

HANDBOOK OF COMPLEMENTARY METHODS IN EDUCATION RESEARCH

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Researching the Complexity of Classroom Interaction

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In this chapter, we provide examples of research traditions, whose perspectives produce different analyses and interpretations of classroom interactions and what is accomplished in and through such interactions. Our aim is to build a context for understanding how different approaches to research into classroom practices have been done, and how each approach produced a different analysis because of its purpose, conceptual framework, logic of inquiry, and related methodology. The studies represent disparate views of what is meant by classroom interaction and how to study it. Our analysis of these approaches showed that they look in different places to find interaction, focus on different features of interaction, and differently assess what interactions accomplish. We have organized the presentation of this work to enable the reader to engage in a comparative reading of concepts, purposes, and logics of inquiry within and across perspectives.¹

OUR APPROACH TO IDENTIFYING PROGRAMS OF RESEARCH

In preparing this chapter, we identified, compiled, and analyzed written studies of classrooms published over the last forty years, focusing on classroom interaction, given its dominance as an object of study across programs of research in classrooms from the earliest days of such research

¹The editors' and the authors' concern to consider global and practitioner perspectives, and to view classrooms from a subject matter tradition other than the authors's, was addressed by reviewers Kristiina Kumpulainen, an international researcher of classroom interaction; Linda Denstaedt, a teacher researcher; and, Hilda Borko, who studies teacher education and cognition in the U.S. The reviewers read versions of this chapter and were instrumental in shaping the methodological focus, the organizational structure, and the research selections.

(e.g., Amidon & Hough, 1970; Bellack, Kliebard, Hyman, & Smith, 1966; Dunkin & Biddle, 1974; Smith & Ennis, 1961; Westbury & Bellack, 1971). We narrowed our list to those articles, books, and chapters most frequently cited in the research literature we identified. Included in our analysis were articles selected through a review of chapters published in the *Handbooks of Research on Teaching* (Gage, 1963; Travers, 1967; Wittrock, 1986; Richardson, 2001), tables of contents from *American Educational Research Journal* (1985 to the present), and electronic data bases in libraries (i.e., Wilson Index of Journal Articles, FirstSearch, ERIC, ISI Web of Science, and ProQuest).

We viewed these studies as research data (Strauss and Corbin, 1999). As we read each text, we generated conceptual categories to describe the substance contained in the report of the research. We then read across our analyses of these studies to identify which categories appeared most frequently. Our analyses provided the foundation for naming and explicating seven traditions and for selecting illustrative studies represented in the charts and discussions that follow.²

HISTORICAL CONCEPTUALIZATIONS OF DIFFERENCES AMONG APPROACHES

In 1986, in his classic chapter in the third *Handbook of Research on Teaching* (Wittrock, 1986), Shulman characterized the field. He explained how programs of research make choices among a host of alternative units of inquiry for studying teaching. He felt it was possible to summarize schematically, in a map, these units of inquiry and so present a reader's guide to the field. He pointed out that strikingly different research programs result from the variety of combinations of units. He asserted that within programs the choices of what and how to study are necessarily rational and that choices among research programs were not made so rationally.

Investigations did not ponder the trade-offs among approaches and deliberately select that particular style of investigation that suited them optimally. Instead, they were driven by their individual disciplinary roots (and propensities within the discipline, as reflected in the differences between behaviorists and mentalists in psychology), their educational or political ideologies, their respective commitments to technical improvement or "scientific" explanation, and, most of all, to the stage in which they become part of the Great Conversation. More than anything else, research programs were influenced by the dialogues and debates among scholars (p. 26).

Shulman goes on to say that because process-product research has dominated those conversations since 1965, research, whether process-product or not, is positioned in relation to that research model. It is either following in process-product's footsteps, or going where that model is unable, or its followers are unwilling, to go. Later in this chapter, we will explain more fully what is meant by this kind of research, but for now we are interested in pointing out that during what has been regarded as an explosive period for extensive research on teaching (i.e., 1980s), the value and rigor of other approaches were most often talked about in relation to what Shulman and others (e.g., see also Biddle & Anderson, 1986; Gage, 1963, 1989) considered mainstream research on teaching—process product. For example, the validity and robustness of interpretive or qualitative research, which described influences of interrelated elements and conditions, were compared to the power of quantified process-product studies, which sought to measure causal relationships between discrete elements.

²For a readable introduction to the challenges of developing a program of classroom research, we recommend Margaret Eisenhart and Hilda Borko's book (1993).

The dominant conversation during this period was conceptualized in terms of differences in paradigms. Gage (1963) first introduced the term and later characterized the differences among paradigms as “paradigm wars” (1989). Kuhn (1970) used paradigm to describe how programs of research cohere or disaggregate. Such conversations have occupied influential research scholars such as Shulman (1986), Erickson (1986), Guba and Lincoln (1994; 2000), and Donmeyer (2001). Disagreements about the meaning of the term paradigm and its usefulness continue to evolve, and understanding these disagreements is important to those working in the field of research into classrooms.

In this chapter we take a position forwarded by Floden (2001) that each program of research makes a contribution, and should be considered on its own terms. Each offers a particular point of view and a methodology that frame particular questions, study particular sites, and produce particular kinds of results for certain purposes. Each also adheres to a particular set of standards for ethics, validity, generalizability, and application. (See foundations chapters by Bredo, Kelly and Strike this volume for extended discussions of these issues). The importance of such understandings becomes relevant to understanding the range of approaches and perspectives represented in the most recent edition of the *Handbook for Research on Teaching* (Richardson, 2001). This handbook represents what may seem like an explosion of paradigms with a universe of choices far greater than those more compactly inscribed by Shulman (1986). Process-product is no longer the point of reference for the Great Conversation and becomes one of a range of participating perspectives. Chapter after chapter provides historical constructions, theoretical framings, ideological positionings, and methodological combinations that serve each time to reposition the field—its history, its issues, its purpose, and its influence. A plethora of inquiry methodologies appear, shaped by diverse conceptual and inquiry frameworks within disciplines as well as across combined disciplines.

AN OVERVIEW OF THE PROGRAMS OF RESEARCH

In response to this plethora, we organized research about classroom interaction into seven perspectives. These are not meant as guides for how to think about the field of classroom practice research, but rather as heuristics, or ways for thinking systematically and comparatively within the diverse methodological landscape (Becker, 1995). The seven categories are process-product, cognitive, situated cognition, ethnographic, sociolinguistic and discourse analysis, critical, and teacher research. Nevertheless, we are aware that whether we intend to or not, our representation constructs a view of the field that we cannot fully recognize or control, and so we offer these caveats. Our seven categories and related studies do not reflect general scholarly agreement about how to organize research in the field. Nor have we checked with each scholar to make certain everyone is comfortable with how we have placed their work. Additionally, we recommend taking seriously Michelle Fine, Lois Weis, Susan Weseen, and Loonmun Wong’s (2000) warning that “it is essential to think through the power, obligations, and responsibilities of social research” (p. 108), to which we would add, “and how such research is represented.”

With these cautions in mind, we present seven traditions organized to reflect the dominant *perspective* of the programs of research we placed within them. We are conceiving of a perspective as a particular conceptual stance taken by the researcher that encompasses all aspects of the study. The perspective or stance includes the researcher’s purpose for the study; the conceptual framework that brings the object or locus of study into focus; the research question that directs the inquiry; and the methodology, or logic of inquiry, which includes how the researcher conceives of, collects,

and analyzes data. All these elements meaningfully and purposefully interrelate to form a perspective. Viewed in this way, research questions emerge from a relationship between the conceptual framework and an issue or problem about classroom practice that needs addressing. In turn, the methodology emerges from the relationship between the research question and the way the phenomenon being studied is conceptualized.

With time, programs of research evolve. As they do, one perspective may alter or combine with another. Therefore, in describing the research within each category, we have made an effort to illuminate what constitutes each perspective as an evolving perspective while also reflecting the variety, range, and overlap that exists within and across perspectives. To that end, within each loosely chronologically organized section, we begin with a brief overview of the approach, provide some of the dominant and illustrative programs of research within that tradition, including big ideas that animate them, and complete each overview with a table that graphically presents the methodological components of three studies within that tradition. We chose the three studies to delineate differences and make comparisons among the approaches apparent but not too clear cut so as to be overly reductive. In each table, we list each study's research question(s), the project's design, and its methods of data collection and analysis.

HOW SEVEN RESEARCH APPROACHES DEALT WITH INTERACTION

Process-Product Perspective

How do classroom practices produce products, and how do products emerge from classroom practices? "Process-product" refers to the central relationship, or interaction, between teaching processes and students' products. Studies applying this model assume that a measurable relationship or significant correlation exists between teachers' pedagogical and curricula strategies and the work students produce. This relationship is often ascertained and described in terms of inferential statistics. Records from observed classroom events and activities are collected as pre-defined variables, which are counted and studied for covariance. Followers of this approach assume that correlations indicating relational interactions between what teachers do and what students produce suggest strategies that teachers can use to improve students' learning or motivation. Classic collections of instructional strategies to emerge from process-product research under the heading of effective teaching include "direct teaching" and "active teaching," and provide methods for delivering instruction and for classroom management.

