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# MOVING DOCTORAL EDUCATION INTO THE FUTURE

*Even if you are on the right track,*
*you'll get run over if you just sit there.*

—Will Rogers[1]



AS YOU READ THESE WORDS, some 375,000 men and women are pursuing doctoral degrees in institutions of higher education in the United States. Most are young adults—many with family commitments, and some juggling careers as well—but PhD programs are also populated by the occasional octogenarian and precocious teen. Some are in their first semester of work; others have been toiling for twenty years. Over 43,000 will graduate this year from the 400-plus institutions that offer the degree.[2]

Many of those who receive PhD's will assume positions of leadership and responsibility in arenas that directly shape the lives we lead. A remarkable number of Nobel laureates from around the world received degrees at U.S. universities. Four of the ten most recent secretaries of state have been doctoral degree holders, as are five of the six current members of the Federal Reserve Board,[3] and numerous world leaders. PhD's develop life-saving medical interventions, shape social programs and policies, and turn their talents to entrepreneurial ventures in the global economy. Approximately one-half of those who receive doctorates this year will join the ranks of college and university faculty who educate today's undergraduates, some of whom will become teachers themselves, in the United States and beyond, shaping the futures of our children and grandchildren. And some will prepare new PhD's, so the effects of doctoral education ripple out across nations and generations.

The importance of doctoral education to this country's current and future prospects can hardly be overestimated. The questions are: What will it take to ensure that the United States continues to be, as many have observed, "the envy of the world"? What will it take to meet the challenges that doctoral education faces today and to make the changes those challenges require?

Some of the challenges are long standing and well known. About half of today's doctoral students are lost to attrition—and in some programs the numbers are higher yet. Those who persist often take a long time to finish and along the way find their passion for the field sadly diminished.[4] Many are ill-prepared for the full range of roles they must play, be they in academe or beyond, and often the experience is marred by a mismatch between the opportunities available to students as they complete their work and their expectations and training along the way. In most disciplines, women and ethnic minorities are still underrepresented among doctoral students. And what makes all of these challenges yet *more* challenging is that few processes for assessing effectiveness have been developed in graduate education, and it is difficult to muster ambition or urgency for doing better in the absence of information about what needs improvement. Thus, one finds attitudes of complacency ("Our application numbers are strong and so is our national ranking, so where's the problem?"), denial ("We don't have problems with gender or ethnic diversity here"), and blame ("Students these days just aren't willing to make the kinds of sacrifices we did to be successful").

Complicating matters is a set of newer challenges, many of them emerging as we write, and only partly recognized and understood. New technologies are altering and accelerating the way knowledge is shared and developed. And the marketplace for scholars and scholarship is now thoroughly global. Much of the most important, pathbreaking intellectual work going on today occurs in the borderlands between fields, blurring boundaries and challenging traditional disciplinary definitions. The need for firmer connections between academic work and the wider world of public life is increasingly clear, as well. And graduate education, like higher education more generally, faces shifting student demographics, new kinds of competition, growing pressures for accountability, and shrinking public investment. In short, expectations are escalating, and doctoral programs today face fundamental questions of purpose, vision, and quality. The Will Rogers quip that opens this chapter seems made to order: "Even if you are on the right track, you'll get run over if you just sit there."

## The Carnegie Initiative on the Doctorate

The good news is that doctoral education is, by its nature, in the business of asking hard questions, pushing frontiers, and solving problems, and over the past several years the five of us have been privileged to work closely with faculty and students from doctoral programs that have made the decision to not "just sit there." The Carnegie Initiative on the Doctorate (CID) has involved eighty-four PhD-granting departments in six fields—chemistry, education, English, history, mathematics, and neuroscience (for the full list of departments, see Appendix B). Our emphasis in this book, and in the Carnegie Initiative on the Doctorate, was on the PhD, although many of our participating education departments also grant the EdD.[5] By concentrating on a limited number of disciplines and interdisciplines rather than on doctoral education in general, the CID aimed to go deep and to work very directly with faculty and graduate students from the ground up. Thus, although the support and assistance of administrators, graduate deans in particular, and disciplinary societies was vital, the work was done by departments on matters within the control of departments—which is, after all, where the action is in graduate education.

