DOCUMENT RESUME

ED 348 359 SP 033 998

AUTHOR	Bird, Tom; And Others
TITLE	Pedagogical Balancing Acts: A Teacher Educator Encounters Problems in an Attempt To Influence Prospective Teachers' Beliefs.
INSTITUTION	National Center for Research on Teacher Learning, East Lansing, MI.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO	NCRTL-RR-92-8
PUB DATE	Jul 92
NOTE	28p.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Educational Objectives; *Education Majors; Elementary Education; Higher Education; Instructional Innovation; *Introductory Courses; Preservice Teacher Education; *Prior Learning; Required Courses; Teacher Attitudes; *Teacher Educators; Teacher Student Relationship; *Teaching Methods

ABSTRACT

This paper describes an introductory teacher education course designed to challenge prospective teachers' beliefs about schooling, teaching, and learning, formed as a result of personal experience. The instructor encountered problems in attempting both to engage his students' existing beliefs about teaching and learning and to encourage their consideration of alternative beliefs taken from educational literature. It proved challenging to establish a satisfactory working relationship with the students, to organize productive interaction between their current beliefs and potential alternatives, to aid them to do the intellectual work involved in such interaction, and to manage the ambiguities and risks that the course presented. A concluding commentary suggests that teacher education courses involve not only encounters between old and new ideas and between students and instructors, but also between different communities of knowledge, commitment, and practice, one based in schools and the other in the university. To make the connections good, the instructor had to learn how to manage a corresponding set of pedagogical balancing acts that took into account students' conceptions of teaching and learning to teach. (LL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED348359

Research Report 92-8

Pedagogical Balancing Acts: A Teacher Educator Encounters Problems in an Attempt to Influence Prospective Teachers' Beliefs

Tom Bird, Linda M. Anderson, Barbara A. Sullivan, and Stephen A. Swidler

NCRTL

National
Center for Research
on Teacher Learning

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

Sponsored by the United States Department of Education
Office of Education Research and Improvement

SP033998

Research Report 92-8

PEDAGOGICAL BALANCING ACTS: A TEACHER EDUCATOR ENCOUNTERS PROBLEMS IN AN ATTEMPT TO INFLUENCE PROSPECTIVE TEACHERS' BELIEFS

Tom Bird, Linda M. Anderson, Barbara A. Sullivan, and Stephen A. Swidler

Published by

The National Center for Research on Teacher Learning
116 Erickson Hall
Michigan State University
East Lansing, Michigan 48824-1034

July 1992

This work is sponsored in part by the National Center for Research on Teacher Learning, College of Education, Michigan State University. The National Center for Research on Teacher Learning is funded primarily by the Office of Educational Research and Improvement, United States Department of Education. The opinions expressed in this paper do not necessarily represent the position, policy, or endorsement of the Office or the Department.

National Center for Research on Teacher Learning

The National Center for Research on Teacher Learning (NCRTL)[1] was founded at Michigan State University in 1985 with a grant from the Office of Educational Research and Improvement, U.S. Department of Education.

The NCRTL is committed to research that will contribute to the improvement of teacher education and teacher learning. To further its mission, the NCRTL publishes research reports, issue papers, technical series, conference proceedings, and special reports on contemporary issues in teacher education. For more information about the NCRTL or to be placed on its mailing list, please write to the Editor, National Center for Research on Teacher Learning, 116 Erickson Hall, Michigan State University, East Lansing, Michigan 48824-1034.

Director:	Mary M. Kennedy
Associate Director:	G. Williamson McDiarmid
Program Directors:	Linda Anderson, Deborah Ball, G.W. McDiarmid
Director of Dissemination:	Cass Book
Project Manager:	Steven A. Kirsner
Editor:	Sandra Gross
Communication Specialist:	Debra Peterson

Many papers published by the NCRTL are based on the Teacher Education and Learning to Teach Study (TELT), a single multisite longitudinal study. The researchers who have contributed to this study are listed below:

Marianne Amarel
Deborah Loewenberg Ball
Joyce Cain
Sandra Callis
Barbara Camilleri
Anne Chang
David K. Cohen
Ada Beth Cutler
Sharon Feiman-Nemser
Mary L. Gomez
Samgeun K. Kwon
Magdalene Lampert
Perry Lanier
Glenda Lappan
Sarah McCarthey
James Mead
Susan Melnick
Monica Mitchell
Harold Morgan
James Mosenthal
Gary Natriello
Barbara Neufeld
Lyan Paine
Michelle Parker
Richard Prawat
Pamela Schram
Trish Stoddart
M. Teresa Tatto
Sandra Wilcox
Suzanne Wilson
Lauren Young
Kenneth M. Zeichner
Karen K. Zumwalt

[1]Formerly known as the National Center for Research on Teacher Education (1985-1990), the Center was renamed in 1991.

6/92

Abstract

A teacher educator encountered problems in teaching an introductory teacher education course designed to challenge prospective teachers' beliefs about teaching and learning. In his dual efforts both to engage his students' beliefs and to encourage their consideration of alternative beliefs stated in educational literature, he found it difficult to establish a satisfactory working relationship with them, to organize productive interaction between their current beliefs and potential alternatives, to aid them to do the intellectual work involved in such interaction, and to manage the ambiguities and risks that the course presented them.

PEDAGOGICAL BALANCING ACTS: A TEACHER EDUCATOR ENCOUNTERS PROBLEMS IN AN ATTEMPT TO INFLUENCE PROSPECTIVE TEACHERS' BELIEFS

Tom Bird, Linda M. Anderson,
Barbara A. Sullivan, and Stephen A. Swidler[1]

Increasingly, teacher educators attend in their research and in their practice to the beliefs that prospective teachers bring with them to teacher education. They both study the influences of those beliefs and seek means to influence them. This paper describes an introductory teacher education course that was designed to challenge prospective teachers' beliefs and presents some problems that the instructor encountered. The instructor was attempting both to engage his students' existing beliefs about teaching and learning and to encourage their consideration of alternative beliefs in the educational literature; the moves he made for the one purpose often seemed to be odds with the moves he made for the other. While the instructor often was pleased with students' performance in the course, he found it challenging to establish a satisfactory working relationship with them, to organize productive interaction between their current beliefs and potential alternatives, to aid them to do the intellectual work involved in such interaction, and to manage the ambiguities and risks that the course presented them. We expect that other teacher educators face similar problems, and so present them here for consideration.