In 1967, in a widely regarded foundational text, Edmund Amidon and J. Hough presented "evidence to support the contention that classroom climate can be objectively and reliably measured and that such climate is related to teacher effectiveness" (p. 120). One piece of their evidence was the widely used Flanders System (Amidon & Flanders, 1967) for recording teacher verbal behavior. The system was based on the assumption that the verbal behavior of an individual was an adequate sample of his total behavior, and that their category system described all verbal interaction occurring in the classroom. To collect data, every three minutes the observer wrote down the category number of the observed teacher-pupil interaction. The sequence of numbers was entered into a ten-row by ten-column table, or matrix. Tabulations were made in the matrix to develop a general description of classroom interaction in terms of percentages as well as to focus on particular areas of the matrix to note interactional emphasis, such as the kinds of teacher statements that tended to stimulate student talk. Amidon and Flanders claimed these analyses helped to answer such questions as: "How do students in this classroom become involved in classroom interaction?" (p. 135).

The Flanders system was preceded by a number of other systems for observing teacher-pupil interaction (see Withall, 1949; Anderson, 1939, Smith, 1960, Aschner, 1959; Hughes, et al., 1959; Adley & Mitzel, 1958 as cited in Amidon & Hunter, 1967). Other process-product observational systems quickly proliferated. The second handbook of research on teaching (Travers, 1967) provides summaries of additional early process product observation techniques for observing interaction in teaching in early childhood settings, including preschool classrooms (Gordon & Jester, 1967), for observing teaching (Rosenshine & Furst, 1967), as well as for assessing teacher effectiveness (McNeil & Popham, 1967). These foundational reviews of the approach focused on the importance of teaching as an interactive component by emphasizing that the research should not be about teachers' attributes but rather about the impact of their behavior upon the learner. In addition, teaching was conceived of as providing instruction for a curriculum. Consequently, process-product researchers often wanted to know what instructional procedures were most likely to prove useful in achieving certain instructional ends with given students.

The researcher's purposes include satisfying a desire to describe accurately what teachers do, searching for associations between theoretically or empirically derived variables and learning, and demonstrating the power of a given factor or instructional operation to make a difference upon the outcome sought (McNeil & Popham, 1967, p. 220).

Some of the findings from correlational research that made a strong impact on practice and policy were the relationships between "time-on-task" or "opportunities to learn" and academic achievement (Galton & Willcocks, 1983; Evertson & Emmer, 1982; Galton & Simon, 1980) and strategies based on interactional principles for motivating students to learn, such as modeling and communicating expectations (Brophy, 1987).

However, from the beginnings of process-product research's rise in popularity, reservations about the measurability of student change as a direct outcome of teaching effects were being lodged (McNeil & Popham, 1967). Concerns about the validity of the results of correlation were addressed in part by adding experimental design to the model. The significant variables obtained in the correlational studies were tested in more controlled situations, a version of which was earmarked by Barak Rosenshine and Norma Furst (1967) as the "descriptive-correlational-experimental loop" (p. 122). During the experimental stage, specific manipulations of teacher behavior were made to strategically change the interactions and, optimistically, create more productive student responses. An early loop experimental design program was the Canterbury Teaching Research Project (Nuthall & Church, 1973). Other experimental programs have been The Missouri Mathematics Effectiveness Project (Good & Grouws, 1979) and The Texas Teacher Effectiveness Study (Brophy & Evertson, 1976); as well as research into the effect of increasing "wait time" on learning (Tobin, 1980), into guided effects of cooperative questioning (King & Rosenshine, 1993) and, more recently, into application of systems perspectives on classroom practices (Fish & Dane, 2000) and text comprehension strategies (De Corte, Verschaffel, & Van De Ven, 2001). For more thorough classic reviews of correlational and experimental research, refer to Snow (1974); Brophy and Good (1986); Rosenshine and Stevens (1986); Anderson and Burns (1989); and Rosenshine (1986).

All along, critiques from within as well as from outside process-product research stimulated changes in the model, though not changes in the primary assumption that products result from interactional processes that can be described quantitatively. British educational researchers, Sara Delamont and David Hamilton (1976), critiqued this dominant type of American classroom interaction analysis and proposed the addition of supplementary anthropological methods.

Walter Doyle (1977) raised issue with the trail of problems of productivity, methodology, and theory faced by teacher effectiveness research. By comparing the process-product model with a classroom ecology paradigm, he suggested that rather than asking: Which instructional conditions are most effective? a better question was: How do instructional effects occur? Nevertheless, the profound generative effect of Michael Dunkin and Bruce Biddle's (1974) *The Study of Teaching* overrode efforts to supplement or transform the popularity of the basic research model. Their characterization of interactive relationships between the properties of teachers, students, and contexts and of the processes of teaching as "causative" (p. 37) lent authority to the claim that findings could positively influence policy and practice as well as further research. When Nate Gage and Margaret Needels (1989) reviewed the criticism of process-product research, they concluded that critiques had failed to weaken its record and promise and recommended a future agenda for broadening its applications. Among other suggestions, they recommended studying relationships between process and product variables with a wide variety of methods and expanding research across subject matters, up the grade levels, and within cultural groups to continue to grow our understandings of the interaction between what teachers do and what students learn, as has been done by Turner, Midgley, Meyer, Gheen, Anderman, Kang, & Patrick (2002). Revisiting and reconstructing the place, usefulness, and vigor of the process-product paradigm has become an obligatory part of the Great Conversation (e.g., Marshall, 1992; Floden, 2001) amid demands by practitioners, policymakers, and funding agencies for more causal evidence of teaching effects on student learning (Floden, 2001).

Table 43-1 shows three process-product studies about interaction and provides a graphic, more detailed representation of some of the methodological components and their relationships for studies in this tradition. For example, the research questions posed by Amidon and Flanders (1967), Turner, et al. (2002), and King and Rosenshine (1993) ask about a relationship between teaching processes and student products—that is, respectively, how students become involved in classroom interaction; the effectiveness of questioning-answering strategies on students' understanding; and, the relationship between students' perceptions of classroom goals and teachers' instructional discourse. By theorizing student and teacher behavior as fairly stable, as generalizable across classrooms, and as causal and objectively observable, researchers in the process-product tradition assume that relationships among classroom climate, behavior, and outcomes can be reliably measured as statistical correlations among components. Hence, the research is designed to apply instruments that quantify components such as a classification system, a test, and a Likert-type scale that we see in these three cases. These instruments were used to measure, respectively, frequency and dominance of types of interactions, impact of intervention conditions, and, through hierarchical linear modeling, the correlations among students' strategies of avoidance, their acts of avoidance, and teachers' instructional discourse.

Cognitive Perspective

How do classroom practices inform cognition, and how does cognition influence classroom practices? Educational researchers who take a cognitive perspective are influenced by the cognitive revolution in psychology, principally theories of knowing and learning, as well as social cognition and theories of personality, motivation, and self-concept. These theories complexify discrete variable quantitative research and add elements of interpretive approaches. Cognitive researchers view classroom interactional practices from the perspective of "active engagement" to forward learning. They assume that teachers are attempting to create engaging learning environments and instruction for individual students to explore and assimilate, while students are using their existing cognitive structures to make sense of what is provided. Jean

TABLE 43-1
Process-Product Perspective

Study	Research Questions	Design	Data Collection	Data Analysis
<p>Amidon, E., & Flanders, N. (1967). Interaction analysis as a feedback system. In E. Amidon & J. Hough (Eds.), <i>Interaction analysis: Theory, research, and application</i> (pp. 121-140). Reading, MA: Addison-Wesley.</p>	<p>"How do students in this classroom become involved in classroom interaction?"</p>	<p>The Flanders classification system is based on the assumption that teachers' behavioral acts influence student behavior. Therefore, the classroom observer monitors teacher verbal behavior to see how much freedom the teacher grants to the student within an interaction. More direct acts minimize the freedom of the student to respond. More indirect acts maximize that freedom.</p>	<p>Every three minutes the observer writes down the category number of the teacher-pupil interaction just observed. These numbers are based upon the observer's judgment of the teacher statements as either direct (lecturing, giving directions, and criticizing or justifying authority), or as indirect (accepting feeling, praising or encouraging, accepting ideas, and asking questions).</p>	<p>The sequence of numbers is entered into a ten-row by ten-column table, or matrix. Tabulations are made in the matrix to develop a general description of classroom interaction in terms of percentages as well as to focus on particular areas of the matrix to note interactional emphasis, such as the kinds of teacher statements that tend to stimulate student talk.</p>
<p>King, A. & Rosenshine, B. (1993). Effects of guided cooperative questioning on children's knowledge construction. <i>Journal of Experimental Education</i>, 61(2), 127-148.</p>	<p>What is the relative effectiveness of three cooperative questioning-answering strategies on children's ability to understand material presented in teacher-led classroom lessons?</p>	<p>Thirty-four fifth graders in three conditions worked in pairs to learn science material presented in classroom lessons. In two conditions students were trained to ask different types of questions. In one condition the students self-determined their own questions. Specially constructed pre and post knowledge tests were administered to assess impact.</p>	<p>After the first lesson of a science unit on tide pools, a pre-comprehension test was administered to students. Then two of the student groups were trained by the teacher in questioning strategies. After the next two lessons, students met in their groups to discuss lesson material using the strategies. Discussions after the fifth and sixth lessons were tape recorded, and a post test was given. A retention test was given six days after the last lesson. Each student constructed a knowledge map of tide pools.</p>	<p>Test scores were compared. Discussions were transcribed and coded for types and contents of questions and explanations. Knowledge maps were rated on a 1-5 scale for accuracy, completeness, and comprehension by comparing to teacher's model concept map.</p>

(Continued)

TABLE 43-1
(Continued)

<i>Study</i>	<i>Research Questions</i>	<i>Design</i>	<i>Data Collection</i>	<i>Data Analysis</i>
Turner, J., Midgely, C., Meyer, D., Gheen, M., Anderman, E., Kang, Y., & Patrick, H. (2002). The Classroom environment and students' reports of avoidance strategies in mathematics. <i>Journal of Educational Psychology</i> , 94(1), 88-106.	How do students' perceptions of classroom goal structure relate to their reports of the use of avoidance strategies? How does teachers' use of instructional discourse relate to students' perceptions of the classroom goal structure and to their reports of the use of avoidance strategies?	Part of a larger longitudinal study, a multi-method approach examined classroom contexts related to three avoidance strategies: withdrawing effort, resisting novelty, and avoiding seeking academic help. Nine sixth grade classrooms in nine schools were observed during the same mathematics instruction unit.	Students were surveyed using Likert-type scales that measured avoidance. Audiotape transcriptions of mathematics instruction and observation notes were combined into descriptive documents.	Factor analysis was performed on the surveys. Only whole-class discussion transcripts were analyzed. A priori categories were used to code discourse into three categories and two subcategories. A third coding for motivational support or nonsupport was performed. Correlations among all variables were achieved through hierarchical linear modeling. Descriptive illustrations of the statistical findings regarding discourse patterns are presented.

