
5 Teaching about Thinking and Thinking about Teaching, Revisited

Magdalene Lampert

From 1978 until 1980, I was a participant observer in a professional development project for teachers in the Division for Study and Research in Education at the Massachusetts Institute of Technology.¹ Although we did not refer to it then by this term, the project would certainly qualify as 'constructivist'. In fact, it was constructivist in at least four different senses. First, it was intended to result in a change in classroom instructional practices toward teachers paying attention to students' ways of thinking about subjects like science, mathematics, and music. Teachers were to become 'researchers' in that they would do local inquiries into their students' ways of thinking about these domains. The project was designed such that the staff of the program did not 'tell' teachers either about the theory of constructivism or about how to apply it in their classrooms. So a second way in which the project was constructivist was that the teachers were to construct their own learning theories by reflecting on how they used and generated knowledge while doing tasks in the domains of music, mathematics, and science. A third constructivist thrust was that the teachers were expected to design methods for applying these theories to their classrooms. The teachers worked on these constructivist activities as a group in weekly meetings over a two year period. They talked about their teaching and about their observations of children, so the project was also a site for the social construction of pedagogical knowledge,² even though it drew directly on the work of Piaget.³ Finally, the project was constructivist in that the teachers were expected to construct their actions as teachers in face to face encounters with students while conducting research on students' thinking. We now refer to this way of thinking about knowledge as 'situative' or situated cognition.⁴

In 1978, the promotion of such practices was rare both in teaching children and in teaching teachers. In the past twenty years, however, many similar projects have been carried out. Teaching that is responsive to students' ways of thinking is supported in all subject matter areas by new curricula and assessment tools. We believe we should pay attention to how teachers and prospective teachers think about teaching and about subject matter, and to take their thinking into account in the design of preservice and inservice teacher education. The notion that teachers design instruction interactively with students is still uncommon, but not unheard of.

In 1984, I published the essay, 'Teaching about Thinking and Thinking about Teaching'.⁵ One purpose of this essay was to describe the teacher development project that I refer to here. That was the 'teaching about thinking' part. A second purpose was to 'think about teaching' — to examine the characteristics of teaching practice that might make it difficult to do the kind of teaching the project was designed to foster. Because the teachers who participated in this project were encouraged to make sense of the connection between learners' ideas and the formal knowledge traditionally taught in school, their talk about teaching included many references to the difficulties involved in integrating these ideas. They were treated as 'collaborators' by the members of the group whose profession was research, and their special contribution was interpreting the realities of the classroom in the context of the project.

An analysis of the talk among project participants revealed the inherent tensions for teachers and teacher educators that result from adopting what we now generally call 'constructivist pedagogy'. The essay ends with the conclusion that the tension between individual construction and formal standards is endemic to knowledge building and cannot be resolved analytically by teachers, researchers, or teacher researchers. Teachers do teach, however, and they also do pay attention to students' ways of thinking. In the essay reprinted here, I explore the notion of the teacher as a person who can manage conflicting goals, even when those goals are analytically contradictory. I argue that the 'stories' teachers tell about their practice can represent these conflicts and how teachers cope with them, whereas paradigmatically expressed theories require resolution or choice.⁶

The kind of teaching and teacher education I wrote about in 1984 has become more common, but we still have few tools for examining how teachers cope with practical dilemmas and we know little about how to teach teachers to cope.⁷ The recognition that even traditional instruction is constructed interactively with students permeates the literature on teacher planning and classroom discourse that has musbroomed since 1984. There is continued controversy about how much of their knowledge teachers need to invent for themselves and how much they can learn from 'experts'.⁸ The relationship between what scholars 'know' about teaching and the knowledge teachers use to do their jobs is a matter of continuing concern. There are many different conceptions of the 'teacher researcher' and arguments about the role of inquiry and reflection in competent practice.⁹ It is for these reasons that we revisit this 'constructivist teacher education project' and the essay I wrote about it now, almost twenty years after the project occurred.

A 10-year-old boy asked his fourth-grade teacher: 'Does Dataman have eyes?' He was wondering about his hand-held computer game that looks like a robot. 'If not, how does he know if my answers are right?'

There are several different ways a classroom teacher might interpret and respond to these questions, depending on how she understands children's

thinking and her role in their learning. If she sees herself as the source of students' knowledge and the judge of their 'wrong answers', her response might be a short lecture about how 'computers know the answers because they are programmed by people'. The boy's question would be taken as evidence that he is not very intelligent: and his teacher would relate to him in the future on the basis of this judgment. From another perspective, the teacher might think of the boy's question as a distraction from the task she has assigned to the class. She might see herself as responsible for planning appropriate lessons and activities for all of her students, throughout the day, to meet particular goals. She would thus respond by refocusing the boy's attention and behavior on the lessons the class is supposed to be learning. In both of these views, the teacher is the source of knowledge and the organizer of its acquisition.

Another way to interpret the boy's question about Dataman's 'eyes', however, is to see it as his attempt to understand a new experience. He could be using an idea that makes sense to him as a way to figure out how computers process information. From this perspective, the teacher's response might be to explore the implications of *his* way of thinking about the mechanical toy, perhaps asking him, 'How do you think Dataman can tell what your answers are?'¹⁰ It would be crucial for the teacher to understand what the boy already knows about how 'Dataman' works, so that she could direct his learning process in a way that would make connections with this knowledge. Even though his idea about Dataman's 'eyes' is at odds with the conventional way we explain how computers process information, it is intuitively meaningful to him, and therefore suggests an appropriate place for the teacher to begin her lessons.

This third — personal and active — view of the learning process redefines the teacher's work to include on-the-spot clinical research into the way a learner thinks about something.¹¹ During the past four years, this concept of teacher-as-researcher has been the subject of a study at the Division for Study and Research in Education at Massachusetts Institute of Technology. The study was built around a series of weekly seminars attended by both researchers and public elementary school teachers. The seminars had several aims, and both their form and their content have raised some interesting questions about the relationship between scholarly inquiry and classroom practice.

The first goal of the project was to train the teacher-participants to recognize what its designer, Jeanne Bamberger, called 'intuitive knowledge'. In her view, each individual builds a store of this commonsense sort of information from personal experimentation on the physical environment. Such knowledge is not usually made explicit, but is often useful and powerful. It contrasts, therefore, with the 'formal knowledge' one is taught in school: a commonly accepted set of well-articulated 'descriptions' of experience, which may have little connection with the knowledge individuals regularly apply in their everyday lives.¹² The project staff devised activities which would help the teachers to distinguish between their own intuitive ways of making sense of various phenomena and the formal knowledge they had been taught in school.

Given this background, the teachers and researchers together were to pursue the second goal, and major purpose of the project: to explore how this appreciation of intuitive knowledge could be useful in educational practice. The hope was that this work would result in practical strategies to help individual children connect their intuitive ways of understanding experience with the conventional formulas everyone needs to know to succeed in school and society. Developing and implementing these strategies was to be the work of 'teacher-researchers':

center[ing] on the image of teacher as teacher-researcher as opposed to the prevalent image of teacher as link in a knowledge-delivery system . . . extends the teacher's self-image and her intellectual engagement by providing a richer intellectual definition of her task.¹³

By this redefinition of the teacher's work, the project sought to bring teaching practice closer to the work of researchers trying to understand how children learn.

