Abstract:

Informed by theories of the academic plan, concurrent curricula, and situated curriculum, this chapter discusses how the content, sequence, and context of teaching assistant preparation programs may unintentionally interfere with research-teaching integration.

Keywords: curricula | academic plan | professional roles

Article:

Doctoral students trained today will soon join faculties in our nation’s more than three thousand colleges and universities (Association of American Universities, 1998). The preparation these students receive while in their doctoral programs will influence the ways they prioritize research, teaching, and service. In addition, the degree to which doctoral students perceive research and teaching activities as parts of a complementary whole or as mutually exclusive activities will likely affect the extent to which future faculty become integrated or fragmented professionals. With integration, faculty may productively combine their teaching, research, and service in synergistic activities; whereas fragmentation involves compartmentalizing academic roles into discrete activities accomplished at separate times or by different people (Colbeck, 1998).

Current Practices for Preparing Teaching Assistants

Preparing doctoral students to be teachers and researchers is frequently left to faculty mentors. Mentoring doctoral student apprentices (Kwiram, 2006) may cultivate students’ scholarly perspective and help them develop a constellation of academic skills. Unstructured or ineffective mentoring, however, may leave students underprepared for their role as teachers of undergraduate students (Austin and Wulff, 2004).
Recently, departments, institutions, and national programs have developed more structured models of doctoral preparation, attempting to provide entire cohorts of students with more sustained and sophisticated training (Wulff and Austin, 2004). Preparing Future Faculty (PPF), funded by the Council of Graduate Schools and the Association of American Colleges and Universities (AAC&U) since 1993, has awarded grants to forty-three doctoral-producing universities to implement training programs that integrate preparation for teaching and “academic citizenship as well as for research” (Gaff and Pruitt-Logan, 2002). Similarly, the Center for the Integration of Research, Teaching, and Learning (CIRTL), funded by the National Science Foundation since 2003, has developed professional development programs for doctoral students in science, technology, engineering, and mathematics (STEM). Both PPF and CIRTL seek to improve undergraduate learning by providing opportunities for future faculty to integrate their research and teaching.

In this chapter, we report findings from an evaluation of a well-intentioned effort to enhance the teaching development of first-year doctoral students in chemistry. We sought to understand how and why the program was and was not achieving its goals by exploring similarities and differences between faculty intentions and doctoral student experiences of the program. We used three curriculum theories to analyze how participation in the teaching assistant preparation program and other departmental factors influenced doctoral students’ perceptions of the relative importance of teaching and research and the degree to which academic roles are integrated or fragmented. In our conclusion, we discuss how good-faith efforts in preparing future faculty for both teaching and research roles might be supported so that intended messages about the priorities of the professoriate are not lost in translation.

**Theoretical Framework**

Three theoretical approaches to curriculum provided lenses through which we viewed how doctoral preparation shaped the chemistry doctoral students’ perceptions of academic work as integrated or fragmented: the college curriculum as academic plan (Stark and Lattuca, 1997), types of concurrent curricula (Eisner, 1979; Posner, 1995), and the situated curriculum (Gherardi, Nicolini, and Odella, 1998).

**Academic Plan.** An academic plan is the “total blueprint” (Stark and Lattuca, 1997, p. 9) of a curriculum and includes eight elements: purpose (the general goals that guide the knowledge, skills, and attitudes to be learned), content (the subject matter within which the learning experiences are embedded), sequence (an arrangement of the subject matter intended to lead to specific outcomes for learners), learners (information about the learners for whom the plan is devised), instructional processes (the instructional activities by which learning may be achieved), instructional resources (the materials and settings to be used in the learning process), evaluation (the strategies used to determine if skills, knowledge, attitudes, and behavior change as a result of the learning process), and adjustment (changes in the plan to increase learning based on experience and evaluation). Stark and Lattuca assert that “every curriculum includes each element of the plan ...whether conscious or not, whether a deliberate decision has been made, or
whether a default has been accepted” (p. 10). The academic plan provides a useful lens through which to evaluate components of doctoral preparation programs.