Prospective Teachers' Beliefs

Prospective teachers enter teacher education programs as experienced actors in the schools that they have attended, in some domains of the communities where they have lived, and in some aspects of the society they belong to. From that experience they have formed beliefs about schooling, teaching, and learning that are likely to vary with their histories and circumstances. In a growing body of literature, educational researchers have described prospective teachers' beliefs as lay theories (Knowles & Holt-Reynolds, 1991), constructs (Mertz & McNeely, 1990), images (Calderhead & Robson, 1991), metaphors (Carter, 1990), and webs (McDiarmid, 1990).

Such beliefs may include *conceptual categories* that define what is reasonable or important to notice and consider (e.g., differences among students or features of classroom

---

[1]Tom Bird, assistant professor of teacher education at Michigan State university, is a senior researcher with the National Center for Research on Teacher Learning. Linda M. Anderson, associate professor of teacher education at MSU, is an NCRTL senior researcher. Barbara A. Sullivan, MSU doctoral candidate in counseling and educational psychology, is a research assistant with the Center. Stephen A. Swidler, MSU doctoral candidate in teacher education, is a research assistant with the Center. The authors wish to thank Mary Kennedy and Diane Holt-Reynolds for helpful comments on a draft of this paper.

activity); *empirical claims* (e.g., students learn to read when they are read to or children will learn racial tolerance when they grow up in multiracial groups); *prescriptive guidelines* (e.g., teachers should treat each child as an individual, or teachers should make each lesson interesting to the children); and *educational values* (e.g., mathematical understanding is essential for all citizens, or cooperation is preferable to competition). Their significance is that prospective teachers use their beliefs to "read" situations, to interpret new information, and to decide what is possible or realistic or proper (Anderson & Bird, 1992).

Teacher educators increasingly take an interest in prospective teachers' beliefs about teaching and learning because those beliefs are *consequential*, relatively *stable*, and sometimes *problematic* (Calderhead, 1991; Carter, 1990; Clark & Peterson, 1986; Feiman-Nemser & Buchmann, 1983; Kennedy, 1991; Lortie, 1975; Zeichner & Gore, 1990); that is, prospective teachers' use their beliefs to make sense of their experience of teacher education in ways that teacher educators might or might not intend. They generally preserve their beliefs as they go through teacher education programs, while teacher educators often intend to change them. They often hold beliefs that are not "well adapted to teaching" (Calderhead, 1991) and that limit the range of ideas or actions that they are willing and able to consider.

For example, Diane Holt-Reynolds (1991a, 1991b) has described the "lay theories" that prospective teachers have formed from their own experience as students. One common and important element of these theories, she found, is that teachers should make things "interesting," and that "interest" is tantamount to learning. She describes in some detail how such lay theories complicated a teacher educator's attempt to teach contemporary approaches to reading in content areas (Holt-Reynolds, 1991b).

On a larger scale, the National Center for Research on Teacher Education's study of teacher education and learning to teach found that prospective teachers in several teacher education programs regarded mathematics and writing not as constructed bodies of knowledge and ways of knowing but as fixed sets of information and rules with limited connection to or bearing on living in the world (National Center for Research on Teacher Education [NCTRE], 1991). Such ideas of content tend to clash with ideas espoused by leading educators in those subject areas (e.g., National Council of Teachers of English, 1986; National Council of Teachers of Mathematics, 1989). Similarly, the prospective teachers tended to regard students as empty vessels to be filled with information and rules and to regard teaching as a matter of telling students the correct information and testing them to assure that they had received it. Again, such ideas tend to clash with perspectives that they are likely to encounter in teacher education courses, namely, that persons learn by active

constructions of personal meaning through which they relate new knowledge to knowledge they already hold.

The NCRTE's study found that prospective teachers' learning was not much associated with program structure but was associated with programs' content and orientation (NCRTE, 1991). Those findings indicate a need to pay more attention to what teacher educators offer and do in the courses and other activities that make up the programs. There is a need to fill in the sketchy picture of "what goes on inside teacher education courses" (Zeichner & Gore, 1990). Accordingly, the National Center for Research on Teacher Learning (successor to the NCRTE) undertook a series of case studies of preparatory teacher education courses that expressly address prospective teachers' entering beliefs about learners, learning, teaching, and learning to teach. More specifically, the aim was to study courses that were consistent with a conceptual change hypothesis (Kennedy, 1991; Posner, Strike, Hewson, & Hertzog, 1982) that prospective teachers' beliefs will be affected by opportunities to notice and examine their entering beliefs, by provocative encounters with vivid and plausible alternatives to their own models of teaching and learning, and by activities that encourage and assist them to recognize the differences between the ideas and images they brought with them and those they are offered.

An Introduction to Teaching Course

We studied Tom Bird's section of an introductory course titled "Exploring Teaching." The course was a requirement for elementary education majors and typically was taken by them before they entered the teacher education program. Most of the students were young, white females from suburban and rural communities. The course was designed to bring to the surface and challenge ideas that many of them held about teaching, learning, schooling, and learning to teach (Feiman-Nemser & Featherstone, 1992). Instructors of the course commonly were concerned with the constrictive conceptions that teaching is mainly a matter of telling, that learning is mainly a matter of remembering, and that learning to teach is a mainly a matter of acquiring the right ways to act, as distinct from acquiring ways to think about right action.

Of course, different instructors rendered the basic plan differently. Bird's syllabus declared that the goals of the course were to help students to build their stock of useful questions about teaching; to help them to notice, express, and evaluate the ideas they already held; to help them to learn to discuss teaching by getting and giving arguments, reasons, and evidence; and to encourage them to reach beyond their personal experience "to get and give options for thinking and talking about teaching, by reading and writing."

The syllabus claimed that these were all parts of learning to teach. In class, the instructor repeatedly emphasized that the purpose of activities in the course was to help students to acquire *options* for thinking and talking about teaching—and ultimately for acting as teachers.

In support of these goals, the instructor had organized his section of the course in four segments, each conducted in much the same way with analogous materials so that students could work intensively with a set of materials and could practice the ways of working together with those materials. Each segment addressed a *problem of teaching*: How should a teacher organize a class? How should a teacher conduct a class? What kind of relationships should teachers want with students, and how do they establish those relationships? If a teacher understands the subject matter, how does she help students to understand it, too?

