment Aaron was given for the department self study: he wrote a detailed report of his research activities.

Vantage Physics: Overall time spent in research related activities was consistent for all three professors who participated in this study from the Vantage physics department. The proportion of individual total time spent on research was 66 percent for Sam Youngman, 63 percent for Ted Klein, and 51 percent for Paul Zepeda. Sam (38%) and Paul (41%) spent most of their research time conducting inquiry. At 17 percent, Ted allocated a lower proportion of his time to inquiry than his colleagues. For Sam, inquiry usually involved brainstorming concepts with colleagues and/or his graduate student assistants. He also occasionally read papers directly related to his own research that he downloaded from the Internet. For Paul, inquiry activities ranged from planning with his research group, testing equipment with research assistants, engaging in phone discussions with collaborators, or programming his computer either at home or in the lab. Ted's inquiry involved planning with his research group, brainstorming equipment modifications with peers and graduate assistants, and discussing article ideas with student assistants.

Because I observed Ted as he listened to conference presentations for two days, Ted (22%) spent far more time than either Paul (4%) or Sam (5%) on actions related to scholarship. While all three Vantage physics faculty spent time on research logistics (usually travel arrangements, purchasing materials, and arranging meetings), Ted spent the most time (9%) both because of his work directing the large laboratory and because of his work hosting conferences.

On one observation day with Sam, he reported that the night before he had flown home from across the country. He had attended a conference at which he had presented the keynote speech in the late afternoon. Sam told me that he had been too tired to do much work on the plane trip home. Nevertheless, he spent the hours in the air as a result of his work as a researcher. These hours contributed to the 11 percent of Sam's time that I coded as "other research."

Vantage English: In the Vantage English department, individual proportion of total time spent on research ranged from 22 percent for Rich Jeffers to 39 percent for Jim Gabriel. Much of this variation can be explained by the timing of my observations of the professors' work. All of the faculty I observed told me that teaching constrained their opportunities to write, and they were most likely to write for publication during off-duty terms and summers. Rich did no writing when I observed his work, but told me that he had been able to finish writing a book over the summer. I did observe Blake's work once during the summer, and this was a day during which he spent much time revising a draft for publication (4% of total time). On the other hand, Jim spent 8 percent of his total time writing even though he was teaching two classes every term I observed his work. He felt the pressure of meeting deadlines for the revision of a book and two conference presentations.

The proportion of time devoted to inquiry was remarkably consistent among the three Vantage faculty, ranging from 14 percent for Jim to 17 percent for Rich. During my observations, each of the Vantage English professors taught one course, either undergraduate or mixed, that was directly related to his current line of research. Inquiry for all three faculty was usually conducted alone and involved reading and analysis for class that related directly to the professor's research. Sometimes in class, the faculty presented lectures or facilitated discussions on topics they had just written about or were about to write about. Blake (7%) presented material directly related to his research more often than Rich (2%) or Jim (1%).

CONTEXTUAL INFLUENCES ON THE NATURE OF RESEARCH INQUIRY

The faculty I observed enacted two alternative contextually-shaped roles as they conducted their research. They approached their research inquiry tasks either as *developers* of new knowledge or as *synthesizers*, or interpreters of existing knowledge. Faculty who approached research inquiry as developers or creators of knowledge talked of their research in terms of direct involvement with life, nature, or concepts. In contrast, the faculty who approached research inquiry as synthesizers or interpreters of knowledge talked of their

research in terms of involvement with previously written texts. The patterns of contextual influences, faculty actions and faculty perceptions that contributed to these roles are shown in Table 2.

TABLE 2
ELEMENTS OF CONTEXTS THAT INFLUENCED FACULTY
APPROACHES TO RESEARCH INQUIRY

CONTEXTUAL INFLUENCES	FACULTY ACTIONS	PERCEPTIONS	ROLES
<ul style="list-style-type: none"> ◆ Discipline values new answers to fundamental questions (discipline). ◆ Broad university definition of what counts for research (university). ◆ Dean's policies consistent with university definition of research (department). 	<ul style="list-style-type: none"> ◆ Direct engagement with: (1) life & language, (2) concepts, or (3) materials. 	<ul style="list-style-type: none"> ◆ Perception that new knowledge addresses core life questions. 	<ul style="list-style-type: none"> ◆ Developer of new knowledge.
<ul style="list-style-type: none"> ◆ Discipline values new interpretations of existing knowledge (discipline). ◆ University definition of what counted for research either broad or consistent with disciplinary values (university). 	<ul style="list-style-type: none"> ◆ Engagement with texts. 	<ul style="list-style-type: none"> ◆ Perception that new truths emerged from interpretation of existing knowledge. ◆ Belief that pulling together disparate ideas helps others to understand them better. 	<ul style="list-style-type: none"> ◆ Interpreter/synthesizer of existing knowledge.

