The Journal of Graduate Assistant Development, Vol. 4, No. 3, 1996-97.

Preparing the Professoriate: A Study in Mentorship

Stephen P. Beaudoin

Arizona State University

Richard M. Felder

North Carolina State University

Most new faculty members begin to teach with no prior instruction on how to do it effectively. Lacking such instruction, they proceed to do unto their students as their instructors (who were also untrained) did unto them. A mentorship program at North Carolina State University addresses this problem, providing graduate students with guidance and experience in teaching. One mentorship that involved both teaching and classroom research eased a graduate student's transition into his first faculty position and even helped him compete successfully for that position.

NORTH CAROLINA State University has a program called "Preparing the Professoriate" that pairs faculty mentors with graduate students who intend to pursue academic careers. The protégés may observe their mentors in the classroom, participate in homework and test preparation and grading, teach classes under the mentor's guidance, and/or co-plan and implement classroom research studies. The protégés are given some formal presentations on issues related to academic careers and are required to submit final reports on their experiences, but beyond that the program is relatively unstructured—it is up to each mentor and protégé to jointly define the nature of their mentorship.

In the fall of 1994, the authors jointly participated in this program. The mentor (RMF) taught a section of the introductory chemical engineering course to a class of about 140 students. The protégé (SPB), then a Ph.D. candidate, observed classes taught by the mentor and several other faculty members, summarized his observations in a journal, and guest-lectured in the mentor's course on several occasions. The mentor and protégé met for about an hour each week throughout the semester for debriefing and general discussions. In the Spring 1995 semester the protégé cotaught a new elective course on environmental engineering with a different mentor, and in the Fall 1996 semester he became an assistant professor in the Department of Chemical, Bio, and Materials Engineering at Arizona State University. The mentorship program provided both mentor and protégé with a variety of insights related to student behaviors and attitudes, the effectiveness of different instructional approaches, and mentoring itself. This paper summarizes their observations and conclusions.

The Protégé's Experience

When I began my mentorship my intention had been simply to watch what my mentor did in class and talk to him about it afterwards. Soon after I began to attend classes, I decided I would learn more by watching the students rather than just the instructor. Their behaviors (notetaking, ask-

ing insightful or irrelevant questions, displaying attention or boredom, sleeping, responding to questions, doodling, working on in-class exercises, etc.) provided significant information about the effectiveness of what the instructor was doing from moment to moment. I also realized that my mentor's teaching style was somewhat unconventional, and decided to observe classes taught by other professors to see how students responded to more traditional teaching.

I sat in classes throughout the semester, keeping one eye on the professor and the other on the class and occasionally questioning the students. What were they writing? What were they thinking when a professor was working through a derivation or an example? Why were they reading the campus newspaper during the class? How did they feel about the way the course was being taught? Early in the semester I explained that I was a graduate student intending to become a professor and I was trying to learn what worked and what didn't. I assured them that their comments to me would be kept confidential and apparently gained their trust, because they were quite candid in expressing their opinions.

During our weekly meetings, my mentor and I discussed my observations of student behavior. I tried to make my comments as specific as possible, focusing on student responses that could be directly correlated to faculty actions. My remarks included such observations as "When you finished the group exercise yesterday, the students didn't stop discussing it and very few of them heard what you were telling them for the next five minutes" and "When you told them that what you just put on the board would be on the test they all started writing." This aspect of the sessions was useful to me because it made me review and organize my observations ahead of time, and I also believe they helped my mentor to see student behavior from a perspective he normally wouldn't have. I would also ask why my mentor had done certain things, or he would point out things he had done and ask me why I thought he did them and how well I thought they had worked. In these exchanges I picked up many details about his instruction that I had missed in class and gained insights into the things instructors think about when preparing and delivering classes.

Most of my observations during the semester fell into two categories. First, I found that students' attention and responsiveness in class varied considerably with the teaching style of the professor. Second, I noticed that they tended to take notes only on certain types of material under certain conditions. My principal conclusions are summarized below; the details of my obervations will be published elsewhere.

- Students actively engaged in a class focus on, analyze, evaluate, and question course material in class to a greater extent than do students who adopt the familiar role of note-takers. Based on my observations of the various courses, students who were primarily note-takers in the classroom were also more inclined to fall asleep or miss class than students who were usually actively engaged in class. A variety of techniques stimulated active student participation, including group exercises, individual prompting (calling on individual students), and group prompting (posing questions to the class). Calling on students individually promoted active involvement, but some students viewed this approach negatively. For example, one student stated, "He calls on us to catch us not paying attention." The students found group questions to be less intimidating. However, typically less than 25% of the class volunteered answers, suggesting that not all of them were working towards an answer. Group exercises obtained nearly complete student involvement, but it was sometimes difficult to refocus the students after the exercise.
- If professors are in the habit of answering their own questions when students fail to respond, most students do not appear to think about the questions. Rather, they remain poised, ready to write down the forthcoming answer. If the class is not given enough time to

think of responses, the questions are similarly ineffective.

- Many students in traditional lectures frankly admitted to doing little besides transcribing the material being presented. Thus, while the instructor covered more material by lecturing than by actively engaging students, the students were required to do most of the processing and understanding of the material outside of the classroom.
- Students generally take notes only on material that is (a) written on the board, (b) seen as necessary for future homework and tests, and (c) not available in the text or on handouts. Material that does not meet these three criteria, however important it may be, will probably not be recorded by most students and is therefore less likely to be learned.

Co-Teaching with a Mentor

In my second semester of the mentorship program, I co-taught a course on environmental engineering with a different mentor, assisting in preparing the syllabus, selecting readings, preparing and grading assignments and exams, and planning and delivering lectures. I was fortunate to be working with an experienced professor developing a new course, so I could see this demanding process first-hand. As a co-instructor, I was able to experiment with different teaching techniques and to receive feedback from my mentor on my initial awkward efforts.