Each segment focused on a *case* or instance of teaching. The cases included Bird's use of groupwork in the course, an English lesson for eighth grade using direct instruction tactics, an open classroom for second and third grade, and a teacher-led mathematical discussion with fifth graders. The latter three cases were presented in videotapes and related text. The cases were chosen to provide images of teaching and learning that students might not have seen before but were likely to encounter again in teacher education, to provide referents for the course texts, and to provide opportunities to explore the possible consequences of alternative courses of action in teaching.

Each segment of the course employed a *text* selection related to the case for that segment. The authors for the four segments, respectively, were Elizabeth Cohen (1986) on "The Benefits and Problems of Groupwork"; Barak Rosenshine and Robert Stevens (1986) on "Teaching Functions"; David Hawkins (1974) on relations among the teacher, the student, and the subject matter; and Magdeline Lampert (1985) on "Mathematics Learning in Context." The selections were chosen because they provided introductions to different genres of educational literature, because they provided rationales for the cases they were paired with, and because they were likely to elicit and challenge the students' ideas about teaching and learning. The instructor expected the videotaped cases to provide referents, images, and demonstrations for the arguments made in the texts, and the texts to provide descriptive language and rationales for the teaching in the cases.

Each segment included extensive *groupwork*, to which Bird attached an explicit ideology that student teachers are colleagues who should join in discussion of teaching and help each other to do their best. He paid explicit attention to norms and skills of groupwork, occasionally assigned specific roles within groups, and invited students to reflect on work in groups. In groups, students discussed their reactions to cases and drew

inferences about their beliefs from those reactions; read texts together using an "active reading" procedure designed to help them understand and apply the arguments being made; did what they saw and heard pupils doing in the cases they studied, as a way of understanding what was happening; helped each other with their writing assignments (to be described below); and constructed arguments to be put to the whole class for discussion.

Each segment of the course incorporated *teacher-led discussions* of the teaching problems, cases, texts, and groupwork tasks. In these discussions, the instructor tried to provide students some scaffolding for the harder parts of the work and tried to increase the rigor of the discussion, as compared to the conversations that occurred in small groups. In the teacher-led discussions, he tried to promote students' mutual efforts to make sense of the cases and texts and tried not to provide the sorts of feedback that would make students stop figuring things out for themselves.

In each segment, each student wrote a "*conversation*" about the case with the author of the related text (Bird, 1991). In these written conversations, the students employed three voices: "Myself as Inexperienced Teacher," "Myself as Experienced Student," and "Myself as the Author of the Text for the Segment." Bird intended to enter and broaden a dialogue about teaching that students were already having with themselves (Holt-Reynolds, 1991a). He wanted to help students to distinguish between their past experience and beliefs as students and their emerging experience and beliefs as teachers, to press students to study the texts closely enough that they could use their arguments to talk about the cases, to remove any need for students to distort an author's ideas in order to make their own arguments, and to set up direct comparisons between the students' prior ideas and the ideas they were offered in the texts—as interpretations of the cases they studied. As they wrote their conversations, students left blank spaces for the instructor to participate in their conversations when reading them.

In executing each segment of the course, Bird engaged in a good deal of *situation-defining and face-saving*. In sections of the syllabus, in short speeches introducing segments and activities of the course, in commentaries on the work as it progressed, and in discussions of progress through the course, he asked students to consider how the course was being conducted and why. He tried to define and modulate the course's explicit and implicit challenges to students' competence. He tried to suggest that the students could and should regard their difficulties in the course as normal products of ordinary human processes like learning, particularly learning to teach.

By this combination of materials, activities, and moves, Bird intended to organize an interaction among the students' current ideas about teaching, the ideas they encountered in

their reading, and the classroom activity they experienced in the course or saw and heard in the videotapes. He hoped that this interaction would create the conditions necessary for conceptual change; that is, students would bring to the surface and review their current beliefs, would become dissatisfied with some of those beliefs as tools for describing and explaining teaching, would recognize plausible alternatives to their beliefs about and images of teaching, and would examine the differences.

Bird expected many students to hold, and he wanted to challenge, the image of a classroom in which the teacher is the constant and prominent center of students' attention, where teaching and learning are mainly or exclusively matters of telling and remembering, and where worthwhile learning occurs only at the teacher's insistence and direction. He expected to hear, and wanted to challenge, the idea that the teacher's main ploy is to take irretrievably dry and boring subject matter and make it interesting by the addition of extraneous fun and games. He wanted to introduce the possibility that subject matters might hold some interest for students, that a class might be a place where students are focused on their projects involving the subject matter, and that a teacher might do good work by organizing, guiding, and supporting such activity.

In regard to learning to teach, he expected many students to hold the idea, which he wanted to challenge, that they have seen the relevant range of approaches to teaching and that they are, by virtue of their experience as students, prepared to decide now how they want to teach or what they should be like as teachers. He wanted to promote a more cautious and, he thought, serviceable stance: that they should be in the business of checking their ideas and of acquiring options for thinking and talking and acting as teachers. He thought that few students would have had the experience that academic writing could help one to think about action; he wanted to promote a suspicion that a skillful reader might get useful ideas out of such stuff. He wanted to prepare students to participate in conversations that use ideas in writing to interpret and decide about actions and to learn to act like colleagues in such conversations.

Bird encountered several problems in his efforts to enact the curriculum sketched above. We think those problems often revealed a pervasive tension between two sets of obligations that he felt and two sets of moves he deployed in their service. On one hand, he wanted to encourage and assist the students to recall their experience as students, to notice the ideas they had formed from that experience, to reconsider those ideas in relation to the images and ideas they encountered in the course, and to reach more considered and explicit ideas about teaching (this, as distinct from parroting back what they thought he wanted to hear). On the other hand, he wanted to recruit the students into a community

of teachers and scholars who, as they worked out their own sense of things, also paid some attention to the reasoned arguments of their colleagues. If he succeeded in that campaign, students would be likely to accord *some* validity to the arguments about schooling, teaching, and learning that they encountered in their reading and to the approaches to teaching that they saw and heard in the cases.

