On the Right Track:

A Manual for Research Mentors

Council of Graduate Schools

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by Margaret F. King
The Graduate School
North Carolina State University

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TABLE OF CONTENTS

FOREWORD

Good mentoring has long been known to make a difference in all aspects of the graduate student experience. Mentors ease the assimilation of students to a new culture, facilitate the integration that may improve a student's chances of successfully completing degree requirements, and help students navigate the rapids of a sometimes-uncertain job market. Mentors often inculcate students in the norms of professional socialization that may not be an explicit part of a program's formal curriculum. And they have proven to be instrumental in recognized efforts to increase the number of underrepresented minorities who successfully complete their graduate degrees.

Mentoring is one of the responsibilities of the research supervisor, but this responsibility is difficult to define. Faculty members do not necessarily receive any formal guidance about its scope and nature. Instead, good mentoring practices are usually developed as a result of the casual and sporadic lessons that faculty learn by experience, conversation, and witnessing the examples of colleagues. This volume represents a comprehensive discussion of the issues and problems involved in the ethics of graduate research supervision.

Using categories of attention, empathy, boundaries, and empowerment, Dr. Margaret King examines the complexities of mentoring at each stage of graduate study. With its in-depth treatment of the issues and its sophisticated discussion and review of advising practices and departmental policies, this publication will be of interest to faculty and graduate education policymakers. Faculty will find it to be a helpful guide; deans, directors of graduate study, and other policymakers will find in this volume a rich source of new guidelines for improving the graduate education enterprise. We thank Dr. King for granting CGS permission to publish this volume.

Debra W. Stewart
President
Council of Graduate Schools

INTRODUCTION

Directing the research of graduate students is the primary point at which the research and teaching missions of the university intersect. Nowhere is instruction more individualized, nowhere is the potential for both satisfaction and frustration greater, and nowhere are the stakes higher. Through their research training, graduate students internalize the norms of their discipline—intellectual, methodological, and ethical. Thus the future health of the discipline, as well as the professional future of the student, depends on the success or failure of this enterprise.

The ethics of graduate research supervision are complex. Regarding the success of research training, where does the responsibility of the supervisor end and that of the trainee begin? What about the responsibilities of the advisory committee and the entire graduate program faculty for the success of graduate research training? And when we speak of "good" supervisory practice, is there a difference between "good" in the sense of "ethically responsible" and "good" in the sense of "strategically effective"? What is the difference, if any, between a research *supervisor* and a research *mentor*? If there is a difference, are the duties associated with mentoring "supererogatory" (above and beyond the call of duty) and thus optional? Or are they among the special but non-optional professional duties that one assumes as a member of a university faculty? Finally, as one decides how to spend the currency of one's time as a faculty member, how much does one "owe" to the duty of research supervision, as opposed to other academic duties?

Attempts to answer these questions have varied widely in their emphases. At one end of the spectrum, emphasizing an ethic of justice, are statements of graduate student rights, which have been variously codified by graduate schools, graduate student associations, and faculty associations.[1] At the other end, emphasizing an ethic of care, are manuals or guidelines that stress the nurturing aspects of mentoring.[2] In between are publications containing both ethical and strategic guidelines for directing graduate student research and mentoring research trainees.[3] All

are useful in setting out reasonable expectations for both the mentor and trainee, as well as suggesting strategies to make the mentor-protégé relationship as productive and mutually satisfying as possible.

I share with many previous commentators some basic premises about graduate student research training: (1) that the core mission of the university is to educate students; (2) that the educational goal of research-based graduate programs is to produce competent scholars capable of conducting independent, original, and ethically sound research; and (3) that the individual research adviser, the student's advisory committee, and indeed a graduate program's entire faculty share with each graduate student the responsibility for meeting this goal. In the context of the various stages of a graduate student's program, I will discuss faculty responsibilities in terms of four behaviors: right attention, right empathy, right boundaries, and right empowerment. As a prelude to this larger discussion, however, I will briefly address the challenges of determining what is "right" in regard to directing graduate student research.

I. DIRECTING THE RESEARCH OF GRADUATE STUDENTS: DOING THE "RIGHT" THING

As it applies to directing graduate student research, the adjective "right" has multiple and interlaced meanings. On the one hand, "right" means "ethically sound"—acting in ways that are fair, honest, and responsible. But because graduate students and professors are human beings, with varying backgrounds, strengths, and weaknesses, the success of research supervision depends in large part on the cognitive and psychosocial variables represented by each student—and each faculty member. If we believe that the educational goal of research-based graduate programs is to produce competent scholars capable of conducting independent, original, and ethically sound research, and if we believe that graduate faculty have a professional obligation to support that goal, then "doing the right thing" in research supervision also means doing what is "effective" and "adequate."

Stated another way, faculty have a duty to help graduate students in research-based programs evolve from apprentices to junior colleagues, with the competencies necessary for full membership in the disciplinary community. However, fulfilling this duty is as much an art as it is a science. What is "effective" and "adequate" in supervising one graduate student may not be "effective" or "adequate" in supervising another. In many cases, determining what has or has not been "effective" and

"adequate" in research supervision can be done only in hindsight, after the student has finally succeeded or failed in the research enterprise. Since students are ultimately responsible for their own learning and their own success, research supervisors *and* the graduate program faculty as a community must ask themselves two key questions: "Have we adequately discharged our obligation to facilitate this student's or these students' progress toward the degree?" and "Have we done anything to hinder their progress unnecessarily?" The discussion that follows suggests key policies and practices that must be examined in answering these questions.

II. SUCCESS OF RESEARCH-BASED GRADUATE PROGRAMS: CORPORATE RESPONSIBILITY

If a graduate student's success depended solely on the research training itself or on the research supervisor, this essay would be much shorter. In reality, each student's success is determined in part by collective decisions of the entire graduate program faculty, beginning with the admissions process.

The Recruiting and Admissions Process: Right Attention, Right Balance, Right Empowerment

The stage for students' success in their research programs is set during the recruiting and admissions process. Graduate faculty must make ethically responsible decisions regarding at least three key admissions issues: the number of students to admit, the criteria by which to admit them, and the information to provide to students as they decide whether to enroll.