Piaget's (1985) theories of assimilation, accommodation, and equilibration as a way of theorizing interaction are drawn upon by a number of cognitive perspective researchers. They explore how students mediate curriculum through cognitive processing by transforming the instructional messages into their own cognitive structures, and how teachers mediate teaching by transforming their cognitive knowledge structures into understandable and appealing instruction. Research questions such as "What sense is the teacher making of the instructional task and of student responses to it?" and "What sense are students making of what is being taught?" focus on aspects of interacting individual cognitive realities and problem spaces. (For a more comprehensive overview of research about cognition and learning, see Greeno, Collins, & Resnick, 1996).

A number of researchers who are cognitivists also take a constructivist perspective, meaning they assume that the process of conceptual change during classroom interactions is influenced by personal, motivational, social, and historical processes. Therefore, the knowledge and dispositions of the teachers and students involved in classroom practices become important research foci. Examples of research in this tradition include teacher-focused studies, which apply domains of teacher knowledge conceptualized by Shulman (1986b; 1987). These include research about pedagogical content knowledge as related to a subject area (Grossman, 1989), about knowledge required by beginning teachers (Grossman, 1990; 1991), and studies of relationships between subject matter knowledge and beliefs in beginning math teaching (Borko, Eisenhart, Brown, Underhill, Jones, & Agard, 1992).

Cognitivist research also focuses on students, and includes, for example, studies based upon models of conceptual change processes (Posner, Strike, Hewson, & Gertzog, 1992). A number of these studies have found that if content is taught in a manner that does not promote integration with students' prior knowledge, it is less meaningful and useful to them (Anderson, 1990). Additionally, a body of work has developed understandings of the role of students' motivation in their academic learning (Pintrich, Marx, & Boyle, 1993; Pintrich & DeGroot, 1990a). For example, studies have found that students' highly charged beliefs, such as self-efficacy and their goals for learning, influence their engagement in academic tasks (Pintrich & Schrauben, 1992), where engagement is theorized as requisite to interaction and learning (Pintrich & DeGroot, 1990b; Pintrich & Garcia, 1991).

Constructivist cognitivists have also found it important to attend to the structure of the knowledge to be learned when devising ways to learn it. Foundational curricular and instructional approaches in particular subject matters include Schoenfeld's (1985) instruction for integrating the solving of mathematical problems and the learning of the general mathematical principles they embodied, Annemarie Palincsar and Ann Brown's (1984) reciprocal teaching of reading, and Carl Bereiter and Marlene Scardamalia's (1987) attention to the rhetorical procedures students follow in writing. This research focus assumes that subject matter disciplines are in part characterized by differences in the ways knowledge is structured, and consequently programs of research into classroom practices tend to be subject matter specific.

For example, the cognitively guided instruction project (Carpenter & Fennema, 1992; Carpenter, Fennema, & Frank, 1996), in an experimental loop design similar to the model previously described (Rosenshine & Furst, 1967), taught teachers about children's thinking as they solved math problems and then observed the effects on classroom instruction and student achievement (Carpenter, Fennema, Peterson, Chiang, & Loef, 1989; Fennema, Franke, Carpenter, & Carey, 1993). This research-intervention model is built upon a perceived relationship between teachers' knowledge about student thinking, the instruction they build from it, and students' learning.

Some projects that are interventionist and yet not experimental in design refer to themselves as "design experiments," in that they take up residence in schools to establish classroom laboratories

for applying relevant, longitudinal interventions based on cognitive constructionist theory and research. Brown (Brown, 1992; Brown & Campione, 1994) and Paul Cobb (Cobb, 2000; Cobb, Stephan, McClain, & Gravemeijer, 2001) are two leaders in this area. Their research case studies are complicated and multifaceted in order to observe the synergistic complexity of the interactions between teachers and students as the curriculum and instruction are changed and evolve. We place Brown and Cobb's research at the end of the cognitive perspective because it reflects evolving, large scale, longitudinal research that is more often categorized as sociocognitive. For example, Cobb views the classroom as a living system of negotiated meanings and coordinates a social perspective on communal activities with a psychological perspective on student reasoning. This close attention to the relationship between the cognitive and the situational is what more suitably positions Cobb's perspective in the situated cognition category that follows (see Cobb & Bowers, 1999).

By referring to Table 43-2, common aspects of the cognitive perspective become evident as do unique differences among study approaches. They have in common a focus on learning and reasoning, especially of subject matter knowledge. They focus on students' and teachers' active intellectual engagement, and they describe the elements and dimensions involved in learning and teaching as meaningful interactive cognitive events that require complex research designs to see what is occurring in a given event and what develops over time. The first two of the studies listed derive from the Learning to Teach Mathematics project (Eisenhart, Borko, Brown, Underhill, Jones, & Agard, 1993; Borko, Eisenhart, Brown, Underhill, Jones, & Agard, 1992). They begin with research questions that focus on teachers' and students' knowledge, thinking, or beliefs. Then, these studies observe how that knowledge or those beliefs are related to instruction and to student achievement. Eisenhart et al. (1993) observed the interaction among novice teachers' knowledge and beliefs about teaching mathematics and the process of learning to teach. Borko et al. (1992) studied the relationships among a novice teacher's unsuccessful math lesson, her knowledge and beliefs about fractions, and knowledge taught in her math methods course. For Carpenter and Fennema (1992), the baseline and experimental case studies were driven by questions about the relationship between teachers' knowledge and beliefs about student thinking and problem solving and students' computational test scores. As the researchers informed teachers about research-based knowledge about student thinking, they studied its effect on teachers' instruction and students' achievement.

Though both programs of research produced case studies of the effects of teachers' thinking on student performance, their approaches to data collection and analysis differed considerably. One was interested in describing naturally occurring events, while the other manipulated events to measure what occurred. Eisenhart et al. (1993) and Borko et al. (1992) took an ethnographic approach to study naturally occurring conditions from the participants' perspectives by employing interviews, field notes, questionnaires, and documents that they coded for important content and themes. Carpenter and Fennema (1992) conducted an experimental intervention study with a control group and a treatment group of teachers, though they also took observational notes and interviewed teachers and students. While Eisenhart and Borko coded their data to surface patterns of tensions and competing pressures among types of knowledge that teachers experienced, Carpenter and Fennema developed and applied instruments they quantitatively computed to measure and model the development of teacher thinking in relation to student performance measures.

The third study in Table 43-2, by Cobb, Stephan, McClain, and Gravemeijer (2001), combines elements of the prior two research programs. Cobb et al. (2001) focus first on the classroom community's knowledge. They approach the classroom as a culture of instructional activity that develops in relation to individual student achievement. In addition, Cobb et al. (2001) are interested in development and in measuring student performance in relation to the effects of changing

TABLE 43-2
Cognitive Perspective

Study	Research Questions	Design	Data Collection	Data Analysis
Eisenhart, M., Borko, H., Underhill, R.G., Brown, C.A., Jones, D., & Agard, P. (1993). Conceptual knowledge falls through the cracks: Complexities of learning to teach mathematics for understanding. <i>Journal for Research in Mathematics Education</i> , 24, 8-40.	1. What are novice teachers' emergent knowledge, beliefs, thinking, and actions related to the teaching of mathematics; what are the interdependence and mutual influence of these components on teaching and learning to teach; and, what is the impact of teacher education experiences on the process of learning to teach?	1. The project studied eight seniors preparing to become middle school mathematics teachers in four student teaching placements and their mathematics methods course. 1a. A single case study of one novice teacher's unsuccessful math lesson examines what she thinks about mathematical procedural and conceptual knowledge and her own knowledge of it; examines what she does with that knowledge in her classroom teaching; and, compares those facets to the preparation she received in her math methods course.	1. Semistructured interviews and field notes from audiotapes and observation notes are collected in school and methods classrooms, with additional questionnaires and documents. 1a. Data related to procedural and conceptual knowledge was selected for analysis from interviews of novice and methods teacher and from observations of their classrooms.	1. Initial review and coding of data for patterns related to teaching for procedural and conceptual knowledge. Second stage thematic analysis surfaced a pattern of tensions and competing pressures. 1a. Analysis focused on knowledge about procedural and conceptual mathematics and the tensions and competing pressures among them.
Borko, H., Eisenhart, M., Brown, C.A., Underhill, R.G., Jones, D. & Agard, P.C. (1992). Learning to teach hard mathematics: Do novice teachers and their instructors give up too easily? <i>Journal for Research in Mathematics Education</i> , 23, 194-222.	1a. Focused study: What occurred during an unsuccessful fractions lesson and how is that teaching related to the teachers' own system of knowledge and beliefs about division of fractions and to the knowledge taught in her mathematics methods course?			