The staff of the project included two cognitive psychologists: Bamberger, who has done considerable research relating intuitive knowledge of music to learning formal music theory, and Eleanor Duckworth, who has endeavored to make Piaget's theories and research accessible to teachers. Bamberger and Duckworth constructed musical, mathematical, and physical tasks for the teachers which were meant to make them more conscious of the usefulness of their own intuitive knowledge. They demonstrated clinical research methods with children, and they led discussions with teachers of the use of these methods in the classroom.

The teacher-participants volunteered in response to an advertisement for the project which was circulated in their school district. It briefly described the idea of a 'teacher-researcher' and explained the proposed format of the project. The seven teachers who became involved represented a wide variation in grades taught, kinds of schools and classrooms in which they worked, age and years of experience, ethnic and educational background, and personal life styles. All of them participated actively in the project during the 1978–1979 and 1979–1980 school years. The teachers continued their daily work in classrooms while they met once a week with the staff of the project, and members of the staff observed periodically in each teacher's classroom to develop a shared context for discussion.

As an experienced school teacher and teacher-educator, my role in the project was to help the teachers articulate their perspective on classroom practice. I also documented the activities and discussions that occurred in the weekly seminars. It is the perspective of practice, therefore, which I bring to this case study of the project, informed by a careful analysis of what the teachers said about teaching in their conversations with one another during the seminars. From my perspective, as participant-observer, the identification of the teachers as both practitioners *and* researchers and the multiple aims of

the seminar put them in a somewhat ambiguous and often frustrating position. I will address this problem in my analysis of the project. In training the teachers to do clinical investigations of children's thinking, the project looked like many other attempts at staff development or in-service training, with the teachers being 'students' of academic researchers who had ideas about how practitioners could do their job better. The notion that the teachers thus trained would then become collaborators in addressing a research problem defined by psychologists complicated their role considerably. The teachers who participated in this project were also paid and treated as 'consultants', and they were encouraged to articulate their own ideas about the problems of teaching. These varied definitions of the relationship between the teachers and the researchers often left everyone confused about who was 'in charge' of the weekly meetings. Yet the structure did allow the teachers to question the researchers' definitions of pedagogical problems and their assumptions about how to 'fix' the practice of teaching.¹⁴

Whatever else it accomplished, the project raised fundamental questions inherent in the relationship between academic research and classroom practice. It is these questions that I wish to examine in this paper. In the first part of the paper I describe how the project operated; in the second I consider the conflicts that teachers faced as a consequence of participation. The teachers' conflicts arose out of their attempts to translate theory into practice. Ideas about children's thinking which had been useful to researchers in a loosely defined form led to impossible practical dilemmas as these practitioners tried to make sense of them in terms of concrete classroom procedures. However, when the same teachers diverged from the researchers' agenda and told informal stories about their work, the conflicts that they had conceived seemed to be managed within their sense of themselves as teachers. The teachers' stories reveal ways in which the practitioner uses her 'self' to manage the potential contradictions in her work, thus challenging the traditional notion that conflicts are resolved through research and then research 'implemented' by practitioners.¹⁵

Teaching Teachers about Thinking

The work of the teacher-researcher, as conceived by Bamberger, is 'helping the child to coordinate his own intuitive knowledge (what and how he knows already) with the more formal knowledge contained in the privileged descriptions taught in school and shared by the community of users'.¹⁶ The belief that such coordination is necessary is built on the assumption that the *intuitive* knowledge of the individual child can be understood separately from the *formal* knowledge of school and society. Therefore, in order to build connections between these theoretically disparate elements, the teachers first needed to learn to be able to distinguish between them. They needed to acquire both the psychologists' way of thinking about knowledge, and the

clinical research skills that would enable them to put aside conventional assumptions about what is worth knowing so as to examine a child's way of making sense of something.¹⁷ Bamberger framed the following questions to guide the teacher-researchers' inquiry:

How are the child's descriptions different from those formal descriptions accepted as norms in the school setting; what is the nature of the mismatch; and finally, how can [the teacher] help him to integrate his own useful, even powerful, ways of knowing with the expectations of school and community?¹⁸

The view of knowledge underlying the project's design places a high value on the child's intuitive understanding. Intuitive knowledge is considered to be powerful and useful to the individual person. In contrast, formal knowledge is thought of as separate from the persons who are learners. It is considered 'privileged', and thereby presumably alien to the child. At the same time, it is the kind of knowledge 'taught in school' and 'shared by the community of users'. Thus the design of the project echoed a familiar theoretical dichotomy between the individual and society.

As the teachers were trained to become teacher-researchers, they were expected to use this dichotomous perspective to understand classroom practice. As they did this, the *distinction* between intuitive and formal knowledge was translated into a set of practical *dilemmas*. The job of making connections between these two kinds of knowledge, i.e., between the child, and school and society, thus became much more difficult than the project's designer had anticipated. While the teachers agreed that doing research on their students' ways of understanding something seemed essential, they perceived a conflict between that sort of attention to individual differences and implementing the school curriculum. The teachers' new appreciation of the psychology of individual learning seemed to be at odds with their understanding of the responsibilities of their job, yet a clear choice between these two alternatives was also out of the question if they were to take both the project and their jobs in schools seriously.

This dilemma did not surface immediately. At the beginning of the project, the teachers were involved primarily in examining their own thinking processes in areas unrelated to the subject matter they were teaching. They participated in a variety of activities designed to help them recognize the usefulness of their own, informal strategies for solving problems. Bamberger chose to have the teachers do musical tasks in the early weeks of the project precisely because it was a subject in which they would not have had much formal training. She assumed that, although music was a domain in which nearly everyone has experience, it was not as encumbered with learned formal descriptions and societal expectations as the more central school subjects like mathematics and reading.

One of the first tasks the teachers were given, for example, was to compose a tune that would 'sound good', using a set of five individual metal bells.

The bells would make sounds of different pitches when struck with a wooden mallet. Bamberger encouraged each teacher to articulate the various qualities which she thought made *her* tune sound good. The teachers thus practiced doing clinical investigations of individual understanding by reflecting on their own ways of making sense of music. They also analyzed videotapes of the researchers interacting with children who did similar tasks.

After doing these activities for several weeks, the teachers were asked to bring the group instances from their own classrooms in which a child talked about something in a way that seemed 'puzzling'. The research staff helped the teachers to speculate on the structure of the intuitive knowledge that the child was bringing to the situation. Suzanne, a fourth-grade teacher, told about Lenny, who had asked her, 'Does Dataman [a small computer] have eyes?' She reported her first reaction to his question as follows:

My immediate thought was that he thought it was a living thing, had eyes, was connected with a living thing. At first, my aide and I were both so flattened by the idea that a fourth grader would think that Dataman could have eyes or could hear or speak that we just left it and said, 'No. It doesn't'. He said he thought it could see because it — 'he' — told you whether your answer was right and if 'he' wasn't able to see, 'he wouldn't be able to do that'.¹⁹

Suzanne explained that she and her aide were 'flattened' because they just couldn't believe that this 10-year-old boy did not know that machines could not have eyes, and she expressed her distress at the thought that Lenny might actually think computers are alive. She assumed, at first, that he did not *know* something he should know, and that explaining to him how computers work was *her* job. It was in such discussions of their own students that teacher views about the importance of formal knowledge in classrooms began to surface.