In deciding how many students to admit, based on projected enrollments, faculty must determine how many new and continuing students can be adequately accommodated with existing resources, e.g., office and/or laboratory space, core courses, and, above all, research supervisors. Some of the problems that occur in research training result from unmanageably large research groups.[4] In setting admissions goals or caps, faculty must pay attention not only to the graduate student/graduate faculty ratio but also to the distribution of student trainees *among* the graduate faculty. Even if the overall ratio is good, when a small number of a program's faculty end up supervising the majority of the students, the quality of research supervision may suffer.

Setting an appropriate cap on admissions is not always easy. For example, in those disciplines where large numbers of teaching assistants are needed for introductory courses or labs, there may be pressure to

admit more students than can be adequately advised by the graduate faculty. Another complicating factor with which some graduate programs struggle is the impact of an increasingly tight job market. If a growing percentage of Ph.D.s in a given discipline cannot find jobs in their field, does this place a special burden on graduate programs to reduce the number of doctoral students they admit and thus their pool of teaching and research assistants? In response to this issue, some programs have limited their admissions. Others have argued that such an approach is unnecessarily paternalistic—all qualified applicants, provided with accurate information about the job market, should be allowed to pursue a Ph.D. if they so choose.[5] Clearly, the governing principle should be what is in the best interest of the students, but what is in the best interest of the students is not always clear.

Deciding whom to admit demands even greater attention and balance. There are tremendous pressures to make graduate admissions purely a numbers game, particularly a game in which those with the highest GRE scores win and those with GRE scores below a certain minimum are not even considered. These include the pressure to find a uniform standard by which to compare students across a range of undergraduate institutions, the pressure to evaluate large numbers of applicants in a limited amount of time, and the pressure for programs to do well in national rankings.

However, the GRE guidelines themselves state that faculty who use the GRE scores have an "obligation" not to use cutoff scores or to consider GRE scores in isolation from other indicators of ability. There are compelling reasons for such caveats. For example, Wendy M. Williams notes the following in an opinion piece for the *Chronicle of Higher Education*:

> The G.R.E. and its relatives do not tell us who will go on after training to revolutionize a scholarly discipline or a profession. They only predict who will do well in first-year course work, and even here the magnitude of the prediction is modest (correlations hover around 0.2 or 0.3).[6]

In addition, despite the best efforts of the GRE psychometricians, men have higher mean scores than women on the quantitative subtest of the General Test, and among U.S. citizens, white, Asian-Pacific, and "other" test takers have higher mean scores on all subtests than test-takers from other U.S. ethnic groups.[7] Thus to rely primarily on GRE scores for admissions decisions is neither wise nor fair. Letters of recommendation, undergraduate transcripts, statements of purpose, student resumes and/or

publications—and, when possible, interviews—must also be considered in the admissions process. They can provide evidence of qualities not measured by the GRE General Test, such as critical thinking, creativity, intellectual curiosity, persistence, self-discipline, maturity, and an aptitude for research. Without attention to this broad range of indicators, faculty run the risk of admitting students who cannot succeed in the research enterprise and of unfairly denying admission to students who can.[8]

Once students are admitted, graduate faculty must empower them to make timely, informed decisions as to whether they will enroll.[9] Students deserve to know the amount of financial support being offered them (stipend and/or tuition and benefits), its initial duration, the likelihood and conditions of renewal beyond the initial appointment, and what will be required (time and responsibilities) in exchange for the support offered. They also need to know how their funding would be affected by changing advisers, changing programs, or being unwilling or unable to carry out any responsibilities required by their source of funding. In addition, graduate programs should make easily available current data on their attrition and retention rates, on the ethnic and gender mix of the current student population, and on the times to degree for their students. A careful and explicit presentation of key information up front not only provides "truth in advertising"; it may also prevent misunderstandings and disappointments later—for faculty as well as students.

The Early Stage of Graduate Study: Right Attention, Right Empowerment

Contrary to what one might expect, attrition from doctoral programs is actually higher before admission to candidacy than afterwards.[10] Early attrition is not always a bad thing. If a student is temperamentally or intellectually unsuited for graduate study, or if a mismatch exists between a student's goals or interests and those of the graduate program, the less time wasted in making that discovery, the better. On the other hand, early attrition may occur needlessly when, due to faculty inattention, students are allowed to "drift" without being fully integrated into their graduate program.[11] Again, the graduate faculty as a whole bears some responsibility for seeing that each student is quickly and purposefully "launched" into a well-conceived, well-monitored program of study and research.

Early empowerment of graduate students means helping them understand both the implicit and explicit requirements of their graduate programs. Not all students enter graduate school with an equal grasp of those behaviors, attitudes, and competencies crucial to success at the

graduate level. And not all students are easily assimilated into those informal interactions where many students learn the implicit norms of graduate education. Faculty can help level the playing field in a number of ways.[12] Orientation sessions, as well as written guidelines and explicit milestones and expectations, are essential. Also helpful are a peer mentor system, graduate seminars in which new students have a chance to hear about the research of faculty and senior students, regular opportunities for students to interact informally with others in their program or proposed research area, and the designation of an interim faculty adviser for each student until a permanent adviser is assigned. Finally, the graduate faculty should have in place a system for monitoring and providing regular feedback on student progress, even during the first year and at least annually thereafter.[13] Without such a system, students can get far down the wrong track before any corrective action is taken.

The graduate faculty also have a corporate responsibility to empower students by paying "right attention" to the selection process for research supervisors or major professors. In some programs, students choose, or are chosen by, a research adviser at the time of admission. The "up" side of this model is that from the outset, each student has a specific faculty member responsible for guiding and monitoring his or her graduate work. The "down" side is that the student and adviser have no opportunity to determine ahead of time whether they will be compatible. If the fit is poor and the student has to find a new adviser or leave the program, the student has wasted time, and the original adviser has wasted resources. At the other extreme, most often in the humanities, students may not identify a major research adviser until shortly before or after passing the qualifying examinations.[14] (As might be expected, these are the programs in which attrition and time-to-degree are the greatest.) Between these two extremes of instant and late adviser assignments are programs in which new graduate students rotate through several laboratories during their first year before being matched with a research supervisor or interview with several faculty before matches are made. The important thing is that each graduate program develop a formal mechanism that provides *all* new students with the opportunity and structure to identify a research supervisor at roughly the same time in their program—the sooner, the better. Again, the goal is to level the playing field so that students on fellowships, teaching assistantships, or personal support receive the same level of "right attention" as research assistants.