In his pursuit of these dual goals, the instructor attempted, so to speak, to mediate a conversation among his students, a set of teachers who spoke through their teaching (in the cases), and a set of authors who spoke through their writing. In that endeavor he faced problems in (a) establishing teacher-student relationships suited both to cultivating students' ideas and to promoting ideas from theory and research, (b) organizing substantial interactions between the students' prior knowledge and the images and ideas that they encountered in the course, (c) helping students to meet the intellectual demands of those interactions, and (d) managing the ambiguity and risk that the course presented to the students.

Establishing a Working Relationship with the Students

In his attempts to serve as mediator of a conversation, Bird employed methods that were unfamiliar to the students; these methods cast into doubt both his role in the class and his working relations with the students. Seemingly, the students expected him to play a more authoritative and judgmental role—perhaps a more conventionally professorial role—than he was attempting to play. Conversely, he expected the students to play a more active and self-directed role than they often did. In consequence, he and his students found each other somewhat unresponsive in important respects; they had trouble in forming a satisfactory working relationship.

Bird began the course by suggesting that the students' intention to teach made them colleagues with each other and with him and that colleagues have a duty to help each other succeed in their work. He immediately organized the students into discussion groups of four or five students, and asked them to begin reading and discussing his plan for the course together. In that plan, he began by stating his supposition that the students were already engaged in conversations with themselves about teaching. He said that he wanted both to join into the students' ongoing conversations and to invite them to join into the conversation about teaching that had been going on in the profession for some time. In the plan, he described the several segments of the course, in as much detail as we have provided above.

Bird's offering of the plan reflected his experience in the course. He expected that many students would enter the course with conceptions of schooling as a matter of

transmitting and reproducing fixed knowledge and that they would apply those conceptions both to the *content* of the course and to its *procedure*. He would enter the course with a conception of schooling as a matter of negotiating and constructing knowledge; that conception would show both in the material he offered to students and in the ways he asked students to work with it and with him. He expected the two conceptions—or programs for getting through the course—to collide (Bird, 1992).

Thus, he felt that he had much to explain—up front—about the purpose of the course, its procedures, and the desired relationship between students and instructor. While this explaining would take some time, it also would provide students an opportunity to connect a teacher's thinking and actions in the classroom. He expected that the initial explanation would be insufficient and that he would have to work steadily throughout the course to teach students how to play their part in it. This was indeed the case; few of the nine students interviewed after the initial presentation of the plan seemed to have a clear idea of his expectations. Subsequent interaction in the course revealed, however, that they did hold expectations of their own, which he often violated.

One feature of Bird's teaching that perplexed some students was that he seldom expressed his responses to their contributions in class as direct, specific, and unambiguous evaluations of their knowledge or performance. In accord with his view that the purpose of class discussions was for students to engage each other about issues before them, he commonly restrained his reactions to their contributions, waited for students to expand on their fragmentary offerings, asked students to respond to other students' arguments, asked questions, and introduced issues. In response to their seeming unease in one class discussion, he asked students if they were disturbed by the lack of immediate and evaluative feedback on their contributions; they responded that they were. He explained that he wanted to convey to them that the good sense of their contributions to the discussion did not depend on his reaction but on the quality of their reasons. They seemed to be pleased by this explanation, but it is not clear how they interpreted it. They might have concluded either that the standing of their comments depended on their reasonability or that any opinion was as good as any other.

In responding to students' conversational writing, Bird attempted to adopt the position of an experienced viewer of the cases and experienced reader of the texts. In keeping with the intent that the students should be inquiring into the cases and the readings, he tried to bring in arguments from the texts that students had ignored, rendered poorly, or misconstrued; tried to point to features of the cases that they had ignored or given little weight; and tried to raise issues that they had not considered. He thought that kind of

feedback could help students both to understand and link the readings and the cases and to figure out why he had graded their papers as he did. However, the students often were not satisfied; they complained that he was not being clear enough about what they should do to write good papers. They pressed him to play the authority figure with fixed positions on the tapes and readings and unambiguous grading rules that they could interpret to get the grades they wanted in the course. He had provided extensive instructions for writing the papers and extensive feedback on the papers; he felt that he had done what he could do and that the students would have to face up to the remaining ambiguities of complex tasks.

Students also questioned the substance of the course. In a class discussion that Bird intended as a collective reflection on progress in the course, some students complained that talking about the cases and texts was not helping them to learn to teach. They wanted to try some teaching—to act and talk like teachers in a class. He responded with this argument: When we are students, we are able to observe what teachers say and do in classrooms, so we tend to form an image of teaching as a matter of saying and doing in classrooms. And, we tend to form an image of *learning to teach* as figuring out what to say and do in classrooms. However, there is another side of teaching that we have little opportunity to observe as students. That other side is thinking about teaching and talking about teaching with colleagues in places outside the classroom, where students can't see or hear. Bird concluded this little speech by saying that he intended the course to help students fill in the missing part of the picture; that is, he had not planned any activities that the students would be likely to recognize as "teaching experience."

Taken by itself, the instructor's speech may be interpreted as an adaptation to his ambivalent position as would-be mediator between students who are confident in their extensive experience and a scholarly community which holds that they have much to learn. He was trying to get students to question their own experience and was implying that there is much about teaching that they cannot know. However, he also was trying to describe the situation not as a charge that students were incompetent—they would be likely to reject that implication and the course along with it—but as an understandable problem that applies to all who come to teaching.

Bird and some of his students held conflicting definitions of what is needed to teach or to learn to teach. Some of the students entered the course with an orientation to teaching and learning to teach that did not help them or allow them to identify his approach to the course as being useful to them. They resorted to "Yeah, but . . . " responses that tried to draw his attention to their needs as they perceived them. While he explained his

position, he did not satisfy their demand to provide teaching experience; some students may have dismissed the course in response.

What is the problem here? The students are old hands at going to school, but the instructor wants to proceed in ways that are unfamiliar to them. If the students hold an idea of knowledge as being transmitted from authoritative books and teachers to them, how do they regard and work with an instructor who expects them to construct and reconstruct their own knowledge in an encounter between what they already know and what they study in the course? If students believe that proficiency in teaching follows directly from experience in teaching, how do they understand and work with an instructor who wants to prepare them for reflection? If students believe that there is a clear set of right and wrong answers about teaching (some or many of which they already know), how do they work with an instructor who holds that there are more or less useful and more or less defensible ways to talk and think about teaching problems?