(Continued)

TABLE 43-2
(Continued)

Study	Research Questions	Design	Data Collection	Data Analysis
Carpenter, T. P. & Fennema, E. (1992). Cognitively guided instruction: Building on the knowledge of students and teachers. <i>International Journal of Educational Research</i> , 17(5), 457-470.	Baseline study: What are teachers' knowledge and beliefs about their students' thinking and problem-solving; and, how are they related to students' achievement? Experimental and case studies: How does research-based knowledge about their students' thinking affect teachers' instruction and students' achievement?	Over four years, a series of three integrated studies with 40 teachers focused on the development of addition and subtraction concepts: (1) Two correlational baseline studies; (2) an experimental intervention study (20 received no treatment and 20 received a 2-hour workshop) in which instruction was observed for four one-week periods; and (3/4) follow up case studies of six teachers over two years including 2 hours/week for 30 weeks of classroom observation. A focused study was conducted of one teacher and nine of her students.	(1) Teachers were given questionnaires and interviewed. (2) Instruction was observed using two time sampling coding systems, one focused on the teacher, the other on the students. Scaled questionnaires collected teachers' predictions and beliefs about student learning. Pre and post test scores of student achievement were obtained. Post test student interviews were conducted. (3) Notes were taken from six monthly teacher group discussions, in addition to notes and instruments from classroom observations. (4) Teachers and students were formally and informally interviewed and assessed for knowledge.	(1) Teachers' knowledge of and beliefs about their students' addition and subtraction knowledge was correlated with students' computational test achievement. (2) Means, standard deviations, & t tests were computed for categories of teacher and student observation, knowledge, beliefs, and achievement for treatment and control. (3/4) Data was extracted for each teacher from four years of collection and integrated into broad categories for developmental analysis.

(Continued)

TABLE 43-2
(Continued)

Study	Research Questions	Design	Data Collection	Data Analysis
Cobb, P., Stephan, M., McClain, K., & Gravemeijer, K. (2001). Participating in classroom mathematical practices. <i>The Journal of the Learning Sciences</i> , 10 (1), 113-163.	<p>What is the collective mathematical development of the classroom community over periods of time covered by instructional activity?</p> <p>What is the developing of mathematical reasoning of individual students as they participate in the practices of the classroom community?</p> <p>What effects do analyses have on instructional design and on student reasoning?</p> <p>3a. Sample study: How do classroom sociomathematical practices and students' related mathematical reasoning about measurement emerge?</p> <p>How does subsequent treatment effect practices and reasoning?</p>	<p>The project comprises a 12 year instructional design experiment-research cycle. Each teaching experiment-study lasts up to a year, during which are developed sequences of instructional activities to support learning.</p> <p>3a. The teacher is a member of the research team that studied two experimental seven-week instructional sequences on measurement in a 16 student first grade classroom. Researchers focused on two students, and observed classroom practices and student performances as they intervened in concept of measurement learning processes.</p>	<p>Video and audio recording of classroom activity, research discussions, and participant interviews were conducted. Observational field notes and student work products were collected.</p> <p>3a. In the classroom, videotapes were recorded with two cameras. Also collected were student work, three sets of field notes, student interview videotapes, and audio recordings of weekly research team meetings.</p>	<p>A microanalysis was undertaken of classroom culture and individual student's reasoning. An interpretive framework was used to analyze classroom events.</p> <p>3a. Analysis was performed on selected chronological themed episodes of mathematical activity and discourse that emerge as critical to learning about measurement. Analysts looked for regularities and patterns in the ways teachers and students act and interact. They were concerned with meaning and context.</p>

what naturally occurs. They apply instructional interventions in the form of teaching experiments and describe and assess them using qualitative collection methods—video and audio recordings, observational field notes, and interviews. The researchers are concerned with meaning and context as they perform microanalyses of classroom events and student reasoning.

Sociocognitive, Situated Cognition, and Activity Theory Perspectives

How do classroom practices provide social interaction to influence individual learning, and how does individual learning prompt social engagement in classroom practices? Most sociocognitive studies share a sociocultural view of teaching and learning built upon the work of Lev Vygotsky, who asserted that learning and problem solving initially emerge on a social or interpersonal plane and subsequently on an internal or intrapersonal level. Major tenets of a Vygotskian framework inform the work of researchers in this tradition as they investigate the concept of the zone of proximal development, the “hypothetical space between assisted and unassisted performance” (Singer, Marx, Krajcik, & Chambers, 2000, p. 170), a concept that can be viewed in three instantiations. First, the zone of proximal development is often characterized as the “distance between problem-solving abilities exhibited by a learner working alone and that learner’s problem-solving abilities when assisted by or collaborating with more experienced people” (Lave & Wenger, 1991, p. 48). The notion of scaffolding experiences to provide support for early task performance that leads to future unassisted task performance derives from this characterization of the zone of proximal development. The second instantiation focuses on a cultural view that looks at the “distance between the cultural knowledge provided by sociohistorical context—usually made accessible through instruction—and the everyday experiences of individuals” (p. 48). The final view of Vygotsky’s work takes a societal perspective and includes an approach termed activity theory. In addressing the zone of proximal development, activity theory concentrates on societal activity that is collectively generated and on that activity’s associated processes of social transformation. Because researchers in this tradition investigate an evolving dynamic—problem solving that initiates on a social or interpersonal level and moves to an internal or interpersonal phase—their studies frequently assume multilayered approaches that bring together information from various contexts and from investigations whose findings generate subsequent research questions and related studies. As a result, these researchers often employ a constellation of methods to generate and test claims regarding ways in which members’ interactions influence individual and group conceptions of and engagement with the learning of knowledgeable skills within situated learning communities.

Researchers who assume the situative perspective, also termed situated cognition, hold that knowing and learning are distributed across participants and are located in physical contexts that are social in nature; further, the physical and social contexts in which learning occurs become intrinsic elements of that learning. Thus, in contrast to cognitive research, which is primarily concerned with the individual learner, situative research focuses on the learning that occurs during interactions among participants within social contexts and in conjunction with materials and resources. For example, Carol Lee’s (1993, 1995) research theorizes culturally based cognitive apprenticeship as she describes teaching African American high school students how to interpret literary texts by using signifying discourse as a scaffold.

The integration of social, situated, and distributive elements into cognition and learning prompt a reconsideration of the ways in which knowledge is transferred from one setting to another. While a situative perspective often focuses on student learning, Ralph Putnam and Hilda Borko (2000) assert that much can be gained by taking up this lens to examine the advantages and limitations of various contexts of teaching, teacher learning, and the practices of preservice

and inservice teacher education. Questions relating to these topics are explored in the work of several researchers operating within this perspective (Grossman, Smagorinsky, & Valencia, 1999; Grossman, Valencia, Evans, Thompson, Martin, & Place, 2000; Borko, Peressini, Romagnano, Knuth, Willis-Yorker, Wooley, Hovermill, & Masarik, 2000) as they consider the interaction of teacher education programs and classroom experiences and examine the transfer of professional knowledge developed within university education classes to the classroom setting.

Activity theory, associated with the third characterization of the zone of proximal development, guides the work of Palincsar, Kathleen Collins, Nancy Marano, and Shirley Magnusson (2000) and Palincsar, Magnusson, Collins, and Jane Cutter (2001) as they focus on the opportunities and challenges that students with special needs face when as they engage in a particular approach to guided inquiry called Guided Inquiry supporting Multiple Literacies (GIsML). The generational nature of this work—the first study produced hypothesis that guided the focus of the subsequent study—allowed the authors to examine specific ways in which a range of students learn.

One program that emanates from a socio-cognitive perspective is HiCE (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991; Blumenfeld, Marx, Patrick, Krajcik, & Soloway, 1997; Krajcik, Blumenfeld, Marx, Bass, & Fredericks, 1998), a project based approach to instruction that strives to transform classrooms into active learning environments. Researchers in this project base their work on social constructivism, which they define as “an approach to learning in which students learn concepts or construct meaning about ideas through their interactions with and interpretations of their world, including essential interactions with others” (Singer, Marx, Krajcik, & Chambers, 2000, p. 166), actual construction, situated cognition, and discourse. HiCE’s curriculum and research, then, reflect a belief that learning is socially constructed and situated. In addition to student learning, teacher knowledge construction serves as a site of the program’s investigation and work (Marx, Freeman, Krajcik, & Blumenfeld, 1998).

Kristina Kumpulainen and her colleagues (Kaartinen & Kumpulainen, 2002; Kovalainen, Kumpulainen, & Vasama, 2002; Kumpulainen & Wray, 2002) argue for and demonstrate the benefits of multilayered interactional analysis models that support examination across psychological, linguistic, and cultural layers. They create an analytic framework for studying the functions of peer group interactions that combines sociocognitive and sociocultural perspectives on interaction and learning. Their analytic method involves a microanalysis of three inter-related dimensions of peer interactions—the functions of verbal interactions, cognitive processing, and social processing—that the researchers represent in situation-specific analytical maps.