A more difficult ethical issue in assigning research advisers is deciding how much—and in what way—to protect students from poor

advisers. Should faculty who have a reputation for exploiting, verbally abusing, or neglecting graduate students retain the right to have student advisees? What about advisers whose students have a low rate of completion or excessive time-to-degree because the adviser is either incompetent, a perfectionist, or someone who delays completion of the thesis or dissertation unnecessarily so that the adviser's research program can continue to benefit from the student's expertise? If someone with a track record of poor advising has a grant from which to pay a student's stipend, should/can he or she be denied the right to "hire" that student? In some programs, poor advisers may actually be removed from the graduate faculty roster upon the recommendation of the graduate program faculty and/or upon action by the department chair or the dean of the graduate school. In other programs, the graduate program coordinators either explicitly warn students about working with poor advisers or encourage new students to talk with senior students before making a decision. At the very least, "Students should . . . be advised to examine the performance of possible mentors: publication record, financial-support base, reputation, success of recent graduates, recognition of student accomplishments (e.g., through co-authorship), laboratory organization, and, most important, willingness to spend time with students."[15] Students should be empowered to make informed decisions about the individuals who will play such a crucial role in determining their future.[16]

Finally, graduate program faculty have a corporate obligation to review regularly the content of their curricula and the design of preliminary or qualifying examinations. Regarding the former, faculty must give thoughtful consideration to the outcomes they hope to achieve through the courses they offer and especially through the courses they require. Key questions to be addressed include the following: Do the courses offered fit together into some sort of coherent whole? In what way does each course prepare students for their research, prepare them for other aspects of their professional lives, or create an important larger context in which to view their area of specialization? Are the courses and course requirements regularly updated to reflect changes in the field? Are key courses offered often enough that students don't have to delay progress toward the degree while waiting for them to be offered next? In the words of Bowen and Rudenstine (1992), the graduate curriculum should be governed by what constitutes "comprehensive intellectual training . . . in a given field"—not just by "what the faculty like to teach and when they like to teach it" (p. 281).

Broad-based preliminary or qualifying exams should be subjected to similar scrutiny. What are these examinations intended to test, and what is

the evidence that they are testing it? If their purpose is to determine which students are qualified for admission to candidacy, do the majority of the faculty (and the students) feel that the exams are doing so fairly and accurately? Is the selection and content of questions, as well as the grading of them, equally fair to students in all subdisciplines? Are students given clear guidelines as to what and how to study for these exams? Are they given a reading list or other means of limiting the scope of their preparation? A faculty discussion where all subdisciplines are represented, feedback from current and former students, discussions at national or regional professional meetings, and reviews of comparable exams at peer institutions can provide valuable information as to whether current exams are reasonable, fair, and in keeping with prevailing practices.

III. ETHICAL RESPONSIBILITIES OF THE RESEARCH ADVISER AND ADVISORY COMMITTEE

The greatest challenge that graduate faculty face is helping students make a successful transition from the familiar and highly structured world of course work, with its short-term goals and predictable closure, to the unfamiliar, loosely structured, and relatively open-ended world of thesis or dissertation research. Because the appropriate balance between too much and too little supervision is both delicate and dynamic, research advising, like tightrope walking, requires constant and careful attention. As Donald Kennedy points out, "The one-on-one academic relationships, however informal they may seem, require at least as much planned effort and special skill as the lecture and the seminar."[17] Faculty have a responsibility to determine the amount of time they can realistically budget for advising and to limit their number of primary and secondary advisees accordingly. If a research adviser or committee member is overcommitted, attention to his or her graduate students is likely to suffer.

Determining the Research Topic: Right Attention, Right Empowerment

The first major responsibility that most research advisers face is to help their students define a manageable thesis or dissertation topic and to do so in a timely manner. Prodding the student to choose a topic as early as possible, listening carefully to a student's initial ideas, posing questions that help the student refine and focus those ideas, giving direction and focus to the student's literature review so that it proceeds efficiently, and

helping the student formulate a valuable research question that is neither too narrow nor too broad—all these activities require "right" attention.

In guiding the selection of dissertation topics, research supervisors must sometimes also struggle with issues of right empowerment—particularly the degree to which a student should be empowered to determine the focus of his or her own research project. When the student is being supported on a research grant and/or is part of a large laboratory group with a tightly defined research agenda, certain constraints on the dissertation topic are inevitable. But what additional constraints, if any, are appropriate to place on the dissertation topic? If there is a choice between a topic that may lead to a patent and one that is "more intellectually interesting and challenging," for example, is it appropriate for the adviser to push the student toward the topic with patent possibilities because of the potential financial rewards? In this case, many would agree with Jonathan Cole, who raises this issue, that such a constraint on the student's topic would be inappropriate.[18] But the appropriateness of other constraints is less straightforward. For example, should the adviser discourage a student from choosing a topic that is highly controversial, or that the adviser believes will limit the student's marketability, or in which the adviser is simply not interested? According to Donald Kennedy, "The guiding principle simply has to be the interest of the student. Faculty members have a special obligation to foster intellectual development and independence. . . ."[19] In this context, enabling a student to arrive at the most promising dissertation topic requires careful attention and sometimes thoughtful negotiation among competing claims.

Creating Structure and Clarifying Expectations: Right Attention, Right Empowerment

Virtually all studies of and guidelines for research advising stress the importance of structuring the research process in ways that will help the student complete the thesis or dissertation in a timely manner. Establishing deadlines for various milestones in the process—e.g., selecting a committee, completing the literature review, preparing the prospectus, passing the preliminary exams, submitting each chapter to the adviser for review—is crucial to motivating students to move forward. Right attention must also be given to scheduling regular meetings with the adviser to discuss the student's progress, whether face-to-face or via the telephone or Internet. Such meetings are especially important if the student is completing the research away from campus—in a government or industry setting, for example, or while employed at another university.