**Concurrent Curricula.** What teachers and advisors intend to teach via the academic plan may differ from what students actually learn (Posner, 1995). Carefully planned and artfully delivered academic plans do not always achieve the outcomes intended by faculty instructors due to the influence of additional—and sometimes competing—curricula. The intended curriculum of a formal doctoral program usually involves coursework, semiformal seminars, research apprenticeships with faculty mentors, and opportunities to teach undergraduates. This intended curriculum consists of the official curriculum, including the stated goals and objectives, content, and proposed teaching methods; the taught curriculum, or what and how teachers and mentors actually share knowledge and skills with students; and the tested curriculum, delimited by the learning outcomes for which instructors hold students accountable (Posner, 1995). An important part of students’ education is also derived from the extra curriculum, informal but intentional learning opportunities outside formal coursework.

Even as students navigate what they will learn from the intended curriculum, they assimilate many lessons from the hidden curriculum, the set of expectations that shape norms for behavior and values of what is really important (Jackson, 1968). This curriculum is hidden because the messages are often transmitted and received unconsciously by instructors and students, but the lessons students learn from the hidden curriculum may last longer than any learned from the intended curriculum (Eisner, 1979; Margolis and Romero, 1998). What is not taught, the null curriculum, also has important consequences for students because it conveys what content and processes their instructors and mentors do and do not consider legitimate (Eisner, 1979).

The learned curriculum, the knowledge, skills, and attitudes students actually take away from their formal and informal learning opportunities, is mediated by students’ own goals, effort, and ability (Stark and Lattuca, 1997). Students are not passive absorbers of all these concurrent curricula; rather they subtly but consistently negotiate content, assignments, performance levels, and behavioral expectations of the intended and the hidden curricula, both formal and informal, with their instructors, mentors, and fellow students (Cuban, 1992).

**Situated Curriculum.**

Although the situated curriculum theory was developed from an analysis of the preparation of Italian construction workers (Gherardi, Nicolini, and Odella, 1998), it can inform the professional development of doctoral students within the formal educational setting of graduate school. The situated curriculum involves the pattern of learning opportunities available to organizational newcomers and is conceptually distinct from the notion of a teaching curriculum. Newcomers gain access to the knowledge and culture of an organization through participation in an ordered set of activities and tasks. Ordered activities provide “specific modes of engagement” (p. 279) or pathways along which organizational novices may follow to increase their skills and become fully skilled, legitimate members of the organization’s community. Experts tend to perpetuate the curriculum as it was taught to them by their mentors, yet newcomers experience the curriculum in a social context which is beyond the intended or formal curriculum—as well as beyond the control of the expert. Viewing learning as a series of social and cognitive
activities, doctoral student preparation involves both intended and learned curricula and can be understood as a series of experiences (participation and interaction) that provide and sustain the proper context for learning (Gherardi, Nicolini, and Odella, 1998, p. 277).

Applying these three theories to a teaching assistant (TA) preparation program for doctoral students in chemistry, we sought to understand how the sequence of activities and the nature of interactions between peers and faculty may have influenced how the TAs perceived the relationship between teaching and research.

Methods

We studied a teaching assistant preparation program for doctoral students within a single chemistry department at a research-intensive university in the spring of 2006. New doctoral students were required to serve as TAs in introductory undergraduate chemistry. For this work, they received tuition remuneration, a stipend, and a grade for a one-credit course. TAs were responsible for supervising laboratory sections, answering undergraduates’ questions outside of class, and grading weekly quizzes, lab reports, and notebooks. Their participation in the three-week summer TA preparation course was mandatory. The new doctoral students attended lectures about learning styles, tutoring, and ethics; evaluated each other’s mock recitations; and conducted the same experiments and wrote the same reports they would later supervise for their undergraduate students. During the first semester, weekly TA meetings held by faculty instructors and an upper-level doctoral student “TA trainer” were designed to prepare TAs for teaching upcoming material, to address TAs’ concerns, and to communicate general information the TAs were expected to convey to the undergraduates.