In presenting this problem to the group, Suzanne called Lenny's question 'silly' and wondered about the boy's 'intelligence'. She said that he 'was not very smart in math, either', she worried about whether he would learn all that she was supposed to teach him during that year, and she said she told him that Dataman recognized his answers because it is 'programmed'. However, she admitted that she did not really know exactly how the machine works. But what she did know, and what she said she really wanted Lenny to know, was 'that there was definitely not a person or a brain in there working'. Suzanne favoured transmitting formal knowledge rather than examining how she or the child might make sense of the machine's workings.

The staff asked the teachers: 'what might Lenny have been thinking that prompted him to ask his question in the first place?' Although whether Lenny was right or wrong in his thinking, or whether he needed to be taught something about how computers work, were issues of some interest to the teachers, the group was directed to try and imagine how someone might think that a computer might have 'eyes'. The teachers began to wonder whether the boy may have been asking a question that was somewhat more complicated than

the literal ones: 'Does it have eyes?' or 'Is it alive?' and they found themselves questioning just how Dataman could, in fact, tell you whether your answer was right or wrong if it didn't somehow 'see' your answer. One member of the group compared Lenny's reasoning process with the way she, and other adults, might think about computers:

We talk about a computer as a 'brain' with a 'memory' and we also talk about memory being a human being's memory. The eyes are the pathway, the input to the brain. This is getting very theoretical about what this child was up to, if any of these things. But how *could* this thing know whether the answer was right or wrong?

This teacher was using her own way of thinking about computers to assess the legitimacy of the student's way of thinking. These considerations of how Dataman 'knows' led to the idea that it was not necessarily 'stupid' or 'silly' to refer to the computer as having 'eyes'.

What Suzanne had first presented as a 'silly question', which had distracted her and her student from what he was *supposed* to be learning, thus came to be understood as a question of considerable significance: 'He got a machine and he wondered about the essential differences between machine and man; but it's just that he wasn't sure . . .'. At the end of this session of analyzing the child's question, Suzanne had quite a different view of Lenny's 'intelligence':

I had not thought of this child as being very intelligent, but you're right, in that he *should* be thought of in that way since he did ask that kind of question. It's a higher level of thinking, if he's thinking about trying to make that distinction between robot and computer and man and whatever.

By working on this and similar 'puzzles', we hoped that teachers would gain a new perspective for looking at their interaction with students — the possibility of responding to a student's question, not with an answer, but with more questions constructed to help the teacher better understand the *student's* way of thinking.

An example presented by Helen, another fourth-grade teacher in the group, illustrates the development of the teacher's experiments with sustained inquiry into their students' ways of understanding what they learn. It represents the other side of the work of the project: an application of that research in classroom practice.

Mario had come into school one day asking his teacher, Helen, for an explanation of something he had been told by his father. Helen told the group:

Mario, in his usual (somewhat belligerent and challenging) way said: 'My father said we didn't have whatever that thing was yesterday'. Then I said, 'The *eclipse*. What did your father tell you about it?' Mario answered (with doubled assurance) 'He said we didn't have it because it was snowing'.

Helen recognized Mario's confusion, and at first, she believed it would be relatively simple to clear up. She thought that he had misunderstood his father. What he needed to know was that the eclipse was happening behind the clouds even though he didn't see it because it was snowing. But the lesson turned out to be not so simple: 'I told Mario we had it; even though it was snowing, you look behind the clouds. He walked back to his seat and about half an hour later, he said to me, "My father doesn't lie to me, we didn't have it"'.

Initially, Helen perceived a difference between the boy's understanding of the eclipse and her own. But rather than simply telling him *her* understanding, she also tried to explore *his* construction of what happened to the eclipse. She explained her initial attempts to get the matter cleared up:

That next day was also a very cloudy day, and so I asked, 'Where do you think the sun is today?' and he just shrugged his shoulders. I took a book and put it in front of the shade cord and asked him if he could see the cord. He said 'no', and I explained to him that is how it is with the sun when it is behind the clouds. And he said, 'But my father —'. I concluded that he still couldn't understand that it [the eclipse] happened behind the clouds. So anyway, I didn't know what to do.

When Helen presented this problem for discussion, the staff encouraged the group of teachers to try to figure out what Mario might have been thinking.

At the next seminar session the following week, Helen said that what she thought about was 'how I could phrase my question [about the sun] to him so he would say, "It's in the sky", which is what I want to know if he understands'. Her approach to Mario became a combination of figuring out how *he* was thinking about the problem and finding out whether he knew what *she* considered to be some essential basic information about how the solar system works.

She reported her subsequent interaction with him as follows:

So when it was a cloudy day on Friday, I said to him, 'What happened to the sun today?' and he looked at me like I was from Mars, and said, 'It's in the sky'. He must have seen the look of relief on my face because he said 'What's the matter?'

Having ascertained that he understood that the sun was there, behind the clouds, on a cloudy day, Helen then came back to the question of the eclipse:

Then I said to him 'you know that eclipse we had? Did we have it here?' He said 'Well, no. Well, I guess. Well, I'm not sure'. I said, 'I guess what I'm asking you is did it happen in the sky over us?' He said, 'Yah'.

Still testing her understanding of Mario's understanding, Helen said she had asked him some more questions and found that he was aware that the eclipse did happen behind the clouds, even though we couldn't see it. By 'not having it', he had meant 'not seeing it'. She presented her conclusions to the group: 'I have been on such a wrong track with him. The "where" meant: he wanted to point to "there, there it is". But I was thinking he didn't know it was there

at all. So I was happy to find out he did'. Helen's probes demonstrated to her that Mario thought she had initially been asking him to point to the exact spot in the sky where the sun was behind the clouds. He did not think he could do that when he made his first comments, and so she had tentatively concluded that he didn't know that the sun was there behind the clouds. Yet after the second interaction, she thought that *she* was the one who had not understood what he was thinking.

Helen had decided that Mario did not need a lecture about where the sun is on a cloudy day. In fact, such a lecture may have only served to confuse his sense of the relationship between the sun, the clouds, and the Earth. Through discussion of Mario with the group Helen had developed a different sense of the *purpose* of teachers asking students questions. She had not simply judged Mario's answers to be right or wrong, but had considered them as indicating how *he* perceived the position of the sun on a cloudy day.

Based on my analysis of examples like these and teachers' reflections on their own intuitive ways of making sense of various phenomena, it became clear that the teacher-participants had changed their thinking in at least three significant ways: they had expanded their sense of what it means to know something so as to include what the knower figures out for himself or herself, thus complicating the meaning of a 'right' answer and their sense of what makes a student 'intelligent'; they had become more confident in their own ability to figure things out, ranging from problems in music and physics and mathematics to problems of how and what to teach in schools; they had begun to think that clinical-style research investigations, with individual children in classrooms, *might* be a part of their classroom work.