For an adviser to say, "My door is always open; just come see me when the spirit moves you," is not enough.[20] If given the choice, students who are having trouble with their research tend to avoid their advisers, often exacerbating their problems. Only with regular meetings can the adviser assess whether the student is making satisfactory progress and intervene to get the student back on track, if necessary.

There is no one-size-fits-all formula for the amount of structure and direction that a responsible adviser should provide. A balance must be struck between giving students enough direction so that they can reach closure in a reasonable amount of time and giving them the freedom to make the mistakes and solve the problems that will help them develop independence. As a study by John Hockey has suggested, effective advisers may begin by keeping either a tight or loose rein on the student's research but are able to shift to the opposite strategy as the student's progress warrants. For example, an adviser may begin by almost micromanaging a student's research but can relinquish control as the student develops the competence and expertise to move ahead independently. On the other hand, an adviser may begin by giving a student a great deal of leeway but may then impose a much tighter structure if the student seems stalled.[21] The important thing is that the amount of structure provided be based on the adviser's best guess as to what is in the student's best interest.

"Right attention" to clear and regular communication with advisees is essential to their "right empowerment." Without an explicit articulation of goals and expectations, both advisers and their students sometimes make unfounded assumptions that can sabotage the adviser-advisee relationship and adversely affect the students' performance. Advisers should communicate their fundamental expectations—both of their students and of themselves—as early in the relationship as possible and ideally at the time that the matches between advisers and advisees are negotiated. For students to function effectively, they need to know what the adviser expects of them: how much time per week they are expected to spend on their research, what their responsibilities are, how often they must meet with their advisers, who should initiate the meetings, what they should prepare for each meeting, and how their progress will be assessed (i.e., deadlines and measures). Students also need to know what to expect of advisers, e.g., whether their supervision style is primarily hands-on or hands-off, at what point they want to be consulted if a student is having problems with the research, and on what principles they allocate credit in joint publications. If there is a mismatch between the student's expectations and the research supervisor's, discussing and (if

possible) negotiating any differences up front may preclude disastrous missteps and misunderstandings later on.

In addition to helping students develop technical competence, critical thinking skills, and intellectual initiative, advisers play a central role in socializing their advisees into the culture of their disciplines.[22] Thus, in clarifying their expectations to their students, advisers have a special responsibility both to articulate and to model the ethical norms of responsible, rigorous research. These norms include, among others, the appropriate use of animal or human subjects in research, appropriate citation of source materials and prior research, fair allocation of authorship in joint publications, ethical submission and review of publications, the recognition and avoidance of conflicts of interest, ethical use of research funds, and the responsible generation, recording, and use of data.

It is naively optimistic to assume that students will come equipped with a moral compass properly calibrated to steer them through the unfamiliar waters of graduate-level research. Nor are they likely to absorb the norms of responsible research simply through osmosis. Advisers must both show and tell them what constitutes ethical practice in their disciplines.[23] In addition to the formal discussions of ethics that might take place in a seminar or lab meeting, advisers should also be alert to informal "teachable moments" in the research process, when ethical practices can be emphasized. These moments might occur, for example, as the adviser guides and observes the student collecting data; reviews lab notebooks; critiques early drafts of thesis chapters; and, as publications are planned, explains the principles governing recognition of co-authors. Most important, of course, advisers must practice what they preach. If students see their advisers cutting corners in their research, handling data carelessly, letting conflicts of interest compromise their objectivity, or refusing to give proper credit in publications to those who actually did the work, they receive a signal that these unethical practices are really okay, regardless of the lip service paid to higher standards.

The Dissertation/Thesis and Final Defense: Right Attention, Right Empowerment

It is in the dissertation or thesis phase of the research process that the student's advisory committee usually plays the most active role. Chaired by the research supervisor, the committee typically reviews the research proposal or otherwise determines the student's readiness to proceed with the dissertation or thesis, meets with the student periodically to discuss progress on the work, reviews drafts of chapters and then the work as a whole, and

conducts the final oral defense. In the sciences, particularly where the project is highly interdisciplinary or otherwise complex, committee members routinely provide valuable guidance to the research itself.

The committee provides right attention and right empowerment to the student primarily in three ways: first, by providing prompt and constructive feedback on the dissertation proposal and drafts; second, by being reasonably available for committee meetings and the final oral defense; and third, by conducting a rigorous but fair final oral examination. The first of these responsibilities is the most often neglected. Faculty members have so many demands on their time—from their departments, their research, and the students that they themselves teach or supervise—that it is easy to let a draft from "someone else's" student sit on a desk unread for weeks or even months at a time. In the worst cases, this neglect is compounded when a committee member holds a draft until the very eve of the dissertation defense and then returns it with demands for massive revisions.

Although it is the student's responsibility to get materials to the committee in a timely manner and to keep the committee apprised of the progress of the research and writing, the adviser should play a significant role in optimizing the student's interaction with the committee. First, the adviser can suggest potential committee members who can help guide the research and who are known to conduct final oral exams with fairness and civility. Second, because the adviser, unlike the student, is a peer and colleague of the other committee members, the adviser can run interference with them on the student's behalf. For example, at the first meeting of the committee with the student, the adviser should work with the student to establish a regular meeting schedule, as well as a reasonable timetable for the committee to discuss the progress of the student's research and to review and return drafts of the thesis or dissertation to the student. It is then the student's responsibility to give the committee members the appropriate lead time for reviewing the drafts.

Later, if committee members hold drafts too long without reviewing them, the adviser should act as the student's advocate in persuading the committee to review and return the drafts to the student. Finally, if there are methodological, ideological, or personal differences between the committee members and the adviser, although the committee can certainly call on the student during the final oral to defend both methodology and argument, the adviser should work with the committee to ensure that the student's dissertation isn't held hostage to irreconcilable differences among the members.

The adviser has additional responsibilities during the dissertation or thesis process and the final defense. Even more than the other committee members, advisers must pay "right attention" to students' drafts, giving clear and constructive feedback that empowers students to move forward and finish. The adviser must also know and pay attention to institutional deadlines so that the student's paperwork is filed and the defense is scheduled early enough in a given semester to allow the student to meet thesis submission and graduation deadlines.