Sample and Data Collection. We conducted individual interviews with instructors (the TA trainer and five faculty) and four focus groups interviews with twelve teaching assistants (46 percent of the first year doctoral students assisting with one introductory chemistry course). All interviews were conducted by the first author. We asked the advanced doctoral student and faculty about (1) their impression of the overall goals of the program, (2) their involvement and their personal goals for the program, (3) the knowledge and skills TAs should develop from participating, and (4) whether the program included learning communities, diversity training, or assessment of one’s own teaching. We asked TAs (1) what they were most interested in learning from the training for their assistantships, (2) if the program improved their confidence and ability to teach to diverse students, (3) the messages they received from faculty about teaching and research, and (4) whether they developed a sense of community or learned to assess the impact of their teaching.

Data Analysis. For this chapter, we analyzed the interview transcripts for similarities and differences between instructors’ and TAs’ perceptions of the goals and outcomes of the program, perceived achievements and gaps in TAs’ preparation for their teaching roles, and TAs’ perceptions of the messages communicated by department faculty about the relative importance and integration teaching and research.

Findings
Viewing the TA preparation program through the three curricular theoretical lenses revealed four reasons why good intentions of TA preparation program developers and instructors may be lost in translation on doctoral students: (1) the distinction made between training and education, (2) differences between learning to know and working to do, (3) the fact that the sequencing of tasks can affect the perceived risks and values of those tasks, and (4) differences between intended content and learned norms. We found that the purpose, content, and sequence of activities in the TA preparation program, as well as the department context, influenced how TAs saw themselves becoming future professionals.

**Training Versus Education.** A first step in shaping an academic plan is to determine the purpose of the curriculum (Stark and Lattuca, 1997). Tacit assumptions about “education” and “training” that underlie statements of purpose may influence curricular decisions and learning outcomes. For example, training implies that students learn specific tasks that they can replicate and use to solve routine problems. In contrast, education implies that students are exposed to a wide expanse of theoretical and content knowledge that they can then apply in a broad array of settings and to the solution of ill-defined problems (Posner, 1995). A training approach to preparing TAs may produce workers capable of reproducing specific lessons and standardized assessments. In contrast, an education approach might introduce principles and concepts to foster creative and flexible approaches to problem solving. TAs might be encouraged to discover creative ways to enhance diverse students’ learning and to perceive such discovery as similar to the problem solving they accomplish in their basic disciplinary research. The extent to which the purpose of a teaching assistant preparation program is to train or to educate may influence how doctoral students view teaching and research.

In our study, we found that chemistry faculty members’ goals for the TA preparation program emphasized technical training for teaching assistant duties. Faculty shared “tricks of the trade,” including where to seek advice, how to use chalkboards and other visual equipment effectively, and how to acquire resources for experiments and teaching lectures. Similarly, chemistry doctoral students’ goals for the TA preparation program were wholly oriented toward training for their teaching tasks. They viewed any information unrelated to teacher preparation as a nuisance and said that discussions and workshops on general professional development, such as getting published or presenting at conferences, were “too soon” to be helpful for their doctoral student careers. Instead, TAs said they wanted to learn the “nuts and bolts” of teaching, including classroom policies and management, expectations of the department or specific instructors with whom they would be working, techniques for using lab equipment in the chemistry courses, and practice in explaining chemistry concepts.

Teaching assistant preparation programs that focus primarily on short-term tasks and “tricks of the trade” may be part of a hidden curriculum that conveys that teaching skills are relatively mechanistic and can be learned in a short span of time. In contrast, one pursues education over an extended period of time to become a researcher.