Whether researchers operating from this perspective focus equally on all instantiations of the sociocognitive, situated cognition, or activity theory triad or emphasize one or two, social interaction within particular contexts represents the conduit into investigating a range of educational topics. As can be seen in the studies highlighted in Table 43–3, similarities and differences surface in research conducted from this perspective. For example, Wells and Chang-Wells (1992), Kumpulainen and Wray (2002), and Palincsar, Collins, Marano, and Magnusson (2000), share similar approaches to data collection. In each case, the researchers collected discursive events, either via audio or video-tapes, of naturally occurring moments of interaction. Supplementing these data were records of test results and formal or informal interviews with children, their parents, and/or their teachers. Thus, significant similarities exist in the resulting bodies of data for each study. The analytical approaches taken up by these researchers, however, vary in interesting ways. Wells and Chang-Wells (1992) rely upon discursive analysis to construct comparisons between participants and their membership groups. Kumpulainen and Wray (2002) apply an analytic instrument, Fourlas’s Functional Analysis of Children’s Classroom Talk, evolved through their earlier work to code children’s on-and off-task interactions. Finally, Palincsar, Collins, Marano, and Magnusson (2000) code patterns in the data to generate claims about the ways that

TABLE 43-3
Sociocognitive, Situated Cognition, and Activity Theory Perspectives

Study	Research Questions	Design	Data Collection	Data Analysis
Wells, G., & Chang-Wells, G. L. (1992). <i>Constructing knowledge together</i> . Portsmouth, NH: Heinemann.	How can researchers encourage teachers to start from their own particular circumstances in an exploration of what they and their students "might" be able to achieve in a particular situation? By formulating their own alternatives, trying them out in practice through interaction with their students, and selecting those that they judge to be successful, can teachers act as agents in effecting change, even when the overall goals are prescribed by local or national policymakers?	Studied four school sites in Toronto. In each, the majority of the children came from homes in which a language other than English was dominant. The researchers worked with four ethnolinguistic groups: Chinese, Greek, Portuguese, and English and selected six children in each of three grades levels (K, 2, and 4). From 1985-1988, they observed each child three times during the course of each school year, with the observation lasting a complete session, for a total of 18 visits each year.	Researchers videotaped each child's activities and kept a continuous running log of the activity entered directly into a lap-top computer. Their interviews and conversations with the children were recorded via a radio microphone. They interviewed the children's parents and teachers, and obtained results of tests administered in November and June.	Researchers selected episodes for transcription and subsequent discursive analysis. They constructed comparisons between the four groups, selected individual students from each of the ethnolinguistic minority groups, and constructed case studies.
2. Kumpulainen, K., & Wray, D. (2002). The nature of peer interaction during collaborative writing with word processors. <i>Classroom interaction and social learning</i> (pp. 57-75). New York: Falmer.	What is the nature of students' oral language interactions during the process of collaborative writing with a computer? For what purposes do students use oral language when they collaborate? How do these interactions reflect their writing and learning processes?	Two linked studies were conducted of 30 pairs of students from two schools. The pairs freely collaborated in writing a number of texts using a word processor.	Oral interactions at the computer were audio taped for 30 minutes and transcribed verbatim. Informal situated interviews and field notes were taken.	The analysts used Fourlas's Functional Analysis of Children's Classroom Talk (FACCT) system to identify functions of children's interactions. The functions were coded into on-task and off-task categories. Frequencies and distributions of functions were calculated.

(Continued)

TABLE 43-3
(Continued)

Study	Research Questions	Design	Data Collection	Data Analysis
Palincsar, A. S., Collins, K. M., Marano, N. L., & Magnusson, S. J. (2000). Investigating the engagement and learning of students with learning disabilities in guided inquiry science teaching. <i>Language, Speech, and Hearing Services in Schools, 31</i> , 240-251.	<p>What are the opportunities and challenges that GIsML instruction presents students with special needs? How do students with special needs respond to these opportunities and challenges? What hypothesis emerges from the data that will usefully guide subsequent research investigating the means of mediating these students' participation in GIsML for the purpose of enhancing their engagement and learning?</p> <p>Who might collaborate in the service of included students and toward what ends in the context of conducting ambitious instruction in the general education setting?</p>	<p>This was a three-year study of 4th and 5th grade classrooms representing 14 schools in six districts (rural, suburban, and urban) during science instruction. An interview with 5 teachers informed the study.</p> <p>A researcher followed the teacher during small group activities. If the researcher noted a child was totally disengaged in an activity for 5 minutes, the researcher would intervene for the purpose of exploring procedures for reengaging the student, starting with low-level intervention and moving to more supportive, only to the level necessary to reengage the child.</p> <p>The authors focus on one fourth-grader as he engaged in a program of study investigating why objects float and sink.</p>	<p>The collected data consisted of videotapes, focused observation documented by participant observers' field notes, debriefings with the teacher following instruction, structured interviews with the identified children, student artifacts (student notebooks and posters), three formal assessments of each child (a standardized reading assessment measuring vocabulary knowledge and comprehension, a pre-and post-assessment of the students' conceptual understandings of the program of study, and a measure that assessed children's attitudes toward and beliefs concerning the nature of science and scientific problem solving.)</p>	<p>Data were collected on 5 students. Working from multiple data sources (observable, interview, and artifact data), researchers identified confirming and disconfirming evidence for each case. Based upon that evidence, they generated claims that captured both the activity of the child and the context in which this activity was unfolding. Each claim was supported by evidence derived from the data. For example, the claim that the participation of the identified students was influenced by the nature and amount of appropriate assistance or intervention received was supported by field notes/close observation, videotapes, and some trial intervention with one of the five focal students. The claims then informed the design of the individual case studies.</p>

special needs students in the GISML program participate in and contribute to the construction of individual and group knowledge. As a result, regardless of the topic under consideration, researchers within this perspective look to socially-situated interaction as the data-producing dynamic.

Ethnographic Perspective

How do classroom practices enact and build cultures, and how do classroom and school cultures enact and build classroom practices? Ethnographers study cultures. Building on the premise that classroom interactions do not take place in a vacuum, ethnographic and microethnographic researchers look at classroom interactions as well as the culture-laden contexts in which these interactions occur. Although ethnographic researchers recognize the value of studying particular elements of interactions, they maintain that these particular elements may be best understood in relation to whole life worlds (Erickson, 1977). While some ethnographic researchers have allowed the context of various interactions to give rise to questions, Frederick Erickson (1977) argued that ethnographic research should be more systematic, with researchers heading into the field with a question arising from ethnographic monitoring—the consultation of previous research and experience. He further argued that ethnographic research should “make the familiar strange” (1984) and shift the focus of study “from the exotic to the commonplace” (1982b) while looking at the “immediate and local meanings” of educational “encounters” (1982a, p. 166), “as defined from the actor’s point of view” (Erickson, 1984; 1986, p. 119). The researcher could and should exercise “disciplined subjectivity” (1984, p. 61), since this will inevitably help to selectively eliminate some of the wealth of information available in educational settings.

While process-product and other experimental research methods seek to study the causal relationship between variables and outcomes, ethnographic research allows the researcher to investigate the processes of interaction, to understand how they occur, and to analyze how individuals’ own cultures and dispositions play a role in shaping those processes. In 1979, Hugh Mehan observed that historically, large-scale educational studies have failed to pay any significant degree of attention to the social processes of education. He remarked that if researchers do not understand the social interactions through which education takes place and the contexts in which they occur, they cannot generalize as to whether or not these same interactions might be reproduced in other classrooms. Additionally, since classroom interactions have specific conversational characteristics that distinguish them from everyday social interactions, these characteristics require special study and attention, specifically in the way that they differ from ordinary social interactions. Marilyn Cochran-Smith (1984) and Shirley Bryce-Heath (1983) found that learning often takes place outside as well as inside the classroom through gradual socialization rather than direct teaching, and as a result, studying students’ social interactions outside of school is a necessary part of understanding their educational interactions within classrooms. Bryce-Heath’s (1983) classic ethnographic study of three communities in the Piedmont area of the Carolinas described how the cultural discursive practices of the families in each community influenced the children’s classroom performance and the teachers’ attitudes and pedagogical responses.

Luis Moll, Stephan Diaz, Elette Estrada, and Lawrence Lopes (1992), however, point out the importance of microethnographies, which “usually focus on specific behavioral interactions in specific institutional settings, and do not attempt to describe a whole way of life” (p. 341). Since they were interested in observing the complementarity of the teaching and learning processes using the Vygotskian frame of the zone of proximal development, they focused their own microethnography on the conditions that help or hinder students’ learning in a bilingual learning environment. By looking at videotapes of three different ability groups of third graders across two classrooms (one taught in Spanish—the children’s first language—and the other in English),

they determined that "instruction in reading English takes place at a level of reading skill well below the children's general level of development" (p. 347).

Erickson, too, shared an interest in looking at what he called "taught cognitive learning" (1982b), and he called attention to the two types of knowledge that teachers and students draw from: (1) knowledge of the academic task structure (ATS) and (2) knowledge of the social participation structure (SPS) (1982a); that is, while knowledge of how to go about structuring and solving an academic task is necessary, so too is the knowledge of how to engage in that process within any given context. Kathryn Au (1980), Au and Jana Mason (1983), and Pamela McCollum (1989) have all looked at the ways in which participation structures facilitate or impede positive educational interactions. Au (1980) and Au and Mason (1983) have looked specifically at the ways in which classroom participation structures may be made more "culturally congruent" with the cultural participation structures of Hawaiian children, and McCollum (1989), while researching turn-allocation processes in two linguistically and culturally different classrooms (one in Chicago and one in Puerto-Rico), discovered that while the same turn allocation processes are represented in different classrooms, they do not always operate the same way.

While previous ethnographic research had brought the processes of education under the microscope, Roland Tharp and Ronald Gallimore (1988) illustrated the need to study the school as the context in which classroom interactions occur. They argue for, "a new discipline and science of schooling, one that connects analysis of the social circumstances in which educators work to the details of the teaching interactions that schools are intended to create and sustain" (p. 6). Since classrooms are part of schools, Tharp and Gallimore contend that classroom teaching cannot be reformed apart from school reform which has to attend to social conditions.