Most important, the adviser must know "when to say when." An adviser who is too lax about the quality of the dissertation sets the student up for failure in the final defense. At the other extreme, advisers sometimes delay approval of the dissertation because of either unrealistic perfectionism or a desire to get one more experiment or article out of a well-trained student before losing the benefit of that student's expertise. Admittedly, students sometimes think that they are finished with the dissertation before they really are. However, it is also easy for the adviser to rationalize self-interested delays in approving the dissertation. If a student begins to complain that the dissertation has become a perpetually "moving target," the adviser and the student should conduct a reality check by conferring with the rest of the student's committee.

In some disciplines, after a successful defense, the student's final obligation is to revise the thesis or dissertation for publication as one or more articles co-authored with the adviser (and sometimes other committee members or members of the adviser's laboratory). Here, too, expectations should be established and agreed on early in the student's research. Without clear and shared expectations as to the responsibilities and deadlines for such revisions, the student's and adviser's work may languish for too long unpublished on a busy adviser's desk. If someone else in the laboratory must then revise the work for publication, it may also become more difficult to decide how credit for the work should be allocated.

IV. THE ADVISER-ADVISEE RELATIONSHIP: MAINTAINING RIGHT BOUNDARIES

In the adviser-advisee relationship, maintaining right boundaries means preserving an appropriate distance from anything that might compromise one's fairness in the dual advisory roles of guide and judge. In many cases, this means maintaining appropriate personal boundaries between the adviser and advisee. In others, it means making sure that one's financial or career interests don't inappropriately influence the supervision and evaluation of student research.

The most troublesome blurring of right boundaries between students and their supervisors occurs in what faculty handbooks decorously refer to as "romantic" or "amorous" relationships.[24] University policies usually prohibit such relationships, with varying degrees of success. Given the close working relationship between advisers and their students, such relationships are not surprising, and there have certainly been cases where faculty members married their graduate students and lived happily ever after. The problem, or course, is that even if the supervisor believes that he or she can objectively evaluate a lover's work, no one else does. And in cases where the romantic relationship comes to a less than amicable end, the consequences can range from charges of sexual harassment against the professor to abandonment of graduate work by the student. If, despite everyone's best intentions, an amorous relationship between student and supervisor does develop, it is imperative that the supervisor ask a colleague to take over the direction and evaluation of the student's research. Otherwise, even in those rare "happily ever after" cases, the validity of the student's graduate degree will always remain suspect.

Sometimes, boundary problems can occur when the adviser's relationship to the advisee becomes too "parental." In such cases, the adviser may resist or inhibit the student's independence, whether in research or in career plans. The desire to clone oneself through one's intellectual offspring, or to see one's advisees as merely extensions of oneself, is a strong but inappropriate one, which ignores the boundaries between one's own life, goals and desires and those of one's students. If the parental becomes the paternalistic and the supervisor either makes decisions for the student or feels compelled to rescue the student from any and all difficulties, the student's development as an independent researcher can be crippled, and the supervisor's ability to judge the student's work can be compromised.

Finally, the supervisor who takes on a too intensely parental role may fail to establish appropriate limits to the time and resources he or she can commit to the advisee. Excessively dependent students, as well as students with severe emotional problems, can rob the adviser of time owed to other professional and personal responsibilities: to family, community, research, teaching, or other students in the research group. Also, the adviser may end up trying to solve problems beyond his or her professional expertise. Students with severe emotional problems, for example, should be referred to the university counseling center. Setting limits on both the time and the kinds of help that one can responsibly provide one's advisees is a more subtle challenge than avoiding romantic entanglements, but an equally important one.

At the other end of the spectrum, supervisors must set right boundaries between their own financial and career interests and their responsibilities to their advisees. For example, in the case of industry-funded research or any research that might result in marketable intellectual property, sponsors may want to delay publication of results for as long as two years. Even if a faculty member is personally willing to accept such a delay, he or she must consider the consequences for any graduate student involved in the research. The contract must be written in a way that allows the student to defend the thesis or dissertation in a timely manner. Many universities actually have a policy to this effect. If there are constraints on publication, the student should be made aware of them before choosing to participate in the research, and both the faculty member and the student must consider the impact of such delays on the student's career prospects. In other cases, if the financial boundaries are blurred between a faculty member and the company for which he or she is doing research (e.g., the faculty member owns stock in that company), it is doubly unethical to involve graduate students in that research and the potential conflict of interest it entails.

Another boundary/conflict-of-interest problem occurs when faculty supervise students employed by companies that are funding the faculty members' research. In such cases, a faculty member may be pressured by the employer-sponsor to relax the standards according to which the employee-student's research is evaluated so that the student can more quickly complete the dissertation or thesis and return to work full-time. This pressure is exacerbated when one or more members of the student's committee are adjunct faculty employed by the same company as the student. While one might argue that an "easy pass" would be in the "best interest" of the student and the company, clearly it is not in the best interest of the discipline nor fair to other students whose work is judged more rigorously.

V. THE RESEARCH ADVISER AS MENTOR: RIGHT EMPATHY, RIGHT EMPOWERMENT

To some students and faculty, the terms "research adviser" and "mentor" are interchangeable. To others, "mentoring" suggests a level of personal interaction, nurture, and guidance that exceeds the requirements of "good enough" research advising. In this essay, "mentoring" will be used to describe exemplary research supervision. Rather than being concerned solely with the student's completing the dissertation or developing technical competence, the mentor is concerned with promoting a broader range of psychosocial, intellectual, and professional development.[25] Crucial to this concern are right empathy and right empowerment.

Mentoring: Right Empathy

Empathy is the ability to put oneself imaginatively in someone else's place. Right empathy allows the mentor to nurture the student-protégé's talents in an atmosphere of trust, respect, and care. Right empathy also enables the mentor to know when to push or challenge the protégé and when to back off. Finally, right empathy enables the mentor to temper honest and sometimes negative feedback with concern and encouragement. In short, through right empathy, mentors provide a safe emotional space within which students can take the risks, push the envelopes, make the mistakes, solve the problems, and build the confidence that will enhance their development into first-rate researchers.