**Learning to Know, Working to Do.** As prospective researchers, doctoral students engage in learning ways of knowing. Faculty mentors expect them to become master learners who deconstruct ill-defined problems into manageable components or questions and then address the
problems by combining new knowledge with existing information. Learning to know occurs through observation and practice, as well as through self-evaluation and adjustment.

As instant teachers, the chemistry students who served as teaching assistants in their first semester of doctoral work learn ways of doing. Faculty instructors of record expected them to supervise undergraduate labs, to present recitations and lectures, and to grade undergraduates’ assignments. Similarly, doctoral students expected training in performing specific tasks. As one TA said, “I wanted to know the specific instruments, . . . the stock room rules, and how to get items (for labs). . . . I want to know stuff like what to do if someone in my lab has an allergic reaction to latex.”

Education for knowing or training for doing may influence whether students perceive the associated role with learning or working. Consequently, doctoral students may consider the role of researcher with learning and the role of teacher with working. Stereotypes of workers and learners are illustrative here. Workers are paid; learners are not paid. (Doctoral students received stipends for teaching but not research during their first year in their programs.) Workers have well-defined tasks to be completed in a relatively concise period of time; learners’ tasks may be ambiguous. (TAs proctored labs and graded assignments but expected to take years to learn to do research.) Workers’ actions have consequences; learners’ output primarily affects their own development. (TAs’ poor performance might undermine undergraduate students’ grades and instructor’s and department goals, but one’s own failure to learn how to do research might hurt only oneself.)

Whereas the intended curriculum for preparing teaching assistants emphasized technical aspects of teaching, the null curriculum (what was not taught) included foundations of pedagogy as well as studying and assessing one’s own understanding and approach to teaching (Posner, 1995). Without considering learning how to teach as a way of knowing, doctoral students may perpetuate the distinction that Burton Clark (1987) observed faculty making two decades ago: teaching is work and described as a “load,” while “research” is one’s own work and offers the opportunity for continued learning.

Tasks, Risks, and the Value of Teaching. The sequencing of tasks introduced in the overall doctoral program may influence how doctoral students perceive the relationship between their academic roles. Research about learning to work in context, or the situated curriculum, shows that novice workers are often prepared for full organizational participation in structured phases. Gherardi, Nicolini, and Odella (1998) observed that novice Italian construction workers first engaged in a “way-in” period of observation during which they watched master workers. This period involved little risk for the workers or the organization. The next phase involved a “practice” period of moderate risk during which novices were given limited responsibility for some tasks. Once the novices mastered these tasks, they progressed to more advanced and more complex tasks that entailed greater risk. Most training, apprenticeship, or preparation programs follow the sequence of a situated curriculum (Gherardi, Nicolini, and Odella, 1998). For example, medical students are first trained how to diagnose an illness before they are taught how to treat the patient or perform surgery; electricians are taught safety measures before they are taught how to service an electrical transformer.
In contrast, the chemistry TA preparation program structured practice before observation. Doctoral students began active training for their teaching assistant roles during the summer and before they started their chemistry coursework. They took tests to evaluate their mastery of the course content they would be teaching, conducted each of the experiments they would be proctoring, and wrote lab reports similar to the ones they would be grading in their undergraduate courses. The activities structured for them offered little or no time for observing experienced teachers. After just three weeks of training, the TAs were in charge of recitation sections and supervising lab experiments.

Thus the practice period preceded the way-in period, during which doctoral students could have been provided opportunities to observe and receive thoughtful guidance from advanced student colleagues or faculty mentors. As one TA said, “We skipped over the teaching aspects in training and focused more on the policies and regulations. I wanted to see a classroom, maybe sit in on one that was occurring during the summer.” Expecting new doctoral student TAs to teach undergraduates without a way-in period of observation and mentoring conveyed that teaching was low-risk work of relatively minor importance. One TA explained that this sense of minimal risk and importance was reinforced by a lack of feedback about teaching. “We didn’t even get feedback from our instructors until three-quarter of the way through our labs and recitations. So I was doing it wrong all of that time? OK, well, why should I change now with so little time left?” The TA perceived that faculty members’ tardy feedback meant that poor teaching was of relatively little consequence to the department.