Likewise, in his study of poor Puerto Ricans in Philadelphia, Javier Tapia (1998) pointed out the importance of studying the interaction between "household members' survival strategies, residential mobility, home-school connections, and students' learning" (p. 297). He argued that although macrolevel studies of the relationship between a group's economic status and its academic achievement are helpful, they are limited in that they do not help explain "intragroup differences or the specific linkages between economic conditions and educational outcomes" (p. 297). In his ethnographic study, Tapia conducted case studies of five different Puerto Rican households and found that poverty affects households and individual household members differently. Thus, although economic status does seem to have some effect on students' academic achievement, household stability seems to be a more important factor, and economic status does not affect each household's stability in the same way.

In her ethnography of ethnographic research, Catherine Emihovich (1989) pointed out that ethnographic studies are distinguished by their attention to language use, the broader social context, and to the commonplace reality of everyday life in classrooms. She suggested that ethnographic researchers do have a method, but that their methods are not positivistic and may vary from one study to the next in order to adapt to different contexts. The studies represented in Table 43-4 reflect her view. Moll, Cathy Amanti, and Norma Gonzales (1992), for example, while studying how to affect a more positive interaction between students' personal "funds of knowledge" and classroom practices within working-class communities used different methods than those R.P. McDermott (1993) chose to use in studying how the language of a learning disability "acquired" and constituted one particular child. Whereas Moll, Amanti, et al. (1992) examined the interaction of school and household practices, McDermott looked at the interaction of institutional language and individual children. Thus, depending on the site and scope of the interaction, ethnographers employ different methodologies.

Alan Peshkin (1993) has proposed that perhaps qualitative studies may best be categorized by whether their outcomes describe, interpret, verify, or evaluate the phenomena they seek to

TABLE 43-4
Ethnographic Perspective

Study	Research Questions	Design	Data Collection	Data Analysis
<p>Tapia, J. (1998). The schooling of Puerto Ricans: Philadelphia's most impoverished community. <i>Anthropology and Education Quarterly</i>, 29(3), 297-323.</p>	<p>The researcher points out the limitations of macrolevel research that has explored the relationship between a group's socioeconomic status and its academic achievement. He explains the need for examining "intragroup differences" (p. 297), and asks the question, what are the "specific linkages between economic conditions and educational outcomes" (p. 297). More specifically, he considers the household activities of Puerto Rican families in Philadelphia to measure their effect on "home-school connections and students' academic performance" (p. 299).</p>	<p>The researcher conducted his study over the course of three years. The first year consisted of gathering general information and statistics from community organizations while the second and third years involved classroom observations and data collection from three elementary schools and two high schools. The researcher chose five Puerto Rican families to study up close their household activities and schooling practices.</p>	<p>Two Puerto Rican teachers aided the researcher with the data collection. He developed successful relationships with the five families, which he attributes to the assistance of the two teachers as well as his own Latino background and his fluency in Spanish and English. He collected data on household members' labor and migratory histories, and on their economic, social/recreational, ceremonial, and schooling activities. In addition to field notes and artifact collection, he used a questionnaire and interviews, using open-ended questions and audiotapes.</p>	<p>The researcher analyzed the data to identify the strategies the household members use to survive periods of economic or familial instability. By examining all five case studies, the researcher saw that household stability, although influenced by economic stability, "is the most important factor influencing poor students' academic performance" (p. 317). At the same time, the case studies illustrate that poverty affects households and individual members of the households differently.</p>
<p>Moll, L., Amanti, C., Neff, D., & Gonzales, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. <i>Theory Into Practice</i>, 31(1), 132-141.</p>	<p>How can teachers "develop innovations in teaching that draw upon the knowledge and skills found in local households?" (p. 132) The information gleaned from the data collection was meant to help teachers develop "ethnographically informed classroom practices" (p. 132).</p>	<p>Researchers examined approximately 100 households and related classroom practices within working class, Mexican communities in Tucson, AZ.</p>	<p>Researchers conducted ethnographic observations, open-ended interviews, case studies, and life histories.</p>	<p>Researchers sought to understand the history of the border region between the U.S. and Mexico where these communities were located and then applied this understanding to their findings. The researchers analyzed how these students' learn at home and compared this to their learning at school.</p>

(Continued)

TABLE 43-4
(Continued)

Study	Research Questions	Design	Data Collection	Data Analysis
<p>McDermott, R. (1993). The acquisition of a child by a learning disability. In S. Chaiklin & J. Lave (Eds.), <i>Understanding practice: Perspectives on activity and context</i> (pp. 269-305). Cambridge: Cambridge University Press.</p>	<p>Do activities like "attending, remembering, problem solving, and the like, although often invoked in formal institutional descriptions of [LD] children, in fact [have] few referents in their daily lives?" (p. 270)</p>	<p>Researchers sought to tell the "learning biographies" of children diagnosed as learning disabled.</p>	<p>They gathered videotapes of one classroom of eight and nine year olds over a two year period (1976-78) in an attempt "to locate the children 'thinking' aloud in the hope [of identifying] naturally occurring examples of some mental activities that seemed so well defined in experimental settings" (p. 270).</p>	<p>Researchers relayed their findings to teachers in after-school settings. They concluded that these after-school programs were not as effective as involving the teachers as researchers of their own classroom practices.</p>
				<p>The researcher observed and videotaped one particular student, Adam, in four different settings: Everyday Life, Cooking Class, Classroom Lessons, and Testing Sessions. The researchers looked less at Adam's display of LD traits and focused more on "the contexts for the interactional display and management of the traits" (p. 273-74). Researchers described how and why different settings seemed to call forth different behaviors from Adam.</p>

study; however, the majority of ethnographic studies describe. For example, Sabrina Tuyay, Louise Jennings, and Carol Dixon's (1995) study of knowledge construction in a bilingual third grade classroom, although it involved interpretation and evaluation through discourse analysis, began with their attempt "to better understand the ways in which the interactions between and among students influence their opportunities for learning" (p. 78). Likewise, even Peter Woods' (1996) ethnography of teaching, while it may essentially be an evaluation of research on teaching, begins by describing empirical cases of teaching. Ethnographies, even those of curricular design (e.g., Roth, 1997), frequently begin by describing processes of interaction.

While their methodologies may vary, all ethnographic studies involve a sustained commitment on the part of the researcher to understanding, from insiders' perspectives, what is meaningful within their culture of practice. Because ethnographers seek to understand the study's participants in their own environments and on their own terms, they generally enter as unobtrusively as possible and observe their participants for a long period of time. This does not mean that they do not interact with their participants, but rather that they do not actively attempt to intervene in and change the phenomenon under study; on the contrary, as participant-observers, they attempt to understand it more effectively. Although the studies of Tapia (1998), McDermott (1993), and Moll, Amanti, Neff, and Gonzales (1992) began with different research questions, all three studies lasted a year or more, and all of them indicate the researchers' investment in studying interactions among members of a culture.

Sociolinguistics and Discourse Analysis Perspectives

How do classroom practices shape discursive events, and how do discursive events shape classroom practices? Drawing from work in linguistics, anthropology, discourse analysis, sociology, and literary theory and from the seminal work of philosophers interested in language, such as Mikhail Bakhtin (1981, 1986), sociolinguistic researchers examine linguistic processes and participation structures to gain an understanding of the communicative interactions associated with teaching and learning. A classic examination of eight National Institutes of Education studies in the 1970s noted that a linguistic approach provides the research community with a means "for studying everyday life in classrooms and for understanding the nature of educational settings and processes" (Green, 1983, p. 195). Courtney Cazden (1988, 2001), a leading figure in the study of classroom interaction through discourse, has since asserted, "Spoken language is the medium by which much teaching takes place and in which students demonstrate to teachers much of what they have learned" (1988, p. 2). Thus, viewing the classroom as an environment shaped by communicative events, these researchers strive to discover interactional explanations for differences in communicative interpretations and consequently differential learning among school children. By looking at the talk during classroom instructional events, researchers seek to understand what in the way teachers and students talk together enables some students to learn more successfully than others.

Sociolinguists embrace the notion that language-in-use must be studied within, and as a consequence of, particular social contexts (Cazden, John, & Hymes, 1972; Cazden, 1988; Cazden, 2001; Gumperz & Cook-Gumperz, 1980). Examinations of the communicative interactions within specific classrooms help to reveal what is brought to those sites and what occurs there. For example, Cazden, Vera John, and Dell Hymes (1972) employed a sociolinguistic lens to explore the discontinuities between the languages of children's home cultures and the communicative demands of their school cultures. They examined the interaction between the children's communicative repertoires to surface a way to identify, understand, and enhance what occurred within that classroom. In a study that explores a related concept, John Gumperz and Jenny Cook-Gumperz's (1980) microethnographic study of verbal events (focusing specifically on contextualization conventions)

revealed that a child's social background may suggest a way of acquiring and practicing discourse that conflicts with the teacher's conceptualizations, thus producing misperceptions about a child's practices that could influence that child's educational evaluation. Susan Philips (1972) and Lois Yamauchi and Tharp (1995) considered a similar topic, asserting that in order to participate fully in the life of a classroom, students must acquire more than language competence; they must assimilate the socio-linguistic rules that accompany and underlie the discourse styles of the language-associated culture.