In the face of these differences in expectations, how does the instructor construct a role that is both useful and credible to the students and tenable and satisfying for him? How does the instructor gain or retain credibility with students who may write off someone they do not perceive as knowledgeable and authoritative, while continuing to make the case that teaching is inherently ambiguous and that no one can provide "right answers" or "best methods" for all circumstances?

Organizing Interaction Between Students' Personal Knowledge and Other Knowledge

Prospective teachers' lay theories are for them familiar equipment. When Bird showed videotaped cases, the students commented immediately, confidently, and evaluatively, confirming that they arrive with ideas of their own and that they tend to be facile and well-practiced in the use of those ideas. As long-time consumers of teaching, they have ready responses to what they see and hear. By setting up discussions about cases, he hoped to organize meaningful encounters between the students' lay theories and the arguments they would encounter in their reading. But that was not easy. On one side of the problem, students found it difficult to master the course texts well enough that those ideas *could* compete with the ideas they already held. On the other side of the problem, the instructor's unbalanced support for learning the texts, combined perhaps with the students' own conceptions of college courses, often seemed to mute the students' own voices. To him, it seemed very difficult to pull both sets of ideas into the same class discussion or the same page of writing.

Bird thought that the conversational writing assignments would serve both to guide and to consummate each segment of the course. In class, he frequently referred forward to the writing assignments and suggested specifically how—as they viewed and discussed the cases, read and discussed the texts, and worked on the relations between the two—students were collecting material for each of the three voices in their conversations. Initially, students found the conversational writing assignments to be quite perplexing; they had not written that way and wondered how to proceed. To support their efforts and reduce their confusion and anxiety, the instructor provided a sample, along with a written discussion about the purposes for including each voice and the ways in which each voice could be developed. To introduce the first assignment, he tried an analogy: Can you have an argument with your mother without her being present? (Chuckle. Yes.) Why can you do that? (Because I know how she thinks). Okay, you know how you think, so study the author of your text closely enough that you know how she thinks. Then you can have a conversation with her about the case. So far, so good.

However, it was not a trivial task to learn how an author speaks well enough to construct that author's voice in speaking about a case. In an attempt to increase the students' abilities to read for meaning, Bird introduced an active reading procedure that distributed the tasks of reading, reacting, questioning, and summarizing among the members of a student group. Students read the texts individually as homework, then read some difficult and important passages in groups during class meetings and tried to apply the ideas in the text to the case at hand. Then he engaged the whole class in recitations and discussions that he intended to check and refine their understanding. He hoped that the procedure would help students both to deal with the texts before them and to become more active readers on their own.

Such efforts, which occupied a significant portion of class time, were heavily weighted toward helping students to understand the texts. While Bird made efforts to help students notice and refine their own initial ideas, they were less explicit, less systematic, and less prominent in the work of the class. For example, he asked students to notice and record their reactions to videotaped cases as potential material for the voices of Experienced Student and Inexperienced Teacher. In addition, he gave a midterm assignment in which students could express their ideas about teaching in any form of writing that they found agreeable. In this way the students produced a fifth text—their own—to set beside the four that he assigned. On balance, however, these efforts to highlight the students' ideas as significant sources were not as prominent or consistent as the work to help students with the texts.

At the same time, course grading gave students strong incentives to write as they supposed the instructor would want them to. In their experience, probably, that would mean showing that they understood the course texts and would lead them to emphasize the voices of the authors. Moreover, Bird had little experience in coaching such writing, and particularly in cultivating the voice of the Experienced Student. He was on more familiar ground when helping students to grasp the material he assigned them to read; his feedback would have tended to confirm the students' entering expectations and would have encouraged them to concentrate on the voices of the authors.

To the extent that they did so, the writing assignments might have helped them to gain and show both comprehension of the texts and ability to employ the arguments found there, but it is doubtful that the conversational form of writing could organize an encounter between students' prior knowledge and the material of the course. On a first reading of students' written work, it appears that the writing assignments both succeeded and failed in just the manner suggested. While students often showed both comprehension of the texts and ability to apply them to the cases, they also often muted their own voices or employed them as shills for the voices of the authors. A format that the instructor introduced to permit genuine conversations was used to construct contrived ones.

There is an ironic connection here between ideas and methods. Bird set out to challenge the idea, among others, that teaching and learning are a matter of telling and remembering. He wanted students to consider the alternative that learning is a matter of reconstructing old ideas in relation to new ones. He adopted a method consistent with the alternative, a means to relate new ideas to old. That method sometimes or often was defeated, in part, by the very idea he set out to challenge.

It would have been difficult for students to see that they were not being asked to choose one source of knowledge over another but rather to bring the two together for honest comparison and analysis. The instructor's unbalanced efforts would not have helped them to see the opportunity. The difficult balance was to persuade students—and then to keep the bargain—that ideas from outside of them could be valuable if they could make them their own through interaction with their own voices.

Supporting the Students' Efforts

Students often struggled with the main task of the course—constructing an exchange between their beliefs and alternative beliefs regarding teaching. From his prior experience in the course, Bird was inclined to think that one source of their difficulties was that they had too little experience with the intellectual moves involved in this sort of work: reading

for meaning, detecting assumptions, comparing the warrants of arguments, and so on. So, he took steps to support them or to scaffold their efforts to think through the work of the class. He found that providing such assistance is difficult and sometimes has unexpected consequences.

The educational articles, essays, and literature reviews used in the course were not written or chosen for easy reading and comprehension by student teachers. The texts were chosen and were difficult because they provided complex portrayals of teaching and issues related to teaching. Moreover, the assignment to construct dialogues between them and the authors of their reading pressed the students to master the readings well enough that they could use them to talk about the cases. However, they were not practiced in the use of these alternative ways of talking; their conversational writing showed a struggle to master the voices of the authors of their texts to a degree that good conversations require. How could such faltering and difficult commentary on the cases compete with familiar ideas that came readily to mind?

Similar comments might be made about the videotaped cases. A 40-minute slice of classroom teaching is likely to include a great deal to notice and make sense of. Bird chose the tapes to present modes of teaching that probably were unfamiliar to the students. If the teaching shown on the tapes indeed was unfamiliar, students would have difficulty supplying context they needed to make sense of what they saw and heard. They would lack schema needed to see and hear what he intended to show them. For example, a tape that he intended to provide a case of direct instruction might, from some student's point of view, be a case of a teacher's demeanor toward students. Or, students might hold beliefs that would be immediately engaged or offended by something that they saw or heard in the cases, so that they would have difficulty attending to other features of those same cases. All of those difficulties showed both in class interaction and in the conversational writing.