Developers of new knowledge included Vantage physicists Sam Youngman, Paul Zepeda, and Ted Klein, Cosmopolitan State physicists Hank Powell and Ryan Neumann, Cosmopolitan State English professor Darryl Allen, and sometimes his colleague, Aaron Chase. Faculty whose research work inquired directly about basic physical or personal

issues felt excited about the possibility of contributing to new understanding of these issues. For example, when discussing the topic of his research, *Cosmopolitan* physicist Ryan Neumann said, “I think that’s a pretty cool, basic question. . . . And I think I have a good chance of being able to contribute, if not play a major role in answering that question.” *Cosmopolitan* English professor Darryl Allen described the immediacy and the intensity of communicating life experience directly in creative fiction writing:

It’s something you live through and think about and you remember it, and all of the language is there, but when you are in the writing, not necessarily as a reader, but when you are in the writing as a writer, it’s the whole thing. . . . When you’re writing, there you have no explanation. You have no interpretation of your own work. You’re in it.

Darryl read other’s writing for inspiration, but was not interested in writing about it second hand.

Faculty who were primarily synthesizers of existing knowledge included *Cosmopolitan* State physicist Gary Byrne, *Vantage* English professors Rich Jeffers, Jim Gabriel, and Blake Saxon, *Cosmopolitan* English professor Mike Easton, and sometime his colleague Aaron Chase. Synthesizers believed that many important truths could be discovered in new interpretations of existing knowledge. *Vantage* English professor Jim Gabriel described his “vocation” or “calling” as a literary critic: “I’m trying to celebrate the greatness of human achievement in literature.” *Cosmopolitan* physicist Gary Byrne had dedicated ten years to the writing of a new textbook, his synthesis of physics fundamentals grounded in the belief that students needed guidance in “unlearning” faulty ideas about the physical universe before they could learn the correct ideas. *Cosmopolitan* English professor Mike Easton talked about the value of synthesizing information for the benefit of others:

I like to synthesize information. I like to accumulate lots of bits and pieces of material, sometimes unrelated material, and, you know, put it into a 15 minute presentation. . . . Especially nowadays in this information explosion, we desperately need that. . . . You derive your research from topics, ideas, from what other people have done. But I guess that’s part of synthesizing. In other words, my job is not to add to the information load, but to refine it.

Most of the faculty observed for this study enacted the role dominant in their own discipline. Physicists primarily develop new knowledge by seeking explanations for why the material world works the way it does. According to Gary Byrne, inquiry in physics includes the art of designing “a piece of equipment that will ask a question” as well as “working right at the fundamentals of where we don’t know what the direct description of the universe is.” The dominant mode for creative work by professors of English literature was coming up with new interpretations of existing literary texts. As Vantage English professor Rich Jeffers described it, “the act of criticism is to some extent creative in the sense that it’s an act of discovery for me. . . . I think that’s the most creative contribution that literary criticism can make. It’s opening works up so that . . . you are making it simpler, maybe easier for other readers to get into the complexities of [literary works].” His colleague Blake observed that “professors in the English department think of themselves as . . . maybe superior or at least in a higher order and position than writers [of original fiction or poetry].” Thus, those who evaluated the creative work of others tended to receive greater recognition in the discipline of English.

Three of the twelve faculty who participated in this study, conducted inquiry outside the norm in their discipline. All three, English professors Darryl Allen, Aaron Chase, and physicist Gary Byrne, worked at Cosmopolitan State. Vantage University and Cosmopolitan State University defined research in different ways. At Vantage, university recognition and reward policies supported whatever was valued as excellent by each discipline. Working within overlapping contexts that all supported knowledge creation, Vantage physicists Sam, Paul, and Ted maintained research programs that developed or tested new physics theory. Paul, however, proudly showed me materials he had prepared a few years before, synthesizing physics knowledge in a computer course. Although he received many calls and requests for the materials, Paul felt that his current schedule of experimental inquiry left no time for additional synthesizing endeavors. Such activity was recognized, but not rewarded in the Vantage context.