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Over the five years of the program, participating departments made a commitment to examine their own purposes and effectiveness, to implement changes in response to their findings, and to monitor the impact of those changes. Many used their participation to continue plans and activities that were already begun but would benefit from the structure, prestige, and interaction provided by a national initiative. Our role, in turn, included visiting the departments, interviewing campus team members, and bringing project participants together (sometimes by discipline, sometimes by theme) to report on their progress, learn from one another, and help us make sense of their experiences in ways that others can build on. (See Appendix A for a summary of the CID project.) In addition, both faculty and students participated in projectwide surveys, the results of which served as rich grist for discussion and debate about the preparation of scholars in the broadest sense, whether they work in industry, government, or academe. (See Appendix C for an overview of the CID surveys.)

Certainly there was much to discuss. Not surprisingly, in a project sponsored by The Carnegie Foundation for the Advancement of Teaching,

an organization whose mission is to "uphold and dignify the profession of the teacher," a recurring theme was the need for practices that will better prepare tomorrow's PhD's to be teachers, equipped with the knowledge and skills to convey their field's complex ideas to a variety of audiences, not only in the classroom, but in the many other settings in which doctorate holders work. This is an arena in which higher education has made notable progress over the past several decades. Many institutions today—and most of those participating in the CID—offer training programs for graduate teaching assistants, sometimes through a campus-wide teaching center, but often through special opportunities housed in the department as well. And fields in which opportunities to teach have traditionally been limited (for example, neuroscience graduate programs often have no corresponding undergraduate program) are now finding creative ways to provide experience in the classroom. But what the CID has made clear is the need for much greater attention to the sequencing of these opportunities and to the need not only for more teaching but for better, more systematic feedback and reflection that can turn pedagogical experience into pedagogical expertise.

The same diagnosis holds, we believe, when it comes to preparation for the research role. Ironically, this aspect of doctoral education—the sine qua non of the doctorate—has largely been taken for granted and therefore ignored in reports and recommendations on graduate education that have appeared in the past several decades. Our view, in contrast, is that what might be called "the pedagogy of research" (and its different embodiments in different fields) is badly in need of attention. Most graduate faculty care deeply that their students learn how to ask good questions, build on the work of others, formulate an effective and feasible research design, and communicate results in ways that matter. But these outcomes are often more hoped for and assumed than designed into instruction. Although education at other levels is being reshaped by new knowledge about how people learn, these same insights seem to have washed over graduate education with little effect. For instance, whereas undergraduate education now embraces a host of strategies to engage students in research, those approaches have received less attention in doctoral education settings—even though the same faculty members may teach both undergraduate and graduate students. As a consequence, the central tasks and assignments that doctoral students encounter on the long road to research expertise, and the model of apprenticeship that shapes their interactions with faculty, have gone pretty much unchanged from generation to generation, the product of long-standing arrangements

and rites of passage that work well for some students but poorly for others.

Even more distressing, CID participants told us, the rationale for program requirements has often been lost in the mists of history: students may well not understand why certain elements are required or toward what end, and faculty, if pushed, will acknowledge that there is no unified vision underpinning many of the experiences students are expected to complete. Departmental deliberations undertaken as part of the CID often uncovered inconsistent and unclear expectations, uneven student access to important opportunities, poor communication between members of the program, and a general inattention to patterns of student progress and outcomes. More alarming, the pressures of funded research may work against the kinds of risk taking, creativity, and collaboration that are increasingly the hallmark of cutting-edge intellectual work in today's world. And worse yet, students may be treated as cheap labor in the service of an adviser's current project and personal advancement.

Both doctoral students and faculty suffer under these circumstances. The life of a tenured faculty member may appear to be one of privilege and intellectual reward, but many are torn by increasing and competing demands for scholarship, fund raising, teaching and mentoring, community engagement, and family life. Their doctoral students, in turn, often feel burdened by debt, exploited as lab technicians or low-paid instructors, and disillusioned by the disgruntlement of overworked faculty mentors. The passionate zeal with which many students begin their studies is unnecessarily eroded, a loss that faculty decry as much as students do. It is hard, in short, not to be disheartened by the waste of human talent and energy in activities whose purpose is poorly understood. Serious thinking about what works in doctoral education, and what no longer works, is an urgent matter.

In the chapters that follow we will have much more to say about these and other very real challenges to doctoral education, and the ways in which today's approaches fall short of what is needed as we move into the twenty-first century. But we will have much to say about creative solutions and approaches, as well, for we have had a marvelous perch for observing and learning through our work. What will be clear along the way is that no single set of best practices or models can fit the diverse settings that constitute the landscape of graduate education. What works in one field or on one campus may be quite wrong in another. What *does* work in all settings, we argue, and what is distinctly

absent from most doctoral programs, are processes, tools, and occasions through which both faculty and graduate students can apply their habits and skills as scholars—their commitment to hard questions and robust evidence—to their purposes and practices as educators and learners.