Finally, the students were operating under the additional cognitive and social burden of learning to work in unfamiliar modes: whole-class discussions in which the instructor provided little of the customary feedback; small-group discussions where the instructor asked students to practice explicit norms of inclusion and to exploit their differences of opinion; and writing assignments that resembled play scripts. That is, the devices that he intended to help make and organize connections between prior experience and new experience were demanding in themselves and complicated the students' attempts to make those connections. As will be discussed below, students' attempts to get good grades in the course tended to draw their attention away from the substance of their written conversations and into efforts

to figure out what the instructor wanted. That further reduced the prospects for effective encounters between ideas.

Bird's problem, then, was to support substantial interaction between the students' prior beliefs and other ways of thinking and talking, so as to give the students a fighting chance to understand and appreciate—or fairly and knowledgeably criticize—the ideas in the tapes and readings. He adapted to this difficulty in several ways. First, he severely restricted the total amount of material addressed in the course. Ultimately, the students worked with just four cases of teaching, three of them presented in a total of perhaps 100 minutes of videotape. The students worked with just four essays and articles related to those cases. At the cost of ignoring important issues that ought to be addressed in such a course and of depriving students of other, different representations of the same ideas, the instructor bought time to work intensively with a small set of materials. Each combination of case, text, and writing assignment consumed at least four 2-hour meetings of the class.

Second, in the hope of reducing the burden of unfamiliar procedures and increasing students' facility with them, he adopted a formulaic procedure that was repeated in each segment of the course. The videotaped case for the segment was shown to promote students' recollection of their own experience and to elicit and record their current ideas. Then the text for the segment was analyzed and discussed in small and large groups to support comprehension and to practice application of the arguments. Then the case was shown again, both so that the students might see and hear more of the teaching and as the basis for practice in applying the reading to the case. Then students wrote their conversations with the authors of the text about the case. By repeating a formula, the instructor hoped that students would get the hang of the procedures of the course and would begin to use them to carry out their own projects of "exploring teaching."

Third, Bird attempted to array the cases and readings so as to proceed from more immediate experience and more familiar ideas about teaching to more distant and unfamiliar ones. In the first segment of the course when he was still attempting to organize the class, he employed as a case his own use of cooperative learning in the class and combined that case with one of the more plainly and simply written of the texts. He reserved until last the case that he judged students would have greatest difficulty appreciating (because the teacher's procedure was very different from teaching-as-telling) and the text that they might find most forbidding (because it concerned mathematics teaching). The intent was to allow students to practice the unfamiliar procedures with more familiar material, so they might gain some confidence in their ability to participate in the course, and then to proceed on to less familiar modes of teaching and arguments about it.

Finally, Bird resorted extensively to cooperative learning in an attempt to increase students' collective capacities to connect familiar and unfamiliar ideas. He expected that well-organized groups would be more capable than individuals of grasping the arguments in the course and bringing them to bear on the teaching case at hand, so that they could compete with students' prior conceptions. He hoped that his students would have somewhat different experiences of schooling, would have formed somewhat different beliefs about it, and would react differently to the cases and reading, so that interaction among them would tend to unsettle their thinking, enlarge their experience, and foster evolution in their beliefs. Within the limits of the range of students in his class, he composed the groups to maximize the differences in experience.

However, once the instructor had delegated work to small groups, the students had considerable latitude to shape the tasks according to their own conceptions and needs, and his ability to intervene was correspondingly limited. While there were many lively conversations in groups and group members did aid each other in understanding the texts, the students tended to smooth over differences of opinion and the lines of inquiry those differences might open up. They appeared to want agreement, confirmation, and closure, and in relatively short order. (Swidler, Anderson, & Bird, 1992, provide a close look at some group work in this course.)

The students' pursuit of early closure might be interpreted in several ways. Perhaps the students were not accustomed to sustained or open-ended exploration; they expected to get to answers and to get them quickly. Or, they interpreted differences of opinion in a group as unhappy conflict that was inconsistent with solidarity and good relations, and so avoided them. Perhaps the tasks that the instructor gave groups did not bring out differences of opinion, or the norms of interaction that he tried to introduce did not make those differences tolerable or desirable. Perhaps, as experienced novices on the borderline of a new identity, the students were in a somewhat fragile or vulnerable state and wanted confirmation that their current ideas were sensible, so they tried to avoid the implications of being challenged and "taught." Perhaps, the students lacked background knowledge or analytic skill or verbal facility to hear, express, and develop their differences of opinion, so they contrived vague and vacuous agreements in order to get through their tasks.

All these interpretations imply tactics that Bird might have used to increase the value of the groupwork, but they also emphasize a common difficulty. While students in groups could encourage and assist each other actively to expose their prior experience and connect it with ideas offered in the course, they also could join forces in avoiding uncomfortable connections or in rationalizing them away. The instructor's dual tasks of cultivating students'

prior conceptions and promoting their mastery of ideas from course texts remained at odds; while the groupwork provided students opportunities to speak freely, it also restricted the instructor's opportunities to participate directly in making connections between the familiar and unfamiliar ideas.

Managing Risk for the Students

Students enter teacher education as experienced and successful students; on the basis of that experience, they hold a "subjective warrant to teach" (Lortie, 1975). That is, they think they are suited to teaching; some of them believe they have little to learn from teacher education. In the introductory course, they encountered unfamiliar procedures that challenged their competence as students and unfamiliar cases and arguments that challenged their warrant as teachers. Moreover, there was an asymmetry of formal power: Bird set the tasks and gave the grades. Those tasks tended to thwart the students' strategies for getting good grades by giving the professor what he wants while keeping one's thoughts to oneself, because an important part of the course was to notice, record, and reflect on those thoughts. In terms of identity and self regard, the students had a good deal at stake and so faced considerable risks. Like all students who are being graded or otherwise held accountable, the students in this course could seek to reduce the ambiguity and risk of their tasks either by negotiating changes in the task or by pressing to simplify it (Doyle, 1983). The instructor had to manage the risks he created.