The same Vantage University context, however, also supported knowledge interpretation along with the dominant values in the discipline and department of English. Working within these contexts, Rich, Jim and Blake maintained research programs that criticized previously published literature. However, Rich noted with some irony that such research might be considered “second hand.” Blake observed an important paradox in valuing criticism over creative work:

We spend our lives critiquing. But there is this curious thing about our position. And it's a little bit backward. It really is strange. I don't think I share that entirely, but there is a kind of a feeling that as critics we have a greater position than people in Creative Writing. I don't know why that is. It doesn't make sense. But I think across the board it's true, because there are so few creative writing programs going at universities. Basically they are looked upon as the hacks. I don't know why, because after all, they are furnishing us the material with which we are going to work and which we admire.

At Cosmopolitan State University, the faculty I observed worked within overlapping university and disciplinary contexts that gave them either many options or mixed messages. Cosmopolitan State's university reward and recognition policies supported research agendas for all disciplines that included knowledge development, knowledge synthesis, and knowledge application. The Dean of Humanities implemented school-level policies consistent with the university policies. Working within overlapping contexts that supported multiple options for research inquiry, Aaron and Mike maintained research programs that included both knowledge development and synthesis. Darryl wrote experimental fiction. One of his stories had recently won a national award. Aaron and Darryl told me that in most contexts, disciplinary norms interacted with university values to restrict the nature of “valuable” research in English to literary criticism. Darryl felt that English was a very “conservative” discipline. Aaron described his past experience at a research university where “theoretically I could write anything I wanted, but the institutional pressures were more toward a certain orthodoxy.” Darryl and Aaron chose to come to Cosmopolitan State because the university and department supported a wide range of inquiry activities.

CONTEXTUAL INFLUENCES ON CONFLICT BETWEEN OR INTEGRATION OF RESEARCH AND TEACHING ACTIVITIES

In this section, I explore how university and disciplinary contexts influenced the ways that faculty member's research activities interfered with and integrated with teaching activities. I compare time spent on research with time spent on teaching, and discuss how teaching load and definitions of research influenced relative time allocation. I also discuss different ways that faculty integrated research and teaching. Finally, I describe how disciplinary norms for collaboration shaped the time faculty were available for informal interaction with students.

Relative time allocated to research and teaching: Of the twelve faculty whose work was observed and reported for this study, nine spent a larger proportion of their time on teaching than they spent on research, as shown in Table 3. These faculty included Cosmopolitan State physicists Hank Powell and Gary Byrne, Cosmopolitan State English professors Aaron Chase, Darryl Allen, and Mike Easton, Vantage physicist Paul Zepeda, and Vantage English professors Rich Jeffers, Jim Gabriel, and Blake Saxon. In fact, eight of the nine (excluding Paul Zepeda) spent approximately twice as much time on teaching as research. The three faculty I observed who spent more time on research were all physicists: Ryan Neumann worked at Cosmopolitan State and Sam Youngman and Ted Klein worked at Vantage University. I sampled Ted's work activities during a period when he taught only one laboratory class and when many of his efforts were directed toward preparing for and hosting two conferences for researchers in his area of study. Ryan's chair and dean helped provide a department context that enabled Ryan to direct most of his efforts toward research by finding ways to minimize Ryan's teaching responsibilities.

As a group, Vantage physicists spent more time on research (60%) than Cosmopolitan State physicists (49%). During the terms that I observed their work, Vantage physicists' average teaching load was 1.2 courses per term. In contrast, the average teaching load for Cosmopolitan State physicists was 2.4 courses per term. Cosmopolitan State physicists also spent more time than their Vantage colleagues on out-of-class tasks of classroom teaching

such as informal teaching and grading. At Vantage University, graduate teaching assistants performed grading and informal teaching tasks.

TABLE 3
FACULTY TIME ON RESEARCH, TEACHING, AND ON
INTEGRATING RESEARCH & TEACHING
(PERCENT OF TOTAL TIME)

	Total Research ³	Total Teaching ⁴	Integrated Teaching & Research
<i>Cosmo State—Physics</i>			
HANK	36	63	11
GARY	45	81	34
RYAN	62	33	8
<i>Cosmo State—English</i>			
AARON	32	76	18
DARRYL	37	80	24
MIKE	28	62	16
<i>Vantage—Physics</i>			
SAM	66	51	33
PAUL	51	60	28
TED	63	18	11
<i>Vantage—English</i>			
RICH	22	87	18
JIM	39	50	8
BLAKE	36	61	15

The English faculty whose work I observed at Cosmopolitan State and at Vantage Universities allocated similar proportions of their total time to research even though Cosmopolitan State faculty had a heavier teaching load. Vantage English faculty taught an

³Total Research includes time spent solely on research and time when faculty research activities were integrated with teaching, service, or administration.