## Mirror, Mirror

The power of this process and its benefits are illustrated in the experience of Columbia University's English department, where graduate students and faculty have worked together to bring about a number of immediate improvements as well as a renewed sense of intellectual community in which future improvements can take shape and thrive.

Long considered a premier graduate program in the field, consistently ranked in the top ten and home to a number of high-profile faculty stars over the years, Columbia's Department of English and Comparative Literature is large and intellectually lively. Approximately eighteen new PhD students are admitted each year, all of them receiving five full years of funding. In addition to traditional areas within literary studies, graduate students can explore interdisciplinary interests through the Center for Comparative Literature and Society and the Institute on Women and Gender. Admission is highly competitive (around 5 percent) and the student-to-faculty ratio is an impressive five-to-one.

In August of 2001, Jonathan Arac, a member of the department during the 1980s, was invited to return from his position at the University of Pittsburgh to assume the role of chairperson. The department had undertaken a major overhaul of the graduate program a decade earlier, and when the opportunity arose to participate in the CID, Arac and his colleagues seized the moment. Though the doctoral program was in good health, a number of what Arac calls "stress points" had developed, including a sense that advising could be stronger and opportunities for graduate students to teach literature more abundant. As in many humanities departments, the "culture wars" of the 1980s and 1990s had taken a heavy toll, creating what the *New York Times* called "intellectual trench warfare" (Arenson, 2002, p. 1). A sustained focus on strengthening doctoral education was a welcome opportunity, Arac recalls, "to come together around substantive issues involving our work together" (J. Arac, interview with the authors, August 30, 2006).

As a participant in the Carnegie initiative, the department turned to its standing Committee on Guidance and Evaluation, which included David Damrosch, then director of Graduate Studies, several faculty members, and graduate students. Working in consultation with others in the

department and with Arac, the committee created and administrated a survey of students, examined peer programs elsewhere, and eventually issued a report detailing fifty-four recommended changes in what Damrosch termed a "major review and overhaul of our graduate program's requirements" (D. Damrosch, e-mail to the authors, March 11, 2004).

Although some of the proposals and subsequent changes were fine tunings, others required substantial changes. Oral examinations were redesigned to provide "a stronger and clearer structure, so that students and faculty will have a better idea of what they are setting out to do" (Department of English and Comparative Literature, 2004, section 4-A). The roles of dissertation committees were also rethought. An ambitious set of procedures for advising "at every stage of the program" was put in place, aimed especially at improving time to degree (Damrosch, 2006, p. 43). And, in response to the "stress point" about teaching, new opportunities were created for graduate students to teach introductory literature courses.

At a more general level, the experience of careful self-study raised awareness of possibilities for greater collegiality and communication among faculty and graduate students. "For students who are committing themselves to our profession, we can surely do a better job of consultation as we seek a good meeting of our interests and their needs," the report declared (Department of English and Comparative Literature, 2004, section 3-J). In this spirit, the department launched a new seminar series that invites graduate students and faculty to question established notions of literary fields of study. The new structure creates a lively trading zone where senior faculty exemplify the traditions of scholarly discourse in the field, and up-and-coming junior faculty and graduate students can push the leading edge of new areas of inquiry.

But what was "truly memorable," according to Arac, and "will stand a good long time in the department memory as a beneficial fruit" of work with the CID, was the process of "live remolding" through which the resulting document was vetted and negotiated by the department as a whole during a series of four ninety-minute meetings over a number of weeks. "Given that one of the symptoms of the 'bad days' of the 1990s was that no one was willing to come to meetings," Arac notes, "the fact that these meetings were well attended and that their process was effectively interactive was quite extraordinary."

Columbia's experience is worth highlighting not because of the particular changes per se (although they are noteworthy), but as an illustration of the value of a process that is inevitably and necessarily ongoing. Indeed, this volume is less about specific innovations and practices than it is about the

importance of asking questions, gathering information, and creating opportunities for shared deliberation about future directions and improvements. Efforts like Columbia's yield powerful lessons about what happens when departments ask hard questions about their purposes, their students, their effectiveness, and about the mechanisms for refining and improving what they do.