The sequencing of independent practice before the opportunity for observation and supervised and mentored practice affected some of the TAs’ self-confidence for their teaching roles. One said that as a result of the TA training program, she felt “better prepared for teaching” at a large, research-intensive university but didn’t feel that her teaching skills had improved. On the contrary: “I would say that maybe I am a worse teacher now,” she confessed. Others felt that they were “surviving” but not excelling in their teaching roles. “The first year is all about jumping through hoops. It’s boot camp. It’s not viewed as important to why we are here.” TAs felt that teaching was a task to endure to be able to do research in future semesters. One said, “Without us, [professors] couldn’t teach. They need us as much as we need them. But teaching is at the bottom of their priority list.”

**Taught Content and Learned Norms.** Novices in preparation programs learn both intended and unintended messages about what it means to be a member of an occupation through the materials that are selected, the skills that are taught, and the attitudes conveyed intended by senior members. Evaluations of preparation programs frequently do not include assessments of hidden curricula regarding norms, expectations, and values, but the lessons novices learn from the hidden curriculum may have a more durable impact than lessons learned from the intended curriculum (Posner, 1995).

Faculty intended that the official chemistry TA training curriculum should emphasize the value and importance of teaching and strategies for good teaching. Their good-faith intentions seemed lost on the doctoral student TAs, in part because the TAs were learning different values from their immersion in the department’s culture.
Faculty members’ attitudes and allocation of physical space affected TAs’ perceptions of the relationship and relative importance of teaching and research. One doctoral student pointed out that the department’s research-intensive faculty were given space for an up-to-date new building while the teaching-intensive faculty remained in old facilities. He took the space allocation as an indicator of the department’s priorities in which “research is king.” Other TAs observed that top researchers bought out their teaching time to do more research, clearly valuing one role over the other. This suggested that teaching is a secondary activity because, as one student put it, the research university is “about pumping out papers and Ph.D. students.” Another TA observed tensions between faculty over the appropriate portion of time faculty and doctoral students should spend on teaching and research. “Professors who think teaching is important are defensive—they make a big deal out of it. But there are three reasons why people still TA in their second year: they couldn’t get money from the department, they wanted to TA, or they were required to TA because they passed their orals with qualifications because they didn’t do well on the oral part. It’s a punishment [when] it’s supposed to be a learning experience.” One TA’s comment, in particular, revealed perceptions of dramatic fragmentation between research and teaching roles: “Why use research folks to teach? Why not use teaching folks?” So despite the intentions of the TA preparation program developers to help new doctoral students learn the basics of teaching, TAs picked up from a variety of sources in the department that teaching and research were fragmented in terms of physical space and were done by different types of faculty.

A Way of Becoming. Learning is not only a way of knowing but also a way of “becoming,” based on participation in a social system of situated activities (Gherardi, Nicolini, and Odella, 1998). Given this view, “on-the-job learning is no longer equated with the acquisition of work-related bits of knowledge, but it is understood as the development of a new identity” (p. 276). Gaining membership within a group carries emotional value and significance (Hogg and Abrams, 1988; Tajfel and Turner, 1985). Conceptualized as a psychosocial as well as cognitive activity, doctoral student preparation provides not only the platform for what is to be learned but also guidelines for how to become members of the academic community. For example, after his first semester as a TA, one chemistry student said he wanted to learn more about the department’s expectations of faculty for promotion and tenure. “I want to know what the shoes are that they’re expected to fill.” The metaphor of filling another’s shoes points to the social nature of looking to the actions of others who hold advanced positions (such as tenure-line faculty) for guidance in how one should conduct oneself.