Because researchers who operate from a sociolinguistic perspective assume that discourse can be viewed as the basic means through which schooling is achieved (Cazden, 1988), they assert that classroom practices are created and sustained through discourse structures, that classroom learning and social fabric are created through discursive interactions, and that discourse influences classroom identities. Interest in the first point, discursive structures particular to the classroom, prompted a number of researchers to examine closely interactions between teachers and students and the opportunities that such structures afford for student participation and knowledge construction. For example, Mehan (1985) described a routinized interactional cycle engaged in by teachers and students: initiation (in which the teacher poses a question), response (on the part of the students), and evaluation (by the teacher). This I-R-E pattern construed classroom interactions as "rhythmic, cooperative activities, involving the complex coordination of speech and gesture" (p.128). In two related studies, Mary Catherine O'Connor and Sarah Michaels (1993, 1996) explored revoicing, a conversational strategy through which teachers engage and support students as they explore and construct academic knowledge. In their examination of eighth- and ninth grade English classes, Martin Nystrand and Adam Gamoran (1992) differentiated between teachers' discourse practices that elicit substantive student responses and those that prompt passive responses. They found that by asking authentic questions, building on student contributions, and providing high-level evaluation in the form of follow-up questions, teachers signal that they acknowledge and take seriously students' contributions.

The work of Derek Edwards and Neil Mercer (1987, 1989) and James Heap (1989, 1992) reflect the second assumption noted above, that discourse provides a means through which learning and social fabric are created. Edwards and Mercer's (1987, 1989) studies noted that "schools have their own epistemological culture" or norms for identifying and for demonstrating knowledge (1987, p. 3), and that therefore, educational interactions are built on shared knowledge that must be constructed through joint activity and discourse. Heap (1989) employed microanalysis to examine collaborative talk between students during word processing, then observed in 1992 how teacher-student interactions come together to construct discourse and how, simultaneously, discourse constructs and reflects the social structure of a classroom. In examining the interplay of discursive events, social construction, and subject matter, sociolinguists draw connections between the perception of language use as a form of social interaction and the construction of subject matter knowledge. This relationship is explored in a constellation of studies by Cook-Gumperz and Gumperz (1990), Steven Williams and Juliet Baxter (1996), and Gaia Leinhardt (2001) as they studied literacy, mathematical knowledge, and advanced placement history respectively.

Researchers operating from a sociolinguistic perspective also posit that spoken language plays an important role in participants' identities. Assuming that discursive interaction not only influences the ways in which students construct knowledge, researchers in this tradition assume that it also shapes how students and teachers think about themselves and each other. For example, David Bloome and Anne Egan-Robertson (1993) raised questions about "the ways that teachers view what it means to be a reader as well as children's development of reader identities, and the role of classroom dynamics in children's views of themselves as readers" (p.331). The ways in which schooling identities are constructed as social facts were explored in Mehan's (1993) study of a child's certification as a special education student (see Table 43-5). Lesley Rex (2000, 2001)

TABLE 43-5
Sociolinguistics and Discourse Analysis Perspectives

Study	Research Questions	Design	Data Collection	Data Analysis
I. Bloome, D., & Egan-Robertson, A. (1993). The social construction of intertextuality in classroom reading and writing lessons. <i>Reading Research Quarterly</i> , 28(4), 305-333.	How does viewing intertextuality as a social construction enhance our understanding of reading and writing events (especially as they occur in classrooms)? How do teachers come to define what it means to be a reader, and how do those definitions shape children's identities of themselves as readers?	The two focused on the social interactions of three students during a 15 minute teacher-led discussion about "The Turtle and the Rabbit" in a first grade classroom.	The researchers acted as participant-observers in the classroom several mornings a week for two months. This event was theoretically selected from several weeks of daily videotapes.	Step 1: The videotape was transcribed to show student-to-student and teacher-to-class interaction. Stick figure drawings were used to indicate shifts in postural configuration, eye gaze, and arm movements. Step 2: The social construction of intertextuality was analyzed through five components: individual message units; interactional units; the proposal, recognition, and acknowledgment of intertextuality; social consequence(s) of intertextuality; uses and references to written language.
Mehan, H. (1993). Beneath the skin and between the ears: A case study in the politics of representation. In S. Chaiklin & J. Lave (Eds.), <i>Understanding practice: Perspectives on activity and context</i> (pp. 241-268). Cambridge: Cambridge University Press.	In looking at the statistical distribution of special education referrals and placement, what practices produce this array, these careers, these identities?	Mehan and associates followed the special education process (mandated by PL 94-142) of 141 students during the 1978-1979 school year in a midsize school district (2700 pupils) in southern California. They focused specifically on the case of a 9 year-old boy, "Shane," to develop an ethnographically grounded study of the modes of representation in everyday discourse.	Researchers observed in classrooms, teachers' lounges, testing rooms, and committee meetings; interviewed educators and parents; reviewed students' records; videotaped events they ethnographically deemed crucial in the construction of students' identities.	Information available from the school was compared with information that emerged through observation, videotapes, informal and formal discussions. Classroom, eligibility and placement meeting discourse was transcribed and examined along with texts of student files, test results, and reports of meetings, as behavioral records of educators' sorting and classifying practices.

(Continued)

TABLE 43-5
(Continued)

Study	Research Questions	Design	Data Collection	Data Analysis
<p>Castanheira, M., Crawford, T., Dixon, C., & Green, J. (2001). <i>Interactional ethnography: An approach to studying the social construction of literate practices</i>. <i>Linguistics and Education, 11</i>(4), 353-400.</p>	<p>How can we understand the ways in which literate practices are shaped, and in turn shape, the everyday events of classroom life, and thus, the opportunities that the focal student, Aaron, and his peers had for learning?</p>	<p>The researchers relied on data provided by an Australian research team who focused on Aaron, a Year 11 student in Australia. The authors followed Aaron through an entire day, videotaping him in each of his five classes: Food Technology, General English, Hospitality, Industry Studies Metal, and Mathematics. Castanheira, Crawford, Dixon, and Green requested and received two additional days of data in order to triangulate patterns observed and to insure representativeness of the day analyzed.</p>	<p>Collected data were two videotapes (226 minutes), written artifacts (a quiz, completed letter, Aaron's responses to a math worksheet, and a teacher handout with student highlights), printed artifacts (workbook, worksheet, excerpts from a manual and a syllabus, teacher handout, and a recipe), a project description (grant submission), and contextual information (system, school, strands, subjects, student, and editing notes).</p>	<p>Analysis of literate demands were presented in two parts: First, by creating a series of transcripts, data tables, and domain analysis, the researchers explored what was happening in each class by tracing who Aaron interacted with, about what, in what ways, for what purposes, when and where, and with what outcomes. They developed three levels of structuration maps: a time-stamped description of the chain of activity, an event map of the episodic nature of members' activity, and comparative timelines of events and phases of activity. Second, they contrasted Aaron's perspective on events with that of the teacher, others, and the texts (data and representations).</p>

explored the ways in which students' identities can be remade within classrooms dedicated to successful academic and social integration. Each of these studies forwarded the concept of reflexivity of language: as participants interactively construct the social fabric of their classroom through discourse, that discourse shapes their participation in the classroom as well.

Judith Green, Carol Dixon, and the Santa Barbara Classroom Discourse Group's research approach, Interactional Ethnography—a repertoire of inquiry methods and methodologies—allowed the group to examine classroom co-construction of literacy demands in various subject matters in relation to the discursive and social moves and expectations of the participants. Maria Castanheira, Teresa Crawford, Green, and Dixon (2001) applied interactional ethnography to study an Australian school boy's literate practices, actions, and demands that were shaped by, and in turn shaped, the opportunities to construct, take up, and display knowledge and learning. They posed the central question for any IE study of a classroom: who can say or do what to and with whom, when and where, under what conditions, in relation to what actions or artifacts, for what purposes, and with what outcomes? in order to understand the nature of the relationships among opportunities for learning, social and discursive practices, and their consequences for students. For another overview of discourse-based research in educational settings, see Carolyn Temple Adger's chapter in the *Handbook of Discourse Analysis* (2001).

Discourse analysis embraces oral and written texts and socially situated practices that are constructed in moment-to-moment interaction (Hicks, 1995). Sociolinguists consider language-in-use as the means through which to investigate interactional teaching and learning events, and often elemental to those investigations are particular discursive participation structures. While the three studies found in Table 43–5 all embrace a sociolinguistic perspective that focuses on discourse, the scope of each data collection varies significantly. For example, Bloome and Egan-Robertson (1993) conducted an intertextual microanalysis of a single moment of student-to-student interaction that occurred within the context of other discursive classroom events. They examined five components of the intertextual qualities of this discursive event. In the second study, Mehan (1993) paid careful attention to a broad collection of discourses, both written and oral, generated in an array of settings (meetings, testing rooms, classroom, and teacher lounges) to explore the contrasting ways a particular student is represented by school records and the way his identity is constructed by other participants in school and school-parent meetings. The final study by Castanheira, Crawford, Green, and Dixon (2001) developed a case study of one student, Aaron, and relied on a variety of data (videotapes, artifacts, and contextual information). The researchers then examined the events that constituted Aaron's educational environment and compared and contrasted the ways the student perceived these events and the ways other participants viewed them. Thus, the sociolinguistic perspective, with its attention to structures of participation, permitted these researchers to examine closely the ways in which classroom members, both teachers and students, construct their ways of being and interacting through their use of language within particular settings.