## The Formation of Scholars

The PhD is a route to many destinations, and those holding the doctorate follow diverse career paths. Some seek out a life in academe, whether in a research university where one of their roles is to guide future generations of graduate students, or in institutions where the central mission is teaching undergraduates. Others—the majority in some fields—end up in business or industry, or in government or non-profit settings. All of these, we would argue, are *scholars,* for the work of scholarship is not a function of setting but of purpose and commitment. Thus, one might be a scholar of the politics of the Middle East at the U.S. Department of State, or at the state university; a physicist might conduct her investigations on campus or at a federal research laboratory—or in both places. Whatever the setting, the profession of the scholar, and doctoral preparation for that profession, requires specialized, even esoteric knowledge. But they also entail a larger set of obligations and commitments that are not only intellectual but moral.

In this sense, doctoral education is a complex process of *formation*—a term we borrow from Carnegie's work on preparation for the professions, and especially the study of clergy.[6] Graduate education clearly entails technical training (learning how to splice a gene or analyze Russian census records requires very particular kinds of knowledge and skills), and the language of training is widespread in the doctoral context. Formation, in contrast, points not only to the development of intellectual expertise but to the growth of "the personality, character, habits of heart and mind" and "the role that the given discipline is capable of and meant to play in academe and society at large" (Elkana, 2006, pp. 66, 80). What is formed, in short, is the scholar's professional identity in all its dimensions.

The concept of formation also brings into focus the essential role of the learner. Clearly there are aspects of graduate education that faculty must pass along to graduate students; transmission is fundamental to education. But the development of professional identity as a scholar is ultimately a process that students themselves must shape and direct.

Some of the most exhilarating findings from the CID point to what happens when students take more active roles, more responsibility for their own progress and development, whether by using new tools, such as portfolios, for documenting and reflecting on their progress; by serving as mentors to one another; by pursuing connections between research and teaching; or by participating in departmental deliberations about the structure and effectiveness of their own doctoral program—an experience that many of the graduate students participating in the CID found formative indeed. This conception of scholarly formation shapes the vision of doctoral education that readers will find in this volume.

Following from this vision of formation are several corollary themes. The first is the theme of **scholarly integration.** As many readers will know, the Carnegie Foundation has been a persistent voice for a more comprehensive conception of academic work. *Scholarship Reconsidered: Priorities of the Professoriate,* the 1990 report by then-president Ernest Boyer (1990), set in motion a series of reforms aimed at creating a more capacious view of scholarship, encompassing not only basic research but integrative and applied work, as well as the work of teaching. Of course, the notion that teaching and research should be more closely linked is an old theme, espoused by many over the years. Even so, it is a view that runs deeply counter to the practices of higher education, as illustrated by a story told by literary scholar Gerald Graff about having his teaching evaluated: "When my classroom was observed by a professor in the 'visitation' I was required to have as a teaching assistant (and again until I became a tenured professor, after which it was assumed that nothing could be done about me), the only suggestions my senior colleague offered were that I close the door to my classroom and speak a little louder. . . . Clearly, questions of teaching were not thought to be intellectually interesting the way, say, the structure of a metaphysical lyric or the history of ideas is interesting" (Graff, 2006, pp. 375–376).

But this sense that teaching and research are distinct and unequal arenas of work has begun to change, as many campuses have rewritten tenure and promotion policies to bring greater weight to teaching and to establish forms of evaluation and peer review that recognize the intellectual and scholarly aspects of faculty's work as educators.[7]

This more integrated view of scholarship has begun to be embraced in doctoral education settings as well. Consider, for example, the National Science Foundation–supported Center for the Integration of Research, Teaching, and Learning (CIRTL) at the University of Wisconsin-Madison. Working with graduate students (as well as post-docs and faculty) in science, technology, engineering, and mathematics (STEM) fields, CIRTL

seeks to inculcate practices of "teaching-as-research: the deliberate, systematic, and reflective use of research methods by STEM instructors to develop and implement teaching practices that advance the learning experiences and outcomes of both students and teachers" (Center for the Integration of Research Teaching and Learning, n.d.). As the CIRTL mission suggests, there are gains to be made by looking at teaching through the lens of research (what many are calling "the scholarship of teaching") and at research through the lens of teaching (as we have done in the CID by focusing on "the pedagogy of research").[8] To use a phrase that took hold in the CID, "scholarship segregated is scholarship impoverished," and what is needed are deeper forms of integration and connectedness. With this vision in mind, we highlight doctoral education practices that foster this kind of integrated scholarly formation.