Despite messages about training versus education, work versus learning, norms, sequencing, value, and risk, the chemistry students did not necessarily view teaching as a role distinct from research. Several perceived that teaching could inform their research and that research could inform their teaching. One TA said that research helped “generate interest in teaching” because research applies concepts of basic chemistry in interesting ways. Bringing research into the classroom also makes learning more interesting, suggested a TA, when undergraduates can relate what they are learning to the real world. Another doctoral student noticed synergies between teaching and research as a result of interacting with undergraduates: “I watch lab students address problems who haven’t read, and you see the steps one might go through when attacking problems for the first time. It gives me the perception of how you would approach our research.” Thus some of the TAs found ways that they could integrate teaching and research from their own experiences.
**Recommendations: Supporting Integrated Views of the Professoriate**

What can faculty members do to preserve and support doctoral students’ view of teaching as important and of teaching and research as mutually supportive and often integrated roles? One strategy for preparing doctoral students who truly value teaching is to provide a “way-in” period in which doctoral students apprentice under or work with advanced doctoral students or faculty who approach teaching as an ongoing exercise in learning and research. The approach would parallel the mentoring curriculum used in labs for preparing researchers: direct observation, reflection, working with sequentially more difficult technology and more expensive materials, and feedback on one’s practice from the mentor. A teaching mentorship with a faculty member or advanced graduate student would provide opportunities through which new TAs could seek advice and support for teaching in innovative ways and for understanding the impact of their teaching on student learning.

A second strategy for improving doctoral preparation for teaching would be to incorporate readings and discussions of pedagogy into existing TA preparation programs. Pedagogy entails more than knowing how to prepare curricular materials; it includes understanding the cognitive, social, cultural, and environmental factors that affect learning and devising strategies to guide learners in constructing their own knowledge. Rather than providing simple “tricks of the trade” or lessons learned from others’ experiences, TA preparation programs that approach teaching as facilitating student learning could provide a framework for preparing, presenting, evaluating, and adjusting an academic plan in a timely and effective manner.

Third, encouraging current and future faculty to study the relationship between teaching and students’ learning—that is, to engage in a kind of practitioner research on their own classroom experiences—may help doctoral students conceptualize teaching and research as activities that inform each other (Connolly, Bouwma-Gearhart, and Clifford, 2007). By applying a research approach to teaching (by identifying, researching, and attempting to solve a problem), TAs might, for example, diagnose problems in case studies, thereby learning ways to assess their own work with students and improve their current and future teaching practices. The Center for the Integration of Research, Teaching, and Learning (described more fully in Chapter Six in this volume) offers the following guidelines for engaging in such activities, which CIRTL (2005) calls “Teaching-as-Research” (TAR):

1. Learning foundational knowledge (What is known about the teaching practice?)
2. Creating objectives for student learning (What do I want students to learn?)
3. Developing a hypothesis for practices to achieve the learning objectives (How can I help students succeed with the learning objectives?)
4. Defining measures of success (What evidence will I need to determine whether students have achieved learning objectives?)
5. Developing and implementing teaching practices within an experimental design (What will I do in and out of the classroom to enable students to achieve learning objectives?)

6. Collecting and analyzing data (How will I collect and analyze information to determine what students have learned?)

7. Reflecting, evaluating, and iterating (How will I use what I have learned to improve my teaching?)

Applying TAR offers current and future faculty opportunities to engage in teaching as a continuous process of discovery and change, paralleling and intersecting with their discovery through basic disciplinary research.

What students actually learn about faculty careers depends on how doctoral programs enact the purpose, content, sequence, practices, and evaluation of their overall academic plans. The social and organizational contexts of learning have powerful and profound implications for new doctoral students as they learn not only what to know but who to be as prospective faculty members. Therefore, faculty and administrators of doctoral programs should examine the unintended consequences of some current practices. The ways that their department culture values teaching and research roles, approaches responsibility, or integrates or fragments work activities will be mirrored in the attitudes and behaviors of new doctoral students as they become situated within the academic community.

References