Right empathy is usually easiest with those who are most like oneself. For this reason, faculty sometimes shy away from mentoring students from gender, racial, or ethnic groups different from their own, as well as from students with disabilities. Yet studies indicate that cross-gender, cross-racial, and cross-ethnic mentoring, as well as mentoring of students with disabilities, is crucial to the persistence and success of students from these underrepresented groups.[26] In the first place, these graduate students typically have less access to the informal peer mentoring networks that develop among members of the majority student group. Second, there are seldom enough faculty from these underrepresented groups to mentor all the graduate students who are "like" them in terms of gender, racial, ethnic, and disability characteristics. Third, because they see so few faculty or other students like themselves in these ways, students from underrepresented groups are more likely than majority students to suffer a crisis of confidence and decide that they don't belong in graduate school—unless they have supportive mentors.

Developing right empathy for graduate students with disabilities and students of ethnic, gender, and racial groups different from one's own can be challenging. Creating the atmosphere of mutual trust and respect necessary for successful mentoring of students different from oneself requires patience, time, careful listening, and candor. Also, like so many aspects of research mentoring, mentoring underrepresented students is a balancing act. On the one hand, the mentor must be careful not to stereotype these students (e.g., assuming all Asian students are brilliant in mathematics). On the other hand, the mentor must not assume or insist that these students are or should be "just like" their majority counterparts. In short, mentors should respect the differences among, and individuality of, *all* their students.

If there are areas in which students from underrepresented groups need extra help, the mentor should see that they get it. For example, all

campuses have a Disabilities Services Office that will provide the necessary human and technological assistance to students with disabilities. On the other hand, mentors do a disservice to students from underrepresented groups when they expect less of them than of majority students. They must communicate their expectations clearly and consistently to *all* students, as well as providing honest feedback and constructive criticism when warranted. It is unfair to withhold criticism from *any* student early on, out of a misplaced sense of empathy, until a student has dug such a deep hole that climbing out of it is impossible.

Developing right empathy for one's graduate students is actually a broader challenge than simply empathizing with students from underrepresented groups. Although demographics vary by discipline, many graduate students today differ in significant ways from their faculty mentors. According to Peter Syverson, "The decided majority of students pursuing graduate study are quite different from the traditional student—they are older, more often women, typically married, and have family and career responsibilities."[27] To the extent that these "non-traditional" students are present in research programs, developing right empathy for them means understanding and working with the competing claims on their time. It may mean understanding that a student who has to leave campus at 5:00 to pick up children is not "slacker" nor "less committed" than the students without family responsibilities.[28] At the same time, particularly where research is being done in a group setting, fairness dictates that those students without family responsibilities not be overburdened to compensate for those who do have children, parents, or grandparents to care for.

Mentoring: Right Empowerment

In virtually all mentoring relationships, the mentor is more powerful than the protégé by virtue of greater knowledge, greater experience, and higher position. This is particularly true of research supervisors, who are the gatekeepers of their protégés' professional futures. Research supervisors sometimes exercise this power as "power over" their students. They may verbally abuse their students, publicly humiliate them, sexually harass them, appropriate their ideas and discoveries without proper credit, and generally treat them like indentured servants. In other cases, a non-mentoring supervisor may simply withhold or deny power, disengaging from the student and refusing to serve as champion, sponsor, or protector. The *mentoring* supervisor, by contrast, exercises "power with" the student, serving as the student's advocate and empowering the student to grow personally, academically, and professionally from a novice to a colleague.[29] Many aspects of right empowerment have been discussed earlier in this

essay, most of which have focused on empowering students to complete research-based degrees successfully. The paragraphs that follow focus on ways that mentors should empower students to move forward in their professional lives.

For students who wish to go on to faculty positions in research universities, research supervisors have traditionally played a key mentoring role. A research supervisor who is also a mentor acts as the student's advocate and sponsor, both within the graduate program and within the larger disciplinary community. Not only does the mentor make sure that the student gets the maximum appropriate credit for any joint publications; the mentor also encourages the student to attend and present research at national or international conferences, workshops, and symposia. Thus the mentor promotes the student's work among colleagues and helps the student create important professional networks.

As the student begins the job search, a mentor provides advice on seeking postdoctoral or academic positions, contacts colleagues who might be helpful, and writes letters of recommendation. Most research supervisors find it relatively easy to provide this kind of mentoring for their best students. However, research supervisors need to realize how much harder it is today to find a tenure-track position or even, in many fields, any full-time faculty position. Therefore the mentor's guidance, encouragement, networking and promotion of the student are even more critical than they were fifteen or even ten years ago.

If there are personal differences between the mentor and the student, or if the supervisor is less than enthusiastic about the student's potential, then promoting the student's search for an academic position becomes more problematic. What does the supervisor owe the student, versus what is owed to the prospective employer? In such cases, the research supervisor should be honest with the student about any reservations he or she has and let the student decide whether or not to include the supervisor as a reference. If the supervisor is still asked to serve as a reference, the best thing to do is to acknowledge differences with or reservations about the student at the outset of any reference and then focus as much as is honestly possible on the student's strengths. What is unacceptable is to sabotage the student through poor references simply because of personal differences.

While research supervisors often mentor students well for the research dimension of positions like their own, they are sometimes less successful in mentoring students for other dimensions of academic life. For example, numerous recent studies have found that graduate students are poorly prepared to teach; are unfamiliar with faculty governance and

service; have no idea what is involved in managing a lab, procuring grants, managing budgets or directing student research; and are unable to explain their research to anyone outside their own discipline.[30]

To address these deficiencies, many graduate schools and departments have initiated graduate student professional development programs.[31] Where such programs are available, a good mentor will enable students to take advantage of them, even if this means allowing students time away from their research. Pressured by the need to have the student complete their research by a certain deadline, advisers sometimes disparage such professional development programs as "fluff." However, in an era when tenure-track positions are declining and the bar for academic job candidates is being raised and broadened, good mentoring involves helping students find the right balance between the depth of their research training and the breadth provided by other professional development opportunities.