A second major theme is **intellectual community.** Doctoral education is perhaps most easily thought of as a series of milestones on the way to the PhD: course taking, comprehensive exams, approval of the dissertation prospectus, the research and writing of the dissertation, the final oral defense (to name some of the most common). At their best, these milestones and the requirements behind them allow students to develop the knowledge, skills, and dispositions to thrive as scholars in their chosen fields; many graduate programs today are looking for ways to make these elements more powerful and more clearly aligned with evolving purposes. But in our work with departments participating in the Carnegie Initiative, a clear lesson was the importance of the culture in which these program elements exist. In an essay written for the CID, historian Thomas Bender argues:

> Much more attention needs to be directed to the culture of the department: making it a safe place for all faculty and students; making intellectual and pedagogical discourse part of the department's public culture; making it a place of participatory governance, openness, and recognizably fair in the treatment of all members, with adequate grievance procedures. One might say that the long preceding sentence moves away from the curricular matter of doctoral training, but in fact I am convinced that the hidden curriculum embedded in the departmental culture is of enormous importance in the intellectual and professional formation of graduate students [Bender, 2006, pp. 304–305].

A culture of intellectual community is, in this sense, not simply a matter of potlucks and hallway conversation; it is "the hidden curriculum," sending powerful messages about purpose, commitment, and roles, and creating (or not) the conditions in which intellectual risk taking,

creativity, and entrepreneurship are possible. In this volume, then, we have tried to present visions of academic life characterized by real partnerships between faculty and students, habits of respect for and interest in one another's work, and the lively exchange of ideas in which new knowledge is forged and transformed.

This focus on intellectual community underlines a basic truth about graduate education: that it is, ultimately, about learning. Learning is the central business, the core task, of both students and faculty—and the learning in question is often of a very special kind because it breaks new ground and builds new knowledge. Much of the debate about higher education over the last century has been about the tension between research and teaching, and how the former crowds out the latter (see for example, Cuban, 1999). Learning, and the intellectual community that nurtures learning by all members of the community, may just be the nexus where these two functions come together in more productive, integrative ways in doctoral education. And of course these are also the conditions in which the formation of scholars can occur most productively.

The third theme running through this volume is **stewardship.** Etymologically rooted in Old English, the word *steward* first referred to the person who regulated a household and supervised the table (Stimpson, 2006, p. 404). The term has ecclesiastical overtones as well. The Oxford English Dictionary defines stewardship as "the responsible use of resources, especially money, time and talents, in the service of God." One root is the parable of the talents, in which a man gave each of his three servants some coins to take care of in his absence. Two of the servants traded with the coins and doubled their holdings; the third was fearful of the master and buried the coins. Those who had taken risks and used the coins were rewarded; the one who had simply saved the money was punished. Here the emphasis is on investing, risk taking, and putting talents (whether coins or abilities) to work, not on hoarding and saving. A steward of the discipline or interdiscipline considers the applications, uses, and purposes of the field and favors wise and responsible applications.

The contemporary environmental movement has adopted the word *steward* by focusing on sustainable management that will make resources available for many generations to come. Here the emphasis is on people living in concert with the environment and on preservation with an eye toward the future. A steward, then, thinks about the continuing health of the discipline and how to preserve the best of the past for those who will follow. Stewards are concerned with how to foster renewal and creativity. Perhaps most important, a steward considers how to prepare and initiate the next generation of stewards.

In the Carnegie Initiative on the Doctorate, we adopted the notion of stewardship as encompassing a set of knowledge and skills, as well as a set of principles. The former ensures expertise and the latter provides the moral compass. A fully formed scholar should be capable of *generating* and critically evaluating new knowledge; of *conserving* the most important ideas and findings that are a legacy of past and current work; and of understanding how knowledge is *transforming* the world in which we live, and engaging in the transformational work of communicating their knowledge responsibly to others.[9]

The generative function points to the fact that the PhD is, at its heart, a research degree. It signifies that the recipient is able to ask interesting and important questions, formulate appropriate strategies for investigating these questions, conduct investigations with a high degree of competence, analyze and evaluate the results of the investigations, and communicate the results to others to advance the field. Conservation implies understanding the history and fundamental ideas of the discipline, but recognizes that stewards are aware of the shoulders on which they stand and must judge which ideas are worth keeping and which have outlived their usefulness. Conservation also entails understanding how the field fits into the larger, and changing, intellectual landscape. Transformation speaks of the importance of representing and communicating ideas effectively, and encompasses teaching in the broadest sense of the word—not simply as conveying information, that is, but as a dynamic process of transforming knowledge so that new learners can meaningfully engage with it. Such transformation requires that stewards understand other disciplines, the differences between disciplinary views of the world, and how to communicate across traditional boundaries. The application of knowledge, and its responsible use, is another facet of transformation.