⁴Total Teaching includes time spent solely on teaching and time when faculty teaching activities were integrated with research service, or administration.

average of 2.3 courses per term during the observation period, while Cosmopolitan State English faculty taught an average of 3.3 courses per term. Differences in administrative and faculty values in the university settings may have minimized variation in the proportion of time spent on research in the two English departments. First, research is more broadly defined in the Cosmopolitan State faculty manual and union contract than it is at Vantage University. Moreover, the Cosmopolitan State Dean of Humanities, the English department chair, and the faculty also value a wide variety of published works as evidence of “professional development.” Therefore, the time that Aaron Chase and Darryl Allen write fiction and time that Mike Easton spent writing a newsletter were considered research activities in the Cosmopolitan State University English department. These activities would not be considered in the Vantage University English department where faculty inquiry is directed solely toward literary criticism. Second, the Vantage course schedule (two terms teaching, then one term off) gave Vantage professors the opportunity to reserve academic year time for writing. As a result, many faculty gather information while teaching, but save actual writing for summers and off-duty terms. I observed Blake working on a new book during the summer. Rich told me that he had completed a book over the summer, but I did not observe his work during that time. Jim Gabriel, however, raced to finish a conference paper during a teaching term. Cosmopolitan State faculty did not have the luxury of an off-duty term, yet each told me that they felt their own particular form of research and writing was essential to their faculty work. Therefore, they found ways to write short fiction pieces, articles, or book sections on weekends or late at night.

Research and Teaching Integration: Table 3 also shows the proportion of total time that each faculty member integrated teaching and research (accomplished research and teaching purposes simultaneously.) Five of the physicists (Hank, Ryan, Sam, Paul, and Ted) integrated research primarily with informal teaching designed to train students to conduct research. For example, Ryan Neumann, a Cosmopolitan State physicist, met with a masters student for 55 minutes to discuss the student’s progress on a research project. Not only was the project essential for Ryan’s funded research, the student was planning to write

his masters thesis about the work. I counted this activity in both the research and teaching totals. Five of the English professors (Aaron, Darryl, Rich, Jim, and Blake) and Metropolitan State physicist Gary Byrne integrated research primarily with classroom-oriented teaching activities. For example, Vantage English professor Jim Gabriel consulted an unpublished manuscript as he prepared for his undergraduate class. He had been working on a review of the manuscript for a publisher. Although Jim usually turned down the many requests he received to review books and articles, he had accepted this assignment because the topic of the manuscript was related to his current research, and because he planned to present with the author on a conference panel a few months later. I coded this activity as undergraduate education, research, and professional service. Metropolitan English professor Mike Easton integrated research with both classroom-oriented teaching and with research training.

Contextual influences on informal faculty-student interaction: Disciplinary norms for collaboration influenced the extent to which faculty were available for interaction with and informal teaching of students. In his study of twelve disciplines in the United States and Great Britain, Becher noted that social structures for collaboration vary with the knowledge structure of disciplines. Research tasks in fields hierarchical, atomistic fields such as physics may be easily subdivided, and thus are conducive to division of labor and collaboration. Research tasks in many humanities disciplines, however, are perceived as holistic, and therefore more easily performed by a single individual (Becher, 1989). During the period that I observed their work, the physicists were much more likely than English professors to work on projects with groups of students and colleagues. However, this difference in collaborative style did not appear to be related to the degree to which research tasks could be subdivided. For example, in his group, theoretical physicist Sam Youngman brought together several people to brainstorm through issues of an holistic task. In contrast, one day I observed that English professor Blake Saxon was spending much time revising a bibliography for a new book. I asked him if he had considered hiring a research assistant to help with that aspect of the work. He told me, "That might be nice, but I like doing a lot of

the work myself.” He reflected a moment and said, “I would probably be more prolific if I had assistants.” Blake then told me about a research group in Europe working on research similar to his own who “turn out a lot of stuff, but they have whole batteries of helpers.”