Mentoring becomes an even greater challenge when a student chooses a career path different from the research supervisor's, whether inside or outside academia. And yet, as many recent studies have demonstrated, it is unrealistic to expect that even 50% of all Ph.D.s will take positions in academia, much less in research-intensive universities. For example, in their recent study, Chris Golde and Timothy Dore cite statistics that indicate that among doctoral recipients in the biological sciences, "40% hold faculty positions 10 years after receiving their Ph.D. Another 40% are working as scientists in other settings: industry (23%), government (11%), and other sectors (7%). Twenty percent are not working in scientific fields."[32] Furthermore, according to the National Center for Education Statistics, in 1992, only 27% of all faculty were employed in research universities. The rest were employed in non-research-intensive doctoral-granting universities, comprehensive universities, four-year colleges, two-year colleges, and community colleges.[33]

The difficulties that these realities pose for mentors of graduate students are daunting. In the first place, the reputation of faculty at research universities is based partly on the achievements of their graduate students who follow in their footsteps, i.e., doing cutting-edge research at similar institutions, publishing the results, and training additional graduate students. Students who pursue careers in less research-oriented institutions, or outside academia altogether, are often viewed by their advisers as disappointments: at worst, failures; at best, second-rate. Even if sympathetic to career aspirations different from their own, faculty who have spent their entire careers at research universities are often simply not equipped to mentor students for careers elsewhere. They lack both the necessary contacts and the knowledge of what it takes to be competitive for positions in other sectors.

In these circumstances, good mentoring means helping students identify other mentors and a network of career-specific resources. Many such resources exist: campus career centers, internships in industry and government labs, and career guidance provided by professional associations through conferences and Web sites. Most of all, research supervisors can mentor these students by respecting and affirming their "alternative" career choices. As Jules LaPidus wrote in "Doctoral Education: Preparing for the Future," good mentors provide students with "a realistic picture of how they can use [their] incredibly valuable skills in a variety of settings, and in a variety of satisfying and rewarding careers."[34] Finally, the greatest challenge that research supervisors face is mentoring students who either cannot or will not complete their degrees. In those cases where a student suddenly announces plans to cut short the Ph.D. and accept a master's instead, to leave the graduate program for an exciting job offer, or to switch to another graduate program, the supervisor often feels disappointed and in some cases betrayed, especially if the student has been supported to assist with sponsored research and is leaving with a project incomplete. In these cases, the best that supervisors can do is to negotiate for completion of some segment of the research. (Such negotiations are easier if there has been a clear understanding from the outset of what the consequences are of terminating the degree, especially regarding ownership of any data that the student has generated, termination of assistantships, and the impact of such termination on tuition coverage.) At worst, supervisors must respect their students' decisions, cut their losses, and move on. Although little mentoring may be possible in these cases, the supervisor can still exhibit "exemplary" behavior by not retaliating against the student.[35]

When it becomes clear that students are intellectually or temperamentally unsuited for a particular research program, good mentoring can be just as valuable as it is to students who complete their degrees. Whether because of embarrassment, frustration, misplaced compassion, or fear of retaliation, this is the kind of mentoring that faculty most often neglect. In such cases, both research supervisors and the larger program faculty often simply disengage themselves from the students who aren't going to "make it," in the hope that they will quietly disappear. As a result, these students often waste years in a program that is wrong for them, leaving only when the permissible time to degree expires. In allowing this to happen, faculty fail these students and miss an important mentoring opportunity. When it becomes clear that a student cannot complete the degree, the research supervisor or other members of the graduate faculty should suggest to the student that his or her program

be terminated, while affirming the student's strengths and helping the student think through alternative career strategies. To mentor in this way, to affirm and counsel students who do not belong in a particular research program, is to liberate and empower them to move beyond a sense of failure toward a more productive career path.

CONCLUSION

In a graduate commencement address entitled "An Atlas for Scholars," Jules LaPidus, then president of the Council of Graduate Schools, described "the scholar's world" as "an atlas . . . of mental maps": the map of the entire scholarly enterprise, maps of the individual disciplines, and maps of the networks of scholars who have created the terrain of each particular discipline. The last map—the map of each graduate's future—he describes as "the working map of an explorer. It contains lots of empty spaces, the beginnings of a few roads (some of which may never be completed), many question marks, . . . and down in the lower right-hand corner your best guess about scale."[36] This same image of the explorer's map could be used to describe the process of directing graduate student research. Because no two students—and no two student research programs—are exactly alike, the "map" by which to supervise each student's research program will contain some predictable features but also previously uncharted terrain. Thus it will be a map constructed in part through trial and error, requiring constant revision, and never complete until the journey is over. As a guide through this *terra incognita*, the major principles articulated in this essay—right attention, right boundaries, right empathy, and right empowerment—are not intended to provide the precise direction of, say, a Global Positioning System (GPS). Rather, they should serve as points of a moral compass by which to guide responsible supervisory practice as it is carried out by the research supervisor, reinforced by the thesis committee, and supported by the entire program faculty.

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4. For a fuller discussion of the optimal size of research groups, see Macrina (1995), pp. 37–38; and Guston (1993), pp. 57–58.

5. As early as 1976, Rodney Hartnett and Joseph Katz were recommending that growth in Ph.D. programs be constrained. See Hartnett, R. and Katz, J. (1977). The Education of Graduate Students. *Journal of Higher Education, 48*, 646–64, especially pp. 650–51. This article was reprinted and revised from R. Hartnett and J. Katz (Eds.). (1976). *Scholars in the Making: The Development of Graduate and Professional Students.* Ballinger Publishing. See also, for example, Ausubel, J.H. (1996, February 5). Malthus and Graduate Students: Checks on Burgeoning Ranks of Ph.D.'s. *The Scientist, 10* (3), p. 11; and the National Research Council's Committee on Dimensions, Causes, and Implications of Recent Trends in the Careers of Life Scientists, Shirley Tilghman, chair. (1998). Recommendation 1 of "Trends in the Early Career of Life Scientists." For something of a counter-argument, see LaPidus, J. (2000). Ph.D.s and Jobs: A World They Never Made. In *A Walk Through Graduate Education: Selected Papers and Speeches of Jules B. LaPidus* (pp.93–98). Washington, D.C.: Council of Graduate Schools.