My co-instructor lectured from overheads and I decided to use the same method. I spent about four hours preparing my first one-hour class. I started the class, began showing the overheads, and provided additional details from my notes. By the end of the first fifteen minutes, I saw glazed, empty stares, and no one was taking notes on what I said. The students had copied my overheads and turned off their minds until I moved on. The lessons I had learned by observation in the previous semester suddenly took on a greater reality.

Once I recognized what was going on, with my mentor's encouragement and assistance I tried to implement some of the instructional methods that seemed to have been effective in the classes I had observed in the previous semester. Before launching into a topic I challenged the students to speculate on why the topic was likely to be important, prodding them until they produced answers. To my great relief, several good responses were usually offered. Encouraged, I put the students in groups and challenged them to formulate plans for implementing a specified pollution abatement process, which they did. I summarized the plans on the board, and the class and I critiqued them. I remarked that similar critical reasoning would be required in the semester term project, and I was gratified to see detailed notes subsequently being taken. I tried to incorporate elements of these active learning methods into my class presentations for the duration of the course. For each session, I got through about 70% of the material I had initially intended to cover. The students maintained a high level of interest, however, and their questions, comments, and analysis of problems in class convinced me that they got a lot out of the sessions.

Beginning a Teaching Career

The mentoring experience paid immediate dividends in my search for a faculty position. After I had accepted a position at Arizona State University, members of the faculty search committee told me that my preparation for teaching made me unique among all of the candidates and was instrumental in my receiving the offer.

In my first semester of teaching at Arizona State University I taught an elective course on environmental engineering, and in my second semester I taught a core undergraduate course in fluid mechanics. In the first class, I began with the course notes and lesson plans from the course I co-taught at N.C. State. I was able to refine them and fit them to my own particular focus for the course, which made my course preparation very efficient. I had no course notes for the fluid mechanics course, but I obtained illustrative syllabi, homework sets, and exams

from colleagues. Relying on my experience as a protégé, I was able to lay out my course objectives, prepare effective notes, assignments and examinations, and execute the other mechanics of course delivery.

Recalling what I had learned in the mentorship program, I made my principal goal in both courses to get the students actively engaged in processing and evaluating the concepts I presented during class rather than simply transcribing what I wrote on the board. I attempted to maintain a continual balance between theory and practice, providing frequent illustrations of technical concepts in terms of everyday events. I frequently questioned my students and led them to the answers when necessary rather than simply providing the answers myself, and assigned at least one group activity in every two classes.

At the end of my second semester of teaching, I was voted the "Outstanding Undergraduate Educator" by the ASU student chapter of the American Institute of Chemical Engineers, in a department nationally known for its commitment to excellent teaching. My goal was to teach well, not to accumulate prizes, but I believe that the award shows that the students felt my instruction was effective. I credit the Preparing the Professoriate program at N.C. State with providing an effective jump start to my faculty career, and I would propose similar programs as excellent ways to help future faculty members learn their craft.

The Mentor's Experience

Working with Steve was for several reasons a unique and valuable experience for me. Since our weekly debriefing sessions were devoted to analyzing my teaching strategies, I was forced to think consciously about things that I had been doing automatically and in some cases to reconsider and change them. On other occasions, I found that some strategies I was using were succeeding in ways I had never thought about, and only when I heard my protégé's account of what the students were doing in response to the strategies did I truly understand their effectiveness.

It is not that Steve's discoveries were entirely new, although I have not seen anything like his observations of note-taking patterns in the context of a technical course. The superiority of active learning over passive observation is universally accepted in the education and psychology literature, and even instructors who have never read the literature and do nothing but lecture know that most students do not record information that is said but not written. However, even though I knew these things in the fall of 1994, I always thought of myself as being a pretty good lecturer—good enough to get the verbal points I was making in class across to at least a reasonable subset of the students. Wrong! I provided enough active experiences to keep attendance high and minimize sleeping, but the sobering fact was that a substantial amount of the material I presented in any given period was falling on deaf ears. Since that semester I have increased my use of the devices that Steve found encouraged students' attention, notably the participatory exercises. I also make more conscious use of verbal cues about the likely appearance of certain material on future homework assignments and tests, and I make sure to follow through on some of these predictions. I now notice an unusually high proportion of students writing down points I announce are important, especially after the first test. While writing something is no guarantee that it will be learned, I am confident that the writing significantly improves the odds.

As much as the mentoring has done for me, its potential effect on Steve's teaching career could be far greater. He could have read books on pedagogy or attended teaching workshops and encountered some of the same teaching strategies he arrived at inductively, but they would probably have meant little to him. As it is, he discovered them for himself and so took ownership of them. I will be surprised if he does not continue to use them throughout his teaching career, modifying them to fit his own personality and his developing teaching philosophy. My hope is that in a few years he will

take the logical next step and become a mentor himself. I certainly plan to undertake similar relationships with future graduate students and junior teaching colleagues. I cannot think of a more promising model for improving the quality of teaching on our campuses.

Acknowledgments

We would like to thank Professor Christine Grant, the second mentor, for her continuing patience, guidance, and insight, and Dean Debra Stewart and Dr. Fay Head for support provided by the NCSU Graduate School and the Preparing the Professoriate program.

Stephen P. Beaudoin is an Assistant Professor of Chemical, Bio, and Materials Engineering at Arizona State University, Tempe, AZ and **Richard M. Felder** is a Hoechst Celanese Professor of Chemical Engineering at North Carolina State University, Raleigh, NC 27695-7905 (to whom correspondence should be addressed).