The teachers seemed equipped to examine and appreciate students' intuitive ways of making sense and to see, by reference to their own experience, how such individual ways of making sense were different from the formal descriptions accepted as norms in the school setting. However, having learned the *researchers'* distinctions between intuitive and formal knowledge, these teachers had a difficult time with the idea that the two different ways of knowing could be *integrated* in the classrooms where they worked. As they thought concretely about how their teaching was organized and their own position as knowledgeable authorities, they raised several problems which had not been among the researchers' concerns:

If students construct their own understanding of something, like how machines work, or relationships in the solar system — what is the connection between what they understand and what a teacher knows to be 'the right answers?'

And these right answers, which are printed in the textbooks we use, and measured on the tests we give — where did they come from? And aren't they important? And what does it mean for teachers and students to know something if they don't really understand it?

What Bamberger had called 'formal knowledge', the teachers called 'right answers'. This distinction suggests some of the reasons why what had been an

interesting difference for the researchers became a *practical* problem for the teachers. The formal knowledge that is 'taught in schools' is, in fact, taught by *teachers*. It is the source of their power and authority in the social institutions where teaching and learning occur and where norms are established. These norms include what is to be defined as useful knowledge in the classroom. It is not surprising, then, that formal knowledge would have a different *functional* meaning for teachers than it has for researchers.

In school, formal knowledge is not one among many ways of knowing; it is the 'right' way. When the teachers worked as teacher-researchers, however, they were expected to be detached from this formal standard. They were supposed to accept intuitive knowledge as useful and powerful, and to refrain from judging the child in terms of what they or other authorities thought he should know. At this stage of the project the teachers began to sense some of the contradictions involved in adopting the project's view of their role *vis-à-vis* knowledge. Here, the case of Lee is instructive.

Lee, a sixth-grade teacher, wondered whether accepting the reality of differences in individual understanding meant that she would have to give up assigning the *same* textbook work to her whole class. If her students came to an assignment with different ideas about what they were supposed to do, she concluded that she would not be able just to look at their answers as a way of judging what they did or did not understand. Her dilemma was a choice between acknowledging individual differences and measuring students' knowledge by textbook standards. She knew she had to do both, but in the context of the project, she was worried: 'I have the terrible feeling that if this process [the research] goes too far, I'm *never* going to be able to assign page 98 again'.

Here, Lee uses 'assigning page 98' to represent an essential aspect of the way teaching and learning are organized in schools. In a given classroom, one teacher is responsible for instructing a large group of children, all of whom have roughly the same level of knowledge of the subjects taught in school. Textbooks are a standard measure of the class's and the teacher's assignment and their *progress*.

In giving an assignment in a textbook to a whole class, Lee assumes that these twenty or thirty different students are supposed to be able to do something — long-division, let's say — and she has a clear responsibility to ensure that her students can do long division correctly. It is not surprising, therefore, that being asked to give up the functions served by the knowledge needed to complete 'page 98' correctly might give this teacher a 'terrible feeling'.

This use of knowledge is different from exploring a child's knowledge about 'Dataman' or 'the eclipse'. In these cases it was not too difficult for the teachers to imagine themselves as *researchers*, exploring and appreciating *one* student's particular way of thinking and indeed, their sense of a student's 'intelligence' was enriched by such exploration. There were no curricular guidelines on these particular subjects to provide a sense of school norms or expectations. No long division was there to be mastered by all of the students.

In the seminar, Bamberger responded to Lee's worry about giving up the standards reflected in the textbooks with the comment: 'It would be interesting to see how all these different mixes of things would interlace with page 98', i.e., what different children, with different prior knowledge and different abilities, would do with the same assignment. As a researcher, for whom the 'mismatches' between individual understanding and the school curriculum are *valuable* data, she has no responsibility for what children have or have not learned. However, the teachers had a different view of the situation. Jessica, for example, responded to the nature of the *researcher's* interest in children's thinking with the assumption that Lee probably '*already knows* . . . how many different things can be done on page 98!' — implying, by her tone of voice, that for a teacher to have such information would be, not interesting, but troublesome. If it is the teacher's job to get students to learn what is in the textbook, different answers indicate that her job has *not* yet been accomplished. There may be little feeling of accomplishment for a teacher in recognizing that a *variety* of answers may result from each student's unique interpretation of an assignment. But more importantly, Lee thought that she must decide *either* to continue to assign 'page 98' and disregard individual interpretations *or* to give up making uniform assignments based on the textbook which she considered to be a necessary tool of her trade. Her sense of the demands of the theory she was learning seemed to make the first inappropriate, and the nature of her practice as a sixth-grade teacher to make the second impossible. She felt immobilized by the contrary ways in which her responsibilities seemed to be defined. Lee saw herself faced with a choice between understanding individuals and succeeding as a teacher in terms defined by the institutions within which she was working. As one of the other teachers put it, her 'thoughts' about theories of individual learning seemed to be contrary to the 'facts' of practice in a public school classroom. Such ambiguous interpretations of what they were supposed to be doing left the teachers frustrated, and sometimes even angry about their participation in this project. We turn now to an analysis of these contrary tendencies which flowed from assumptions of the project.

Thinking about Teaching

The way these teachers analyzed their work into contradictory responsibilities is not unique. Although their thinking could be attributed to the dichotomous way in which the project defined the work of the teacher-researcher, the conflicts they felt parallel those identified by several scholars who have attempted to understand the work teachers do. Philip Jackson, for example, describes the institutional standards of classroom life as 'threatening to the student's sense of uniqueness and personal worth'; he sees the teacher's role, therefore, as 'fundamentally ambiguous': '[The teacher] is working for the school and against it at the same time. He has a dual allegiance — to the preservation of both the

institution and the individuals who inhabit it²⁰. In these terms, if a teacher distinguishes among the individual learners in her classroom, according to the differences in how they understand something, her allegiance to school standards like textbooks and tests is called into question. Gertrude McPherson, who did an intensive study of teaching in a small-town school, found similar contradictions in the job. She analyzed the differences in expectations placed on teachers in their various professional relationships: by students, other teachers, administrators, parents, the larger community. These relationships define the teacher's 'role set'. McPherson concluded:

It should be clear from this study that much of the teacher's internal conflict is built into the role set; that the conflicting expectations of different interested parties are not easily changed or made congruent either through organizational changes or improved communication.²¹

One endemic conflict in the teacher's 'role set' is between the needs of students and the standards of the institution. McPherson found that what the teacher has come to believe is appropriate practice in relations with *individual* learners is contrary to what is expected by others outside the classroom, who have the power to decide whether she is doing a good job. Teachers cannot easily resolve their dilemmas by allying themselves with one set of expectations or another. The nature of the relationships among the people who can influence what they do — parents and children, for example, or the principal and the other teachers in the school — makes that solution impossible.