By invoking the term *steward,* and by focusing on the formation of scholars who can indeed be good stewards, we intend to convey a sense of purpose for doctoral education that is larger than the individual and implies action. A scholar is a steward of the discipline, or the larger field, not simply the manager of her own career. By adopting the care of the discipline as a touchstone, and by understanding that she has been entrusted with that care by those in the field on behalf of those in and beyond it, the steward embraces a larger sense of purpose. The reach of that purpose is both temporally expansive (looking to the past and the future) and broad in scope (considering the entire discipline, as well as intellectual neighbors in related fields).

Predictably, perhaps, the language of stewardship travels well in some academic circles, and less well in others. But the concept, which is moral and ethical as well as intellectual and technical in its import, provides a provocative framework for raising issues about the purpose of doctoral education that may otherwise remain unspoken and unexamined.

## Overview of the Volume

The themes of scholarly formation, integration, intellectual community, and stewardship introduced in this first chapter weave together and run through the entire volume. In Chapter Two, we turn to the big picture, tracing the contours of doctoral education as it has evolved over time. As even a compressed history makes clear, change has been a constant throughout that evolution, and many of the changes reflect shifts in the larger social, political, and economic context of the PhD. At the same time, the long view underlines the difficulty of change and suggests a set of strategies that have been enacted through the CID—the importance of starting with the disciplines, for instance, and with conceptions of the purpose and future of the field. Indeed, as many observers point out, the disciplines today are undergoing major transformations, making this a fruitful time to think carefully about the shape of doctoral education in the twenty-first century.

Chapter Three looks at how graduate programs can constructively grapple with questions about what they do, why, and with what success. This is hard work, with few tools or habits ready at hand, and one of the central aims of the CID has been to provide frameworks—such as the ideas of stewardship and formation—to guide such reflection and self-examination. In the process, we have learned a lot about the obstacles to this kind of stocktaking—how living with cross-purposes is sometimes easier than negotiating a common vision, for instance. But we have also found compelling "existence proofs" of how programs in a variety of fields can hold a mirror up to themselves and enact principles of what came to be called "PART" by CID participants: purposefulness, assessment, reflection, and transparency.

Chapter Four takes readers much closer to the ground to examine specific practices and elements in doctoral education and how they can be made more powerful. Though this volume is not a how-to manual, the principles of progressive development, integration, and collaboration around which this chapter is structured clearly have practical implications. And examples of new approaches to the pedagogy of research,

the development of teaching expertise, the dissertation, and leadership development can, we believe, be learned from and adapted to many settings. Indeed, one of the most rewarding aspects of the CID was the energetic exchange of ideas that developed among different fields and campuses.

Chapter Five focuses on what might well be called the "signature pedagogy" of doctoral education, apprenticeship. The tradition of close work between a faculty "master" and student "apprentice" has its roots in medieval guild culture, which then took hold in the early university as well. This central relationship is not the only approach to graduate teaching and learning; there are courses, seminars and independent study. But apprenticeship remains a central experience. The question is whether it is serving the purposes most important to the formation of scholars in the twenty-first century, and our answer is that it is not—and that many students in many fields would greatly benefit from an alternative model of doctoral education in which apprenticeship is a shared function, and a reciprocal one, that fosters learning for both professor and student. This vision—and there are wonderful examples of how it might look on the ground in programs we have studied and worked with—is foundational to the concept of intellectual community that has been central to the CID.

Chapter Six then turns to the theme of intellectual community, which we see both as a condition for making the kinds of changes and improvements described elsewhere in this volume and as a consequence, or a product, of those improvements. It is not, certainly, a difficult goal to embrace (who could be opposed to a more humane, vibrant, open intellectual community?), but neither is it easily achieved. Indeed, many students report that the culture of their chosen program makes already daunting challenges even harder, and the difficulties are often felt most keenly by students of color and women, international students, and by those attending part-time. The goal, then, is to create environments in which all qualified students can succeed in the fullest way, becoming responsible stewards of their disciplines, academic citizens, and contributors to the larger society. The benefits of a thriving intellectual community, however, go beyond the important goal of nurturing individual scholars. It also fosters the development of new knowledge by encouraging scholarly debate and intellectual risk taking. Intellectual communities are not simply happier places to work; they are also more efficient engines of knowledge production than their dysfunctional, antisocial, or apathetic counterparts.