Rather than ease of subdividing tasks suggested by Becher (1989), disciplinary differences in the social process of knowledge development influenced the extent to which faculty in this study collaborated with peers and students. Physicists told me how interpersonal communication contributed to their research. They perceived the process of exploring external reality as something that could be enhanced by sharing creative thinking as well as experimental tasks with others. In contrast, most of the English faculty talked about the research process in terms of intra-personal engagement. The English professors were more likely to talk about personal involvement with literary texts or with their own lived experience. Knowledge was something they discovered within themselves as they experienced literature and life. The physicists I observed spent 68 percent of their research time working with peers and students. In contrast, the English professors I observed spent 77 percent of their research time working alone.

The locations where professors conducted most of their research activities also influenced the extent to which faculty were available for informal interaction with students. Four of the physicists I observed worked in laboratories near their department offices. Three worked at Vantage University where, as Ted Klein told me, “the traditional mode is for faculty to have offices near their labs to have frequent interactions with students.” Hank Powell also maintained his lab in the Cosmopolitan State science building. However, toward the end of this study, Hank was exploring options to open an off-campus lab to minimize distractions from students. Most faculty in the Cosmopolitan State physics and English departments worked on campus only half the week. Ryan Neumann conducted most of his research at Flagship University or at Flood Labs, but maintained frequent e-mail contact with his research assistants. All three Cosmopolitan State English professors maintained home offices, and worked in their campus offices either two or three days per week. Vantage English professors Blake Saxon and Jim Gabriel worked in library offices

that had no telephones. Thus, the English faculty I observed tended to be less available than physics faculty for informal consultations with students. Vantage physics faculty were more available to students than Cosmopolitan State physics faculty.

DISCUSSION AND IMPLICATIONS

This study focused on faculty allocation of time to research tasks and on relative allocation of time to research and teaching. Given the intense involvement in the field to conduct this study, the number of faculty whose work I observed was small (N=12). Comparative case study analyses of their work activities are rich with detail to show how specific elements of their university and disciplinary contexts influenced the ways that individual faculty conducted their daily work activities. The findings are not meant to be generalizable to populations of faculty. Rather, it is my hope that faculty, administrators, and higher education policy makers can learn from details of the relationships between contexts and activities in physics and English and Cosmopolitan State and Vantage Universities. I hope, further, that they will consider how such relationships might operate in their own university and disciplinary contexts:

The findings of this study addressed concerns about faculty research time raised in the U. S. Congress Office of Technology Assessment's 1991 report on *Federally Funded Research: Decisions for a Decade*. The report expressed concern that administration of large grants is reducing the time faculty have available for the actual conduct of research. Research administration did not interfere with the conduct of research for the faculty I observed during this study. In fact, the proportion of time spent on a combined total of logistics, grant work, and other research tasks was remarkably similar for participants in this study whether or not they had external funding for their research. The time spent on logistics, travel, grant work, and other research administration averaged 17 percent of total research time for the twelve faculty I observed. English faculty and physicists without external funding spent this time on making arrangements with publishers, arranging conferences, preparing department reports, and traveling to research symposia.

The Office of Technology Assessment report also expressed concern that faculty members' research activities may interfere with their teaching. Although most faculty whose work I observed for this study spent more time on teaching than on research, the faculty who spent the most time on research were physicists who had external funding to support their research. The three Vantage physics faculty and Cosmopolitan State physicist Ryan Neumann had lighter teaching loads than other participants in the study. Deans and chairs ensured the teaching load was light so that faculty would have ample time for research. Renowned Vantage physicists received two course credits for teaching back-to-back sections of the same course in a single term. This arrangement not only minimized preparation time, it gave them the next term free of classroom teaching altogether. The Cosmopolitan Dean of Science looked for ways to help star researchers evade the university mandate of a four-course load for all faculty. This finding suggests that administrators as well as faculty are seeking the funding and the prestige derived from grants.

My observations of faculty at work, however, revealed other important, but more subtle ways that contexts constrict the production of research or allow research to interfere with teaching. These include university reinforcement of narrow disciplinary norms for "appropriate" types of inquiry and for solitary vs. collaborative work. Universities, departments, and disciplines could help faculty increase both their research and teaching productivity if they expand institutional definitions of "acceptable" research, encourage social interaction in the research process in all disciplines, and provide facilities that encourage faculty to work on campus where they are accessible to students.

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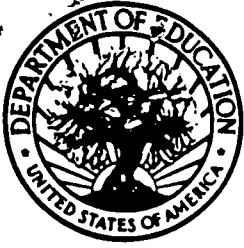
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