When Dan Lortie asked teachers how they manage the conflicting expectations that result from the way schools are organized, he found them to be 'ambivalent' and conflicted about how their job should be defined. He summed up their sentiments as follows:

There is a certain ambivalence, then, in the teacher's sentiments. He yearns for more independence . . . but he accepts the hegemony of the school system on which he is economically and functionally dependent. He cannot ensure that the imperatives of teaching, as he defines them, will be honoured, but he chafes when they are not . . . In any event, the feelings I have discerned among Five Towns teachers are internally contradictory and reflect dilemmas in the role.²²

Lortie interpreted teachers' general feelings about their work as expressing a contradiction between their own ideas about how to relate to students as individuals, and the constraints and rewards of the organization in which their teaching occurred.²³

The teachers who participated in the MIT project seem to have arrived at the same conflicted conclusions. Bamberger had hoped that the teachers could find pedagogical strategies for making *connections* between individual understanding and institutional expectations. But as the teachers examined the

purposes of their work in terms of the distinctions between individual and formal knowledge, and as they continued their work in classrooms, these connections seemed to them something of a *practical* impossibility. The more they accepted the theorists' view of learning and teaching, the more they were frustrated — alternately wanting to understand individual children better, and feeling that such understanding might actually *get in the way* of the job they have to do in the classroom. These teachers' sense of contradiction between a researcher's concerns and their own practical concerns in the classroom (such as class size, behavior problems, and external interference) parallels that described by John Elliott in his analysis of a program in Great Britain designed to train teachers to plan activities to match an individual child's developmental level. In Elliott's view, teachers could not assume a researcher's perspective on their students because it did not take account of the complexity of their responsibilities; they saw the program's expectations as 'isolating certain events for special attention to the neglect of others'.²⁴ Even though the teachers may have concurred that the researcher's concerns for individual children were important, they could not give them the absolute attention that seemed to be expected.

The tension between individual and social standards seems to be at the very heart of teachers' work.²⁵ Students have had different experiences and have different ways of making sense of those experiences, and therefore bring a wide range of interpretive frameworks to the lessons they are learning in school. It is also the case that there are certain things taught in school that are useful for *everyone* to know, and that a student's success in learning them may affect his or her whole life. From the perspective of an individual's system of ideas, however, this standard knowledge is only one among many ways of understanding and describing experience. From the project's point of view, an individual's way of understanding his or her own experience was considered to be a more useful and powerful way of knowing, and, in the long run, a more powerful base on which to erect teaching strategies.²⁶

As these teachers sought to move from being teachers to being teacher-researchers, it is not surprising that they felt some contradictions in their work. While learning to recognize children's ways of constructing their own knowledge from experience had informed their teaching and the way they thought about children, the dichotomous ways of thinking about practice which they derived from the project's psychological theory did not appear useful. Trying to figure out whether it would be better to pursue a child's intuitive knowledge *or* to teach the formal curriculum seems to have been counter-productive. While arguing for the superiority of one purpose or another might have been an appropriate *academic* activity, it did not seem to the teachers particularly connected to the problems they worked on every day in their classrooms. These problems surfaced when teachers told 'stories' to each other at informal moments during our meetings about what they actually did in their classrooms.

The contrast between the contradictions the teachers expressed in their speculative *seminar* discussions and thus the ideas about teaching that can

be found in 'stories' they tell about their practice is significant. It raises two questions that seem useful in examining the relationship between theory and practice. First, what is it about this *project* that led these teachers to feel that they needed to make impossible choices between children and curriculum, between inquiry into individual understanding and upholding school standards, between their own intellectual interests and their classroom responsibilities? And, secondly, what is it about *teaching* that made these choices seem essentially unrelated to their practice? The teachers' 'stories' about themselves at work suggest some answers to these questions and point to a possible framework for furthering our understanding of what teachers do.²⁷

In one such story, a kindergarten-first grade teacher told the group about how she had used the occasion of a new child joining the class in the middle of the year as the subject of a lesson in counting, addition and subtraction. One girl in her class, Penny, counted the new boy twice, adding him both to the number of children who were 'present' *and* to the number of children who were absent. When Jessica finished her story, the other teachers in the group eagerly took up the puzzle, exploring what the girl might have been thinking. This was the problem from the perspective of a group of teacher-researchers. But as she spoke about her classroom, Jessica considered several other issues. First of all, she said she wanted everyone to be clear about the fact that there was a total of twenty-four children in the class, i.e., that twenty-two here, and two absent, added up to twenty-four altogether. She could not give equal legitimacy to Penny's conclusion that there were twenty-five without confusing the other children. The girl's understanding of the situation was not something she wanted anyone else to share. She needed to teach all of the children, including Penny, that each member of the group should only be counted once.

A teacher has a special position as the person in the class who knows formal mathematics. Her students look to *her* as the authority on addition. She personally represents the order of arithmetic in contrast to their own shaky sense of how it works. Particularly because Jessica was interacting with Penny in front of all the other children in the class, she thought it was important for her, as the teacher, to stand behind the formal knowledge represented by the correct sum and the correct procedure for arriving at the total number in the group.

Of course, there are many different ways of understanding this mathematics problem, and that might be what Jessica ought to have tried to understand about Penny's thinking. But examining how Penny constructed the problem was not possible; in addition to the mathematics lesson, Jessica said she also needed to give her attention to managing the transition of a large group of young children from one sort of activity to another. Penny's irritation, which may have caused some problems among the other children in the group, needed to be dissipated. These aspects of classroom teaching made it difficult for Jessica to engage in or even think much about an exploration of Penny's intuitive understanding of addition. From the distance of the seminar, however, Jessica reflected on what a good researcher might have done in the same

circumstances, in contrast to her own, teacherly, response. She said to Duckworth, one of the researchers in the group:

I wanted you there, because I knew you would ask her the right question. I kept saying, 'this is perfect, Jessica get it out'. But I couldn't think of a question to ask. Of course, I was worried about a few other items . . . I couldn't defuse her anger because I couldn't understand what she was talking about. And I didn't have the time — I tried — I gave it three sentences.

A researcher could have gone off on Penny's tangent with the confidence that someone else was responsible for managing the whole class's behavior and teaching this girl (and the rest of the class) how to add.

Although Jessica felt that she had not acted as a researcher would have in these circumstances, it was obvious that her participation in the project influenced her response to the child's way of thinking about arithmetic. She said she was aware of the child's intuitive understanding and how it differed from the formal knowledge first-graders are supposed to learn about addition. She assumed that there was some 'sense' to Penny's way of thinking and she tried to get her to articulate it. Even though there was clearly a tension between individual thinking and conventional social standards in this instance of practice, Jessica did not need to make a choice between them in the way she spoke about her work. Like Helen, who wanted Mario to know about the eclipse, she was able to manage both the child's understanding and the formal knowledge she wanted to convey.

In contrast to their stories, the teachers' discussions of the dichotomy between intuitive and formal knowledge communicated the belief that if they were going to value their own or any other individual's way of thinking about something, then they would have to disassociate themselves from the formal standards that are used to measure learning and teaching in schools. What was a distinction of interest to theorists (intuitive versus formal knowledge) had become a set of contradictory categories for defining their task: *teacher-researchers versus school and society*. If the teachers had fully identified with the researchers in the project, they might have settled on that self-definition. However, the structure of the project also encouraged them to see themselves as school practitioners. The researchers valued the teacher's perspective on their classroom practice, and recognized them as authorities in matters of classroom life; the teachers were told that they knew things about work in schools that the researchers did not know. Thus the teachers' authority as collaborators in the project was based on their work in schools. In order to perform this function they defended the importance of the formal knowledge that is taught to children in schools. From this perspective, they reasoned that aligning themselves with schools meant they could not also be researchers, and so they divided things up differently. The dichotomy became: *researchers versus teachers and schools and society*. They had been asked to collaborate on the project's research *because* they were public school teachers. Yet their

association with all of the aspects of that role made it difficult for them to pursue the kind of inquiry which the researchers had hoped for.