Finally, Chapter Seven pulls things together and returns once again to the urgent need for change. What is needed, we argue, is not simply deliberation, which is essential, but action. Thus we issue a challenge to

students, faculty, university administrators, and external partners who must be involved in moving doctoral education successfully into the twenty-first century. This final chapter also sets forth an agenda for further study.

Throughout the volume, we have drawn primarily on our work with the eighty-four CID participating departments (a list of departments is in Appendix B) because we know them well and have worked with them to document their efforts in ways that can usefully be shared with others. (For electronic representations of departments' work, including many of the examples described throughout this volume, see the CID Gallery Web site at http://gallery.carnegiefoundation.org/cid).

Of course the CID-participant programs are only a subset of the world of doctoral education; important activity and new thinking is evident much more widely. The Council of Graduate Schools continues to be an important venue for grappling with new challenges and trading ideas (for example, Council of Graduate Schools, 2004, 2007), and the Association of American Universities has recently released several key reports on doctoral education (Association of American Universities, 1998a, 1998b, 2005; Mathae and Birzer, 2004).

In the disciplinary societies, as well, new energy and resources have been brought to bear on this work, for instance through the 2004 report from the American Historical Association on graduate education (Bender, Katz, Palmer, and Committee on Graduate Education of the American Historical Association, 2004). The National Science Foundation has been another important catalyst for new efforts, through a program to promote interdisciplinary doctoral programs, another linking graduate students with K–12 teachers and students, and a third prompting shifts in the culture of mathematics graduate programs.[10]

Lively deliberations about the future of doctoral education are taking place in other countries as well, and we have been privileged to participate in symposia with European Union countries and to visit with leaders from Chinese research universities about their plans. In the latter, for instance, a new government scholarship program will send 7,000 scholars (including doctoral students) to eighty countries to pursue advanced study.

We see and draw from this broader landscape as a context for our claims and recommendations. And of course we have drawn, too, on earlier studies and initiatives undertaken by others. Finally, we have drawn on our own personal experiences—as graduate students ourselves (some rather recently, some longer ago); as mentors working with graduate students in our various settings; as active scholars with our own areas of research and expertise; and (in one case) as a long-time graduate school dean who has lived with many of the issues we will explore in these pages.

Our hope is that this book will be a resource and an "owner's manual," to borrow a term from Henry Rosovky, former dean of the faculty of arts and sciences at Harvard and CID advisory committee member, for those who feel ready to ride the wave of change in doctoral education. It is not written as an educational research report, but as a tool for thinking, to provoke, inspire, and assist the community of scholars on the ground—and especially the students who are joining that community of scholars. We hope the ideas and examples we present will be a starting point for lively conversation and creative action among those who care about doctoral education.

## ENDNOTES

1. The epigraph is widely attributed to Will Rogers, although there is no clear documentation of its source according to Steve Gragert, associate director of the Will Rogers Memorial Museum in Claremore, Oklahoma.
2. The figure of 375,000 enrolled doctoral students is an estimate. The National Postsecondary Student Aid Study data suggest a slightly higher number: 390,000, which is 14 percent of the 2.8 million enrolled graduate or first professional degree-seeking students (Choy, Cataldi, and Griffith, 2006). The Council of Graduate Schools institutional survey reports 340,000 (out of 1.5 million graduate students), which should be considered a lower bound because not all degree-granting institutions participate in the survey (D. Denecke, e-mail to the authors, June 5, 2006). Determining the number of doctoral students is further complicated by the fact that some doctoral students are counted as master's students in the early years of their studies.

   The total number of doctorates granted each year comes from the Survey of Earned Doctorates reports. In 2005 the total was 43,354, and has been climbing (Hoffer and others, 2006). The most recent Carnegie Classification recognizes 413 institutions in the various doctoral-granting categories (Carnegie Foundation for the Advancement of Teaching, 2006). Likewise, the most recent Survey of Earned Doctorates report, *Doctorate Recipients from United States Universities 2005,* lists 416 doctoral-granting universities (Hoffer and others, 2006).
3. Of the ten most recent secretaries of state, the following have held doctorates: Condoleezza Rice (University of Denver), Madeline Albright (Columbia University), George Schulz (MIT), and Henry Kissinger (Harvard University). The Federal Reserve Board has seven spots, six of which are filled as we write this note; five members have PhD's: Ben S. Bernanke, Chairman (MIT), Donald L. Kohn (University of Michigan), Susan

Schmidt Bies (Northwestern University), Randall S. Kroszner (Harvard University), and Fredrick Mishkin (MIT).