During this course, two of the students broke into tears in different meetings of the class. When (in later office visits) the instructor asked them what was the matter, they gave similar reports, both connected with his responses to and grades on their conversational writing. One of these students had several years of experience teaching in a preschool. She was disappointed at receiving only a passing grade, and suggested that the instructor simply didn't like her writing style. His impression was that she had not seriously considered the arguments in her reading; he thought he had graded her accordingly. The other student who cried, a freshman, said that she had had a bit of trouble in some of her other coursework, but had expected to do well in "her field." She said was very frustrated in the class; she was one who argued vociferously that the course was not helping her to learn to teach, that she needed to teach in order to learn to teach. She said that her qualifications to teach would show in practice, if not in these writing tasks, which she regarded to be rather disconnected from teaching.

These encounters were similar, in kind if not degree, to many students' reactions upon receiving graded work. In an effort to create what he called a "grade-free, free-speech

zone" in class discussions, Bird had confined his grading to the students' conversational writing. When he assigned the first written conversation, students asked how he would grade it and proposed that he ought to be lenient, because they had little practice with such writing. They pressed him for clearer and more specific instructions for the writing assignment. He tried to deal with the situation by saying that he would try to grade the first paper in the same fashion as the last so that students could get a sense of the standard but that he would give less weight to early grades than to later ones. Facing a choice between reducing the ambiguity of the assignment or attempting to reduce its risk, he attempted to pursue the latter course. However, the continuing dissatisfaction expressed by several students about their grades suggested that they did not perceive a reduction in ambiguity or risk. They continued to press the instructor to say what they had "done wrong" when they got grades lower than they wanted or expected.

Poor grades for unfamiliar assignments were not the only risk that students faced in the course. In one segment of the course, the case was a math lesson for a class of fifth graders; that case was linked to Magdalene Lampert's (1985) article on "Mathematics Learning in Context," in which she provided a description of another lesson for the same class. On the grounds that his students could not get Lampert's point without going into the mathematics that her students were studying, Bird asked his students to work with some of the same math problems as the fifth graders. In the past, largely owing to their difficulties with mathematics, some students in the course had reacted to this task so nervously as to halt their work on the case.

Anticipating that reaction and wanting to reduce the students' anxiety about revealing incompetence, Bird began this segment of the course by confessing that he, too, suffered from the same math problem: He can perform many calculations, but by and large does not understand what he is doing. He solicited their confessions that many of them are in the same boat. He tried to explain why widespread mathematical incompetence cannot be attributed to an epidemic of stupidity either in the general population or among people who want to be teachers. Finally, he invited the students to jcin him in facing up to the problem.

Such ploys clearly have limits. When he returned students' papers for this segment of the course, Bird reported that the best papers had incorporated consideration of the mathematics of the lesson they discussed. Some students retorted that they had not realized that they were expected to deal both with the math and with the teaching. They may have understood his assurances to mean that they could safely ignore the mathematics content,

as they felt most comfortable doing. Seemingly, some of the students were searching for ways to teach mathematics without having to understand it.

The course's content and methods frequently implied that the students' subjective warrant to teach might be unsound. The course was full of explicit and implicit messages that the students' experience was problematic as a guide to teaching and that prospective teachers should examine and test their experiences. The students had the option to reject those messages and the course; that is, they could complete it and dismiss it without becoming engaged in it. The instructor thought that he should couch such implied criticism in terms that allowed students to save face and to engage the material of the course.

Face-saving was one of the instructor's aims when he suggested that, as students, *we* are able to observe what teachers say and do in the classroom but do not have much access to teachers' thoughts or talk, in other settings, about teaching. The clear implication of the statement was that there is a large gap in the students' understanding. However, he was attempting to speak in such a way that students would be unlikely to hear a charge that they were deficient. He wanted them to hear a description of ordinary human processes to which they also were subject, with no implication that they are less fit than other candidates to go into teaching.

Such efforts at face-saving typically were worked in around other discussions and assignments. We did not pursue the matter with students, so we cannot say how they received Bird's efforts. Too much face-saving may have left the students' comfortable and therefore less likely to experience disequilibrium that would promote learning. In contrast, too little face-saving may have left students anxious about dealing with ambiguous tasks and less likely to engage in the kinds of thinking that the instructor wanted to encourage.

The final problem then, is this: How can the instructor create conditions in which the students will open up, reveal what they think, consider unfamiliar ideas, and take chances in reconsidering their ideas, and at the same time hold and promote standards regarding better and worse arguments and promote a sense of accountability for producing better arguments? How can the instructor help the students to explore their own and others' ideas when the situation encourages them to protect their current position and to focus on what they must do to get a good grade in the course? How does the instructor balance support and responsiveness to students' personal needs and anxieties while still creating enough healthy tension that they will consider new ideas in an effort to resolve it?

Commentary

We are not saying that the course as Bird taught it failed to influence the students' beliefs about teaching, learning, or learning to teach. We are saying that the attempt to teach in a way that could engage and alter their beliefs was fraught with problems. Further, while we acknowledge that Bird might have dealt with his problems more skillfully, we are suggesting that those problems are likely to accompany the dual tasks of cultivating students' beliefs and promoting beliefs written in educational literature. There seems to be a constant tension between establishing oneself as a knowledgeable and helpful teacher and encouraging the students to think for themselves and take risks; between cultivating familiar ideas and promoting unfamiliar ones; between helping students think and taking over the direction of their thinking; between keeping the students comfortable with and responsive to novel demands while prompting them to test their thinking and reconsider their ideas.

By focusing on the instructor's problems, this paper might have conveyed a more negative appraisal of the course than we hold. While students expressed considerable anxiety about the conversational form of writing and about the grades they received on that writing, most found that they could produce the conversations and did so with increasing facility. Their instructor often was pleased with their efforts to understand and apply the course texts. While we saw a tendency for students to mute their own voices in the written conversations, we also saw that they often were vocal and that the discussions among Inexperienced Teacher, Experienced Student, and Author were lively. In reflecting on the course, we saw ways that Bird might have encouraged and responded to the students' voice of experience along with their voicing of the course texts, and so could have come closer to organizing a fruitful interaction between students' familiar ideas and the unfamiliar ideas they encountered in the course.

In considering how the instructor might now proceed, we note that teacher education courses involve not only an encounter between old and new ideas and an encounter between students and instructors, but also an encounter between different communities of knowledge, commitment, and practice, one based in schools and the other in the university. In terms offered by Margret Buchmann (1990), prospective teachers' "private beliefs" about schooling are backed not only by their own extensive experience as students, but also by "folkways" of schooling and by "local mores" that apply to schooling in particular places. Taken together, these private beliefs, folkways, and local mores provide prospective teachers not only with subjectively reasonable alternatives to the ideas that teacher educators might wish to promote, but also with alternative communities to join.