Given these two quite opposite ways of thinking about themselves, it is not surprising that the teachers were frustrated by trying to play the role of both teacher and 'teacher-researcher'. The way they understood the project's assumptions led them to a choice: should they align themselves with children by focusing on the individual's intuitive knowledge? Or should they align themselves with the school as teachers of society's formal knowledge? They faced a dilemma; it seemed to them that they could not do both.²⁸

What is most striking about the thinking of the MIT project teachers is that although they *analysed* their work into a set of forced choices, they did not seem to have to make such choices in their *practice*. Their 'stories' about themselves imply a variety of alternative strategies for coping with conflicts that enabled them to work *without* choosing. This is the significant point we should consider. The teachers' management, in practice, of concerns that they talked about as contradictory in their analysis of practice raises some very interesting questions about the relationship between *thinking* about teaching and doing it. They did not have an analytic language for reflecting on their practice to counter the contradictory themes that developed in their thinking about intuitive and formal knowledge. But what they did have was a way of working and a concrete way of talking about their work, and there is much to be learned from listening to their 'stories' about particular interactions with students.

How did they manage the tensions and contradictions inherent in their work? And why did their ability to manage them surface in their stories when it was absent from their more abstract analysis? In the stories the teachers told about specific instances of practice, they were talking about *themselves*. All of the various expectations that are a part of learning in schools seemed to be filtered through the person of the teacher in the act of teaching. She used her 'self' as a tool to manage the contradictions of her trade. Jessica portrayed herself as *more* than simply a conduit through which formal knowledge passes to students. When she talked about herself as a teacher of mathematics, it seemed important to her that children learn what *she is* teaching them. In talking with a child to find out what he or she thinks about something, her *personal* attitude towards the child and towards the skills being assessed make a significant difference in how she understands what the child 'knows'. Yet what Jessica's students learn from her is also part of the shared knowledge that is important to their success in school and society. The way this knowledge is structured by teachers themselves in relation to their students makes it difficult to say whether it is 'intuitive' or 'formal'.

The way the teacher uses her self in her practice suggests that the dichotomy between these two kinds of knowledge is a false one. In the person of the teacher, knowledge is conveyed to students in a way which is both socially useful and meaningful to the teacher herself. In the course of instruction the teacher attempts to make knowledge meaningful to students through her formal

authority and the relationship she has established with them as individual persons. On the part of the student, there is a certain degree of trust that if something 'makes sense' to the teacher, it will eventually 'make sense' to the learner; both are part of a society in which the knowledge taught and learned in school has some usefulness. The 'mismatches' between intuitive and formal knowledge, posited by Bamberger, may thus be managed by the teacher without deliberate research into their incongruence.

The tensions in a teacher's work are the same kinds of tensions everyone feels as an individual growing up in society, writ large because of the teacher's official role in the growing-up process. We all feel enduring contradictions, for example, between what it seems other people, in various positions of power, want us to do and what *we* think we should do. But teachers have a special responsibility for managing these kinds of tensions in themselves and in their students. Given what these teachers have said, it seems appropriate, therefore, to consider the notion that teaching involves *inventing personal strategies for working with universal contradictions that cannot be finally resolved*. Coping with these conflicts in one's self seems related to how they are managed in practice, and we need to persist in trying to find out how teachers do cope, in practice, with these enduring and unresolvable tensions.

Theories of self like those of George Herbert Mead, which I have drawn on here in thinking about the teacher's self, may be useful in examining this aspect of the teacher's work.²⁹ In Mead's view, a person is both a spontaneous actor on the environment and an interpreter of the ways in which actions are received by others. The 'self' develops in the course of managing the tensions between one's own actions and the expectations of others. The perspective from which a person acts is thus different from a 'theory' of action, developed at some distance from the problems to be managed. At the same time, a person is understood to direct his or her own actions rather than involuntarily reacting to social expectations. A teacher's 'story' about *herself* at work might be understood, therefore, as something different from either a reflected-upon theory about why she did what she did or a list of impulsive behaviors.

Analyzing such stories may lead to a reflective language for talking about practice that is more congruent with what teachers do in classrooms. This language could be used by both researchers and teachers for teaching about thinking as well as thinking about teaching. Finding such a language is of critical importance for curriculum change.³⁰ With such a language teachers may be able to contrast the *personal* aspect of their work with the more abstract contradictory themes that emerged when they were asked by theorists to speculate about becoming teacher-researchers.

Clearly the project influenced the teachers' sense of the internal contradictions in their work, and the researchers on the project did not offer any way out. The problem stems from more universal characteristics of relationships between theories about teaching and practice, however. Our experience in the project points to a gap in the way researchers understand practitioner thinking: the gap emerges because teachers' particular 'stories' about what they do in

classrooms have been given little attention in research and writing about practice. Teachers who participate in university seminars are often criticized for the 'stories' they offer about themselves and their students. Their contributions are considered irrelevant to focused discussions of educational theory and research. Judged by academic standards, the 'stories' seem like evidence for inadequate problem-solving ability; what teachers say they do seems uninformed by all the careful theoretical analysis of teaching and learning that goes on outside of the classroom.³¹ Even though the designers of the MIT project did not take this perspective, the emergent differences between 'thinking like a teacher' and 'thinking like a researcher' had similar implications.

The way teaching has been thought about and written about by academics certainly has had an influence on how teachers themselves think about it. The conventional relationship between theory and practice has assumed that practitioners should be *consumers* of theory which is created by someone else. When researchers have tried to separate how teachers themselves think about their work from academic descriptions of practice, they have concluded that the language practitioners use is too concrete, too context-bound, and too inconsistent to inform good teaching.³² Teachers who want to improve their practice, therefore, are expected to use the language of *researchers* both to define problems and to understand their solutions.

Researchers conceive of their own job as actively searching for *solutions* that can be applied to the problems of practice. A recent review by Richard Shavelson and Paula Stern of a wide range of research that has been done on teacher decision-making is illustrative; the authors admit, however, that the fundamental formulation of the research problem that has been examined in this work 'ignores multiple, potentially conflicting goals which teachers have to balance daily'.³³ Yet a teacher who tells 'stories' about *managing* problems rather than *solving* them is considered intellectually passive, if not helpless. Coping with conflict, rather than getting rid of its source, goes against our society's deep-seated hopes for progress. Enduringly unsolved problems remain something of an embarrassment, and thus while research is valued, it is a struggle to see a teacher's everyday acts of teaching, in spite of the essential contradictions in her work, as productive and creative. When compared with the problem-solving researchers, she appears to be naive or indifferent.