4. Predictably the numbers vary by discipline and setting. Attrition rates, insofar as they are known, are thought to average 40 to 50 percent (Golde, 2005; Lovitts, 2001). Estimates range from 20 percent to nearly 70 percent depending on discipline. According to data from the Survey of Earned Doctorates the average registered time to degree was 8.7 years in 2005, ranging from 5.7 years in chemistry to 9.7 years in history and 13.2 in education (Hoffer and others, 2006, Table A-3).

5. The field of education has long struggled with drawing clear distinctions between these two doctorates, the research doctorate and the doctorate of practice, and we are encouraged by renewed efforts to distinguish and invigorate both degrees (see Shulman, Golde, Bueschel, and Garabedian, 2006). We recognize the growing trend to develop new degrees, often referred to as "clinical doctorates," "professional doctorates," or "practice doctorates," but in the CID and in this volume our primary concern is research doctorates and the PhD.

6. The Carnegie Foundation for the Advancement of Teaching has a long history in the study of professional education, beginning with the Flexner report on medicine in 1910 and a study of legal education in the 1930s. This tradition continues today with comparative studies of law, engineering, clergy, nursing, medicine, and teacher education. The language of formation derives primarily from the study of the preparation of clergy, where the authors write, "A distinguishing feature of professional education is the emphasis on forming in students the dispositions, habits, knowledge, and skills that cohere in the professional identity and practice, commitments and integrity. The pedagogies that clergy educators use toward this purpose—formation—originate in the deepest intentions for professional service" (Foster, Dahill, Goleman, and Tolentino, 2006, p. 100).

7. In *Faculty Priorities Reconsidered* (2005), Kerry Ann O'Meara and Eugene Rice present findings from a campus survey, reporting that 35 percent of chief academic officers say that teaching now counts more than it did ten years earlier. That—for those who have sought greater recognition of the scholarly work of teaching—is the good news. The sobering counterweight is that, on 51 percent of campuses, research, too, counts more than it did ten years ago (O'Meara and Rice, 2005, p. 320). Clearly the ante is being raised on all fronts. Thus, in the CID and other Carnegie Foundation programs, we have been especially interested in forms of academic work in which teaching, research, and service are seen as an interconnected whole rather than three different pigeonholes to be filled.

8. The "scholarship of teaching and learning" may no longer need a special note; it has been a growing part of the higher education landscape for more than a decade now—the focus of a number of national initiatives, an animating agenda on hundreds of campuses, a topic on the program of many disciplinary and education conferences, a new thrust for a number of journals, and the theme of a long list of publications. In *The Advancement of Learning: Building the Teaching Commons,* Mary Taylor Huber and Pat Hutchings argue that "the scholarship of teaching and learning entails basic but important principles that can and should be in every professor's repertoire. It means viewing the work of the classroom as a site for inquiry, asking and answering questions about students' learning in ways that can improve one's own classroom and also advance the larger profession of teaching" (Huber and Hutchings, 2005, p. 1).
9. This formulation may recall the "vision of the research university of the twentieth century" as a "sheltered grove in which knowledge is propagated, created and applied" (Atkinson and Tuzin, 1992, p. 23).
10. The Integrative Graduate Education and Research Traineeship (IGERT) program was initiated in 1997 to establish innovative new models for graduate education and collaborative research that transcend traditional disciplinary boundaries. The Graduate Teaching Fellows in K–12 Education (GK–12) program funds graduate students in science, technology, engineering, and math (STEM) fields to work with teachers in K–12 schools. Both of those programs are NSF-wide and cross several directorates. The Division of Mathematical Sciences sponsored the Vertical Integration of Research and Education in the Mathematical Sciences (VIGRE) program from 1998–2002, aimed at "the development of a community of researchers and scholars in which there's interaction among all the members" (National Science Foundation, 1997, p. 1). Mathematics departments that received multi-year VIGRE grants were expected to "vertically integrate" their graduate traineeship program, an undergraduate research experience program, and a post-doctoral program.