In these terms, Bird was trying to induct his students into his community so they might form some critical appreciation of the various ways that scholars have talked about teaching, consider the array of ways that skillful teachers have attempted to teach, and accept the resulting complexity and ambiguity as a fact and way of life. However, the students were about to enter an occupation where action is imperative. Students had good reasons for insisting that what they most needed to do was to learn to act and talk *as* classroom teachers and also for rejecting the invitation to join a community that mostly talks and writes *about* the work. Moreover, they had great latitude to slide by the instructor's invitations and demands by playing the college game: Give him what he seems to want, get past the course, and get on with your life. On the college campus, prospective teachers have a choice between "two worlds"; the difference between those worlds may be a trap—a "pitfall of experience"—not only for prospective teachers but also for their instructors (Feiman-Nemser & Buchmann, 1983).

If a teacher educator is skeptical about the prospects for persuading the students to join his community (as currently constituted), he might entertain the possibility of *joining theirs* in some kind of supportive or provocative role. It might be argued that the instructor in this case was attempting to join the students' program when he focused his course on cases of teaching, moved scholarly texts out of the limelight and into the position of tools for interpreting the cases, and replaced teacher-led discussions and expository essays with group conversations and conversational writing. Nevertheless, his program still showed in his methods and in his execution of them. Moreover, in the attempt to carry out that program, he made himself and the course strange to the students and so ran the risk that he would not be recognized, in their terms and the terms of communities to which they probably refer, as a *real* teacher who knows the traditions of schooling.

This introductory course was planned to promote a set of connections—between the ideas that students brought with them and the ideas they encountered in the course, between the sights and sounds provided by the cases and the words provided by the texts, between the content of the course and the methods used to teach it. To make those connections good, it seemed, the instructor had to learn how to manage a corresponding set of pedagogical balancing acts that took into account the students' conceptions of teaching and learning to teach. To credit the messages in the course's *content*, they had to be able to credit the messages in its *conduct*.

References

Anderson, L. M., & Bird, T. (1992). *Transforming teachers' beliefs about teaching, learning, and learners.* Unpublished manuscript, Michigan State University, National Center for Research on Teacher Learning, East Lansing.

Bird, T. (1991). *Making conversations about teaching and learning in an introductory teacher education course* (Craft Paper 91-2). East Lansing: Michigan State University, National Center for Research on Teacher Learning.

Bird, T. (1992). After you. No, after you: A collision between two programs for getting through TE 101. In S. Feiman-Nemser & H. Featherstone (Eds.), *Exploring teaching: Reinventing an introductory course* (pp. 159-180). New York: Teachers College Press.

Buchmann, M. (1990). *Making new or making do: An inconclusive argument about teaching* (Issue Paper 90-7). East Lansing: Michigan State University, National Center for Research on Teacher Education.

Calderhead, J. (1991). The nature and growth of knowledge in student teaching. *Teaching and Teacher Education, 7,* 531-535.

Calderhead, J., & Robson, M. (1991). Images of teaching: Student teachers' early conceptions of classroom practice. *Teaching and Teacher Education, 7,* 1-8.

Carter, K. (1990). Teachers' knowledge and learning to teach. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 291-310). New York: Macmillan.

Clark, C. M., & Peterson, P. L. (1986). Teachers' thought processes. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 255-296). New York: Macmillan.

Cohen, E. G. (1986). *Designing groupwork.* New York: Teachers College Press.

Doyle, W. (1983). Academic work. *Review of Educational Research, 52,* 159-199.

Feiman-Nemser, S., & Buchmann, M. (1983). *Pitfalls of experience in teacher education* (Occasional Paper 65). East Lansing: Michigan State University, Institute for Research on Teaching.

Feiman-Nemser, S., & Featherstone, H. (Eds.). (1992). *Exploring teaching: Reinventing an introductory course.* New York: Teachers College Press.

Hawkins, D. (1974). I, thou, and it. In *The informed vision: Essays on learning and human nature* (pp. 48-62). New York: Agathon Press.

Holt-Reynolds, D. (1991a). *The dialogues of teacher education: Entering and influencing p. service teachers' internal conversations* (Research Report 91-4). East Lansing: National Center for Research on Teacher Learning.

Holt-Reynolds, D. (1991b). *Practicing what we teach* (Research Report 91-5). East Lansing: Michigan State University, National Center for Research on Teacher Learning.

Kennedy, M. M. (1991, Spring). *An agenda for research on teacher learning* (NCRTL Special Report). East Lansing: Michigan State University, National Center for Research on Teacher Learning.

Knowles, G., & Holt-Reynolds, D. (1991). Shaping pedagogies through personal histories in preservice teacher education. *Teachers College Record, 93*, 87-113.

Lampert, M. (1985). Mathematics learning in context: "The voyage of the Mimi." *Journal of Mathematical Behavior, 4*, 157-167.

Lortie, D. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.

McDiarmid, G. W. (1990). Challenging prospective teachers' beliefs during an early field experience: A quixotic undertaking? *Journal of Teacher Education, 41*(3), 12-20.

Mertz, N. T., & McNeely, S. R. (1990, April). *Cognitive constructs of pre-service teachers: Research on how student teachers think about teaching*. Paper presented at the annual meeting of the American Educational Research Association, Boston.

National Center for Research on Teacher Education. (1991). *Final report of the teacher education and teacher learning study*. East Lansing: Michigan State University, National Center for Research on Teacher Education.

National Council of Teachers of English. (1986). *Guidelines for the preparation of teachers of English language arts*. Urbana, IL: Author.

National Council of Teachers of Mathematics (1989). *Professional standards for teaching mathematics*. Reston, VA: Author.

Posner, G. J., Strike, K. A., Hewson, P. W., & Hertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education, 66*, 221-227.

Rosenshine, B., & Stevens, R. (1986). Teaching functions. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 376-391). New York: Macmillan.

Swidler, S., Anderson, L. M., & Bird, T. (1992, April). *Prospective teachers in small groups: Negotiating tasks and maintaining relationships*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Zeichner, K. M., & Gore, J. M. (1990). Teacher socialization. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 329-348). New York: Macmillan.