Much research has been built on the model of the sciences, in which the validity and reliability of a solution are defined by the qualities that a number of events have in common. We have, therefore, been drawn away from the 'anecdotal' ways teachers talk about themselves at work (and what that can tell us about what is problematic in that work) towards solutions for problems that are defined to be useful for improving 'teaching' in general. The specific ways in which a teacher manages her classroom are not as interesting, from this perspective, as are general principles derived from research that can be developed into a universal theory of practice.³⁴

Our thinking about how the teacher affects what she does in the classroom by using her 'self' to manage conflict has also been limited by the

psychological concept of 'personality'. Instead of thinking of each teacher as an intentional agent in the moment-by-moment management of contradictory ways of thinking as Mead suggests we do, we have placed teachers in theoretically derived trait categories like 'warm and friendly' or 'authoritarian', based on a statistical average of classroom behaviors. This led to attempts to 'solve' educational problems by identifying which sort of teacher produces the most learning and figuring how to get those kinds of teachers in classrooms. Such solutions could not take account of the *dynamic* nature of the teacher's identity. As Mead points out, who a person is and what she does is expressed in and shaped by the environment in which she works, and yet she may appropriately *decide* that it is useful to be warm and friendly in one instance and authoritarian in another. The teacher, while affected by the environment, is not driven by it.

No matter what kind of teacher is placed in a classroom, the essential contradictions in teaching persist. Jessica, for example, cannot choose between accepting the fact that students come to school with different ideas about the structure of counting *or* teaching them to add and subtract according to conventional mathematical rules. Lee does not have a choice between expecting students to correctly answer the questions on 'page 98' of the textbooks which the school district assigns to her or trying to make sense of the individual variations in students' answers on a class assignment. Theoretical arguments might lead to apparent resolutions of these dilemmas, but such arguments seem remote from what teachers do in their classrooms. Although a resolution may be accomplished in each particular incident of teaching, the underlying tensions do not go away. It is this difference — between the specific momentary, creative acts of management on the part of teachers, and the more general picture of their work as contradictory — that makes the MIT teachers' stories about their own practices so important.

Our project might have gone much farther if we had taken account of the richness of these teachers' language for talking about their work. Instead, we provided them with a researcher's language in the cause of teaching them about thinking. We did not concurrently examine *their* ways of thinking about teaching. If we could better understand the special qualities of the thinking revealed in the way teachers talk about their own work, researchers might be able to participate in a different sort of conversation with teachers about improving practice. Taking teachers' stories as evidence for their thinking about why they do what they do means developing both new ideas about what 'thinking' is and a different attitude towards teachers. If teachers are to be considered as 'intentional' practitioners whose own thoughts and feelings serve as the rationale for their actions, what researchers have to offer in the improvement of practice needs to be reexamined.³⁵

The MIT teachers' stories suggest a conceptualization of the practitioner's teaching self — an actor in a situation who brings her personal history, knowledge, and concerns into a relationship with her working environment. Her own ideas about what should be happening in that environment (informed by

educational research and theory or not) must be adjusted, by her, to the concrete reality which she faces in each situation. Because the teacher must thus use her 'self' in the Meadian sense, in her teaching, and because the materials on which she works are the 'selves' of her students, the relationship between thinking and doing, between research and practice, is created by her in moment-by-moment classroom interaction. She does not put aside the formal aspect of her own or a student's knowledge while she examines the intuitive, nor can she simply impose the formal without making some kind of sense of it for her self and for her class. It is the essence of the teacher's job to be a person who can manage both conventional social expectations and individual understanding, even though the two may often be in conflict.

Acknowledgment

The research reported in this paper was partially supported by a grant from the National Institute of Education (Grant No. G78-0219) awarded to the Division for Study and Research in Education at Massachusetts Institute of Technology, Cambridge, Mass.

References and Notes

- 1 *Many of the teacher-members of this project continued to meet well into the 1980's. See Eleanor Duckworth 'Understanding children's understanding' in The Having of Wonderful Ideas and Other Essays on Teaching and Learning, NY, Teachers College Press, 1987, pp. 83-97.*
- 2 *For an elaboration of this interpretation of constructivism, see Paul Cobb 'Where is the Mind? Constructivist and Sociocultural Perspectives on Mathematical Development', Educational Researcher, 23, 7, October, 1984, pp. 13-20 and Carl Bereiter, 'Constructivism, Socioculturalism, and Popper's World 3', Educational Researcher, 23, 7, October, 1984, pp. 21-3.*
- 3 *Eleanor Duckworth, who had studied with Piaget and popularized his ways of interacting with children in this country, was one of the teacher developers on the project.*
- 4 *See James Greeno 'On claims that answer the wrong questions, Educational Researcher (in press) for the origins of this term and the differentiation between situativity and constructivism.*
- 5 *Journal of Curriculum Studies, 16, 1, 1984, pp. 1-18. The essay is reproduced here in its original form. An introduction and additional footnotes have been added and are distinguished from the original text by italics.*
- 6 *See Jerome Bruner, Actual Minds, Possible Worlds, Cambridge, MA, Harvard University Press, 1986, for an analysis of the distinction between narrative and paradigmatic ways of knowing.*
- 7 *See, for example: Philip W. Jackson, The Practice of Teaching, NY, Teachers College Press, 1986, and these first hand accounts and analyses by teacher researchers:*

- Deborah L. Ball 'With an eye on the mathematical horizon: Dilemmas of teaching elementary school mathematics', *Elementary School Journal*, **93**, 4, 1993, pp. 373–97; Lisa D. Delpit 'Skills and other dilemmas of a progressive black educator', *Harvard Educational Review*, **56**, 4, November 1986, pp. 379–85; Ruth Heaton, 'Creating and studying a practice of teaching elementary mathematics for understanding', *Unpublished Doctoral dissertation, East Lansing, MI, Michigan State University, 1994*; Tim Lensmeir, *When Children Write: Critical Re-Visions Of The Writing Workshop*, NY, *Teachers College Press, 1994*; Suzanne Wilson 'Mastadons, maps, and Michigan', *Elementary School Journal (in press)*.
- 8 See Magdalene Lampert and Christopher Clark 'Expert knowledge and expert thinking in teaching: A reply to Floden And Klinzig', *Educational Researcher*, **19**, 4, 1990, pp. 21–3, 42.
- 9 For a review of these arguments and conceptions, see Magdalene Lampert 'Studying teaching as a thinking practice', in James Greeno and Shelly G. Goldman (Eds) *Thinking Practices*, Hillsdale, NJ, Lawrence Erlbaum and Associates, in press.
- 10 In terms of current theories of cognition, we might say that the teacher would be 'tuning to the affordances' In her attempt to integrate structuralism with situated cognition into a theory of knowledge use, Lauren Resnick asserts:

In each new situation, learning is a matter of beginning to act in the environment on the basis of particular affordances of that environment. One's initial actions are either successful or not. If they are dramatically unsuccessful, that is, if there is no match at all between one's prepared structures and the affordances of the environment, the most likely response is to leave the environment, either physically, if possible, or by 'tuning out' when actual physical departure is not possible. If the match is complete, no learning takes place. One just acts. But if the match is partial — enough to keep one engaged, but not enough to provide a ready-made set of actions — a process of tuning to the affordances sets in. This tuning is what I mean by learning. It produces an ability to act 'perfectly' in the environment. But because it is a tuning process, it results in a specifically situated competence. The competence developed will not be perfect for any other specific environment.