6. Williams, W. M. (1997, October 10). Point of View: Reliance on Test Scores is a Conspiracy of Lethargy. *Chronicle of Higher Education*, p. A60.

7. Graduate Record Examinations, "Sex, Race Ethnicity, and Performance on the GRE General Test, 2000–2001."

8. See also Hagedorn, L. S. and Nora, A. (1996). Rethinking Admissions Criteria in Graduate and Professional Programs. In J. G. Haworth (Ed.), *Assessing Graduate and Professional Education: Current Realities, Future Prospects* (pp. 31–44). San Francisco: Jossey-Bass; and LaPidus, J. (2000). Numbers Last: A Proposal for Improving Departmental or Program Based Graduate Admissions. In *A Walk Through Graduate Education*, pp.153–54. (Reprinted from *CGS Communicator*, November 1999.)

9. For a good discussion of "informed choice," see Hartnett and Katz (1977), pp. 649–50, and Kennedy (1997), p. 58. A graduate student's right to key information about prospective graduate programs is included in nearly all the statements of rights and responsibilities cited in note 1 above.

10. See Nerad, M. and Miller, D. S. Increasing Student Retention in Graduate and Professional Programs. In Haworth (1992), pp. 61–76; and Bowen, W. L. and Rudenstine, N. L. (1992). *In Pursuit of the Ph.D.* Princeton: Princeton University Press, p. 111.

11. See Lovitts, B. E. (2001). *Leaving the Ivory Tower: The Causes and Consequences of Departure from Graduate Study.* Lanham, MD: Rowman and Littlefield. Lovitts cites the failure to integrate students into the "corporate culture" of their programs as the primary cause of graduate student attrition.

12. Representative of recommendations in this arena are those of Robert R. Bargar and Jane Mayo-Chamberlain in Bargar, R. and Mayo-Chamberlain, J. (1983). Advisor and Advisee Issues in Doctoral Education. *Journal of Higher Education, 54*, 416–17.

13. For a good discussion of right attention, see especially Council of Graduate Schools. (1990). *Research Student and Supervisor: An Approach to Good Supervisory Practice*; and Bowen and Rudenstine (1992), pp. 281–87.
14. The late assignment of research advisers in the humanities has often been cited as one of the factors contributing to the lengthier time to degree and higher rate of attrition in humanities doctoral programs, when compared to programs that ensure their students' early engagement in the research process. See, for example, Nerad, M. and Cerny, J. (1993, Winter). From Facts to Action: Expanding the Graduate Division's Educational Role. In L. L. Baird (Ed.), *Increasing Graduate Student Retention and Degree Attainment; New Directions for Institutional Research* (pp. 27–39, esp. pp. 31–33), *80*. San Francisco: Jossey-Bass.
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16. Macrina (1995) also has a useful list of information that graduate students should have about potential advisers (p.35).
17. Kennedy (1997), p. 116.
18. Cole, J. R. (1993). Balancing Acts: Dilemmas of Choice Facing Research Universities. In J. R. Cole, E. G. Barber, and S. R. Graubard (Eds.). *The Research University in a Time of Discontent* (pp. 1–36). Baltimore: Johns Hopkins University Press.
19. Kennedy (1997), p. 107.
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21. Hockey, J. (1996). Strategies and Tactics in the Supervision of UK Social Science PhD Student. *Qualitative Studies in Education 9*, 481–500.
22. For fuller discussions of the relationship between mentoring and socialization, see Green, S.G. (1991). Professional Entry and the Adviser Relationship. *Group & Organization Studies 16*: 387–407.
23. See Macrina (1995), p. 31.
24. See Kennedy (1997), pp. 9–11.
25. Good overall discussions of the role of the graduate mentor include Kennedy (1997), pp. 97–116; Guston (1993), pp. 50-65; COSEPUP. (1997). *Advisor, Teacher, Role Model, Friend*; Macrina (1995), pp. 29–47; Council of Graduate Schools (1995), *A Conversation about Mentoring*. Washington, D.C.: Author; Kartie, J.V. (1996). O Mentor! My Mentor! *Peabody Journal of Education*, 71, 114–25; and Welch, O. M. An Examination of Effective Mentoring Models in the Academy. A paper presented at the Annual Meeting of the Educational Research Association (New York, April 8–13, 1996).
26. See, for example, Nerad and Miller (1996), pp. 61–76; Mentoring Within a Diverse Community. In Horace H. Rackham School of Graduate Studies. (1999). *How to Mentor Graduate Students: A Guide for Faculty in a Diverse Community* (pp. 21–42). Retrieved on January 10, 2003, from http://www.rackham.umich.edu/StudentInfo/Publications/FacultyMentoring/contents.html; Waldek, J. H. et al. (1997, Summer). Graduate Student/Faculty

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30. See, for example, Association of American Universities, Committee on Graduate Education. (1998, October). *Report and Recommendations*; Bowen and Rudenstine (1992); Haworth (1996); National Academy of Sciences, Committee on Science, Engineering, and Public Policy. (1995). *Reshaping the Graduate Education of Scientists and Engineers. Washington, D.C.: National Academy Press; and Golde, C. M. and Dore, T. M. (2001, January). At Cross Purposes: What the Experiences of Today's Doctoral Students Reveal About Doctoral Education.* Philadelphia, PA: A report prepared for the Pew Charitable Trusts. Retrieved on January 10, 2003, from www.phd-survey.org.
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32. Golde and Dore (2001), p.18.
33. National Center for Education Statistics, Department of Education. (1999). *Digest of Education Statistics, 1999.* Retrieved on January 10, 2003, from http://nces.ed.gov/pubs2000/digest99/listoftables.asp.
34. LaPidus, J. (1997, November). Doctoral Education: Preparing for the Future. *CGS Communicator, 30* (10), Special Edition, p. 9.
35. In those (thankfully) rare cases where graduate students exhibit behavioral or attitudinal problems that disrupt the research experience of the adviser and/or a laboratory group, the adviser should warn the student about these behavioral problems and the consequences of their continuing. If these problems are not addressed in a reasonable amount of time, the adviser should recommend termination of the student's program.
36. LaPidus, J. (2002). An Atlas for Scholars. In *A Walk Through Graduate Education*, pp. 156–62.

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