- 'Situated rationalism: Biological and social preparation for learning', in *Mapping the Mind: Domain Specificity in Cognition and Culture*, LA, Hirschfield and S. Gelman, Eds, New York, Cambridge University Press, 1994, p. 480.
- 11 From the perspective of current thinking about systemic reform, we might also argue that it redefines the purpose of schooling to include respecting students' thinking.
- 12 For a more complete description of the distinction between intuitive and formal knowledge, see Bamberger, J. 'An experiment in teacher development' (A proposal submitted to the National Institute of Education, Basic Skills Group, June 1978a); and Bamberger, J. 'Intuitive and formal musical knowing: Parables of cognitive dissonance', in *The Arts, Cognition, and Basic Skills*, Second Annual Yearbook on Research in the Arts and Aesthetics Education (CEMREL, Inc. 1978).
- 13 BAMBERGER, J. op. cit. (1978a), p. 1 (see Note 12).
- 14 Of course, the frustration and ambiguity of this scenario has been repeated over and over again and experienced by many as we embark on more and more

- teacher-researcher collaboration. See for example, Marsha Levine, *Ed Professional Practice Schools: Linking Teacher Education and School Reform*, NY, Teachers College Press, 1992. The jury may still be out on whether or not it is 'worth it' to blur the boundaries in this way. See Magdalene Lampert 'Looking at Restructuring from Within a Restructured Role', *Phi Delta Kappan*, **72**, 9 (May, 1991), pp. 670-74, David Wong, 'Challenges confronting the researcher-teacher: Conflicts of purpose and conduct', *Educational Researcher*, **24**, 3 (May 1995), pp. 22-8; and Suzanne Wilson, 'Not tension but intention: A response to Wong's analysis of the researcher/teacher', *Educational Researcher*, **24**, 8 (November 1995), pp. 19-21.
- 15 Narrative is developed as a teacherly way of knowing in Miriam Ben-Peretz, *The Teacher-Curriculum Encounter: Freeing Teachers from the Tyranny of Texts*, Albany, State University of New York Press, 1990; Michael Connelly and Jean Clandinin, 'Stories of experience and narrative inquiry', *Educational Researcher*, **19**, 5 (1990), pp. 2-14; Freema Elbaz 'Research on teachers' knowledge: The evolution of a discourse', *Journal of Curriculum Studies*, **23** (1995), pp. 1-19.
- 16 *Ibid.*, p. 3.
- 17 A great deal has been written about the relationship between what one 'knows' and what one is able to 'see' and/or talk about. One current line of work worth noting here is the work on 'practices' and their 'discourses', for example, Edward Hutchins' 'The technology of team navigation', in J. Galegher, R.E. Kraut, and C. Egidio, Eds, *Intellectual Teamwork: Social and Technological Foundations of Cooperative Work*, Hillsdale, NJ, Lawrence Erlbaum Associates, 1990, pp. 191-220, Jean Lave and Etienne Wenger, *Situated Learning: Legitimate Peripheral Participation*, New York, Cambridge University Press, 1991. Teachers are members of one community of practice, researchers of another. Each has a situated understanding of the nature of knowledge and of how it is acquired. This notion could also be extended to say that children and teachers are members of different discourse communities (by virtue of age and activity, or by virtue of culture) and in order to communicate they need a kind of cross cultural interpretation. Shirley Bryce Heath makes this argument in *Ways with Words*, NY Cambridge University Press, 1983.
- 18 *Ibid.*, p. 9.
- 19 The quotations in this essay are all taken from transcriptions of tapes that were made during the teachers' weekly discussions. First names are used to identify the teachers in an attempt to convey the personal quality of their exchanges with one another and the staff. The quotations have been edited only insofar as was necessary to make them readable.
- 20 JACKSON, P. (1978) *Life in Classrooms*, New York, Holt, Rinehart and Winston.
- 21 McPHERSON, C. (1972) *Small Town Teacher*, Cambridge, Harvard University Press.
- 22 LORTIE, D. (1975) *Schoolteacher: A Sociological Study*, Chicago, University of Chicago Press.
- 23 More current related analyses of conflicts in teachers' work is being carried on in the field of critical theory, etc. and analysis related to issues of multiculturalism.
- 24 ELLIOT, J. Some key concepts underlying teachers' evaluation of innovation (Paper presented at the British Educational Research Association Conference, London, 1977), p. 8.
- 25 Recently, scholars have been examining an intermediate realm between the 'social' in informal, standardizing institutional terms and the individual: A local form of 'social' knowledge is thought to be developed in classrooms which enables

- the members of class groups to communicate with one another about their work. See Paul Cobb and Erna Yackel 'Constructivist, emergent, and sociocultural perspectives in the context of development research', *Educational Psychologist* (in press), Elice Forman 'Forms of participation in classroom practice: Implications for learning mathematics', in Perla Nesher, Les Steffe, Paul Cobb, G. Goldin and B. Greer, Eds *Theories of Mathematical Learning*, Hillsdale, NJ, Lawrence Erlbaum Associates; Rogers Hall and Andee Rubin, '... there's five little notches in here: Communication and mathematics learning', in James Greeno and Shelly G. Goldman (Eds) *Thinking Practices*, Hillsdale, NJ, Lawrence Erlbaum and Associates, in press.
- 26 DUCKWORTH, E. (1979) 'Learning with breadth and depth' (The Catherine Molony Memorial Lecture, City College School of Education Workshop Center for Open Education, June).
- 27 These 'stories' are treated in greater detail in LAMPERT, M. 'Teaching about thinking and thinking about teaching', Mimeo (1982).
- 28 Olson also applies the term 'dilemma' to the situation in which teachers find themselves as implementors of curriculum innovation. See OLSON, J. 'Teacher influence in the classroom: A context for understanding curriculum translation', *Instructional Science*, **10**, 1981, pp. 259-75.
- 29 MEAD, G.H. *On Social Psychology*, University of Chicago Press, Chicago, 1956. See also BLUMER, H. 'Sociological implications of the thought of George Herbert Mead', in B.R. Cosin et al. (Eds) *School and Society: A Sociological Reader*, Routledge and Kegan Paul, London, 1971, and BERLAK, H. and BERLAK, A. 'Towards a political and social psychological theory of schooling: An analysis of English informal primary schools', *Interchange*, **6** (1975), pp. 11-22, for applications of Mead's theory to teaching.
- 30 See also OLSON, J. 'Teacher constructs and curriculum change', *Journal of Curriculum Studies*, **12** (1980), pp. 1-11.
- 31 JACKSON, P. (1971) 'The way teachers think', in Lesser, G.S. (Ed) *Psychology and Educational Practice*, Glenview, Illinois, Scott, Foresman, and Co.
- 32 A similar critique of this perspective on teachers thinking can be found in HAMMERSLY, M., 'Towards a model of teacher activity', in John Eggleston (Ed) *Teacher Decision Making in the Classroom*, Routledge and Kegan Paul, London, 1979, and FLODEN, R. and FEIMAN, S. 'Should teachers be taught to be rational?' (Paper presented at the annual meeting of the American Educational Research Association, Boston, April 1980).
- 33 SHAVELSON, R. and STERN, P. (1981) 'Research on teachers' pedagogical thoughts, judgements, decisions and behavior', *Review of Educational Research*, **51**.
- 34 For a similar criticism of generalized approaches to curriculum problems see REID, W.A. *Thinking about the Curriculum*, Routledge and Kegan Paul, London, 1978.
- 35 The implications of this view for improving practice have been examined by FENSTERMACHER, G.D. 'A philosophical consideration of recent research on teacher effectiveness', *Review of Research in Education*, **6**, 1978.