Critical Perspective

How do classroom practices instigate and generate consequential power struggles, and how do power struggles influence the consequences of classroom practices? While most classroom research could be said to contribute to the positive transformation of teaching and learning, research that takes up a critical perspective takes a more or less aggressive deconstructive and liberatory stance. Researchers assume the role of advocate for those who are currently and historically poorly served by conducting research that seeks to make unfair practices visible, to understand what keeps them in place, and to promote pedagogical and curricula

change. Research initiated in the 1960's and 1970's tended to be more aggressively liberatory and conceptual in addressing pedagogy as a macro-societal issue, as in the work of Paolo Freire (1971), Michael Apple (1979), and Bronwyn Davies (1993). This work explores the ways in which dominant Eurocentric and androcentric knowledges and cultural practices delegitimize those whose race, class, ethnicity, or gender do not match the dominant discourses of the classroom (e.g., Davies & Monroe, 1987). Later, the 1980s and 1990s saw the ascendance of critical research about the classroom construction of school knowledge (e.g., Baker and Luke, 1991), strongly influenced by the ideas of French philosophers about the role of discourse or ideologically imbued language and its relationship to identity (Althusser, 1971) and to knowledge (Foucault, 1980). Hamilton & McWilliam (2001) describe the more recent trend in critical classroom research:

...[C]ritical pedagogues and poststructuralists frame research as more tentative and more provocative, with the focus shifting from prediction and prescription to disclosure and deconstruction (p. 37)...[C]alls to liberation or transformation in and through the classroom have been met with skepticism from many quarters. There has been a preference for climbing down from the quasireligious visions of an earlier generation of critique to more moderate estimates of pedagogical possibility, for example, that a teacher might enable rather than transform (p. 38).

Poststructural theories of competing multiple discourses, which view teachers and students as teaching and learning subjects within power-laden webs of ideologies and social relationships, have complicated us-versus-them, liberatory, resistance agendas for critical research. Elizabeth Ellsworth's study of her own critical pedagogy (1989) demonstrates how critical researchers have become more self-conscious and exploratory in attending to the transformative complexities and potentials in classroom practices.

In critical classroom research, the issue of power is central. Power relations are always relations of struggle, though those struggles may take different forms and assume varying degrees of intensity (Fairclough, 1989; Orellana, 1996). Some researchers have investigated struggles with power among teachers and students to bring to light existing social problems by examining teaching and learning in relation to hegemonic discourses, student resistance, deterministic structures, and marginalizing practices. Some critical perspectives have drawn attention to the way power, as exercised through the privileging of certain knowledges and identities, subjugates. Others have become interested in exploring how power circulates among teachers and students to provide insights into how knowledges and identities are negotiated and to see power as productive as well as negative. More recently, attention has been paid to the individual as a social subject with multiple subjectivities who acts to locate herself within the discourses and power relations in which she lives and works. This focus has given rise to studies of how teachers and students take up particular identities and knowledges within unique classroom situations.

Critical educational scholars assume that classrooms present rich sites for investigation of the interplay among issues of power, social capital, and subjectivity/identity. Many view the discourse of the classroom as the medium through which these issues are made visible. By analyzing the discursive moves that form the basis of classroom interactions and textual production, critical educational researchers gain insight into the reflexive ways that discourse defines participants while the participants simultaneously build and shape discourse, thereby re-enforcing or resisting existing power dynamics.

While critical researchers share a common focus—power relations—they often adopt different theoretical frames and surface seemingly contradictory results from their studies. These divergent results suggest differences in whose voice is heard and about what. That divergence is

evident in a two-issue special edition of *Linguistics and Education* (Martin-Jones & Heller, 1996) dedicated to exploring power relations within classrooms located in countries shaped by colonialism and by new forms of economic, cultural, and social domination. In each study, interaction among various elements of education is identified as a central locus for constructing social identities and unequal power relations, and the researchers explore the processes of production and reproduction through code switching or code choice in multilingual settings.

Jo Arthur (1996) describes relations of power between English, Setswana, and marginalized languages in Botswana and identifies interactionally produced inequitable relationships in classrooms that allow groups who control material goods or symbolic resources to determine cultural and linguistic value and shape educational operations. Lin Ndayipfukamiye's (1996) examination of the relationship between French and Kirundi in rural and urban schools in Burundi; Angel Lin's (1996) investigation of the positions of English and Cantonese in Hong Kong; Antoinette Camilleri's (1996) work in Malta with English, Maltese, and Maltese dialects; and Martin-Jones and Mukul Saxena's (1996) exploration of "bilingual support" received by Panjabi-, Gujarati-, and Urdu-speaking primary students in Lancashire, England produced findings similar to Arthur's: the code switching that occurs in classrooms privileges English and French and reproduces an established hegemony of power. In contrast, in his study of interethnic interactions, Ben Rampton (1996) disputes the notion of determinism, a belief that an individual's political stance, and thus power, is "fixed in his or her allocation to different analytic categories" (p. 170), and instead embraces Stuart Hall's idea that "common struggle and resistance is possible without suppressing the real heterogeneity of interests and identities" (Hall, 1988, p. 28).

Issues of power negotiations within classrooms where participants share a common language are also sites for critical research. Studies investigate who controls the discourse of the classroom and, by extension, who controls teaching and learning. The notion that the teacher controls the discourse of a classroom has been disputed by Bronwyn Davies and Kathy Munro (1987). They studied the disruptive behavior of an Aboriginal student and concluded that the discursive social practices of the teacher and students negotiated and co-constructed classroom events and local understanding of disruption, resistance, and normality. Similarly, research by Antonia Candela (1998) and Jerri Willett, Judith Solsken, and Jo-Anne Wilson-Keenan (1998) explored how discursive negotiation among classroom members produced a consequential structure of classroom practices. Other studies of various discursive interactions in the daily life of a classroom illustrate how power and identity are locally constructed (e.g., Gutierrez, Rymes, & Larson, 1995). Critical researchers consider the complex relationships between local discourses (language-in-use) and macro societal discourses or interpretive repertoires that produce the socially powerful, disenfranchising, or hybrid positions of students and teachers within specific situations. James Gee and Kate Clinton's (2000) study of African-American children in a science classroom investigated the ways in which home and community-based discourses interacted with a student's construal of school-based discourse to produce a social language hybrid.

Concepts of subjectivity and positionality in the construction of self and other are central for many critical researchers, raising questions about the ways that classroom participants interact in the production and control of knowledge. Cynthia Lewis (2000) focuses her examination of classroom dynamics on the way in which teachers tend to emphasize personal responses to literature and ignore the social and political dimensions that allow students to engage critically with multicultural works. Such practices are missed opportunities for examining structural inequalities and changing perceptions of "the other." Rex's (Rex, 2000, 2001; Rex & McEachen, 1999) program of research focuses on student access to classroom knowledge and to identities with educational capital. Focusing on when, why, and how students participate, she explores how

some classroom practices enable reconstruction of knowledge (Rex & McEachen, 1999), identity, and social position (Rex, 2000, 2001) to deconstruct conventional socially and academically marginalizing practices. She compares teachers' inadvertent use of narratives (Rex, Murnen, Hobbs, & McEachen, 2002) and orienting discourses (Rex, 2002) that advance particular beliefs, dispositions, and values, which encourage like-minded students to participate.

As indicated in Table 43–6, critical perspective researchers may employ similar methods of data collection. Rampton (1996), Candela (1998), and Rex, Murnen, Hobbs, and McEachen (2002b) collected data in a combination of ways including taking field notes; making audio, video, or radio-microphone recordings; and conducting participant interviews. However, critical researchers may focus on different aspects of discourse for their data collection: Rampton gathered information on students' code switchings; Candela examined turn sequences in teacher-student interactions; and, Rex et al. focused on the instructional narratives their participant teachers used. Not surprisingly, critical researchers may also analyze their data differently: Rampton used interpretive socio-linguistic analysis; Candela employed Edwards and Potter's (1992) modes for discourse analysis; and Rex et al. (2002) generated taxonomies to describe the meanings, sources, and purposes of the teachers' instructional narratives. Regardless of their methods of data collection and analysis, all critical perspective studies shed light on the reflexive relationship of discourse and power and the ways in which these dynamics work to challenge or buttress existing power relationships, to define individuals and groups, and to determine the nature of teaching and learning enacted within that particular community.

Teacher Research Perspective

How are classroom practices uniquely represented by teachers, and how do practicing teachers' views uniquely influence classroom practices? Teacher research, narrative research, and action research are characterized by the researcher's involvement in the interaction under study. Whereas in other types of classroom research outside observers study the interactions occurring in classrooms, these types of research engage teachers in the study of their own interactions. Teacher research may be a teacher describing her own practice, as is the case with Vivian Paley's (1979) self-narrative in which she examines her own "fears and prejudices, apprehensions and expectations" as a white teacher teaching black children; however, researchers such as Dixie Goswami and Peter Stillman (1983) have raised the question of precisely what it means to research one's own practice, suggesting that one must do more than describe one's teaching in order to call it research. In their view, reflexive teaching is teacher research: teachers need to study their interactions in their classrooms by beginning with a question and then allowing the answers they find to shape and inform future interactions, while giving way to new questions.

Different from Goswami and Stillman who were interested in studying teacher knowledge, Magdalene Lampert (1990) studied her own classroom interactions in order to better understand her students' knowledge. Her action research examined how her interactions with students affected their ways of knowing. As a fifth grade mathematics teacher and an educational researcher, Lampert sought to understand whether the interactions she had with her students could help make knowing mathematics in her fifth grade classroom more like knowing mathematics in the discipline. Moreover, Lampert wanted to study whether she could teach her students Polya's moral qualities for mathematics: intellectual courage, intellectual honesty, and wise restraint. After planning a curriculum that aimed to teach these virtues, Lampert concluded that although she could engage her students in the process of acquiring these virtues, it is very difficult to assess what knowledge students actually take away.

TABLE 43-6
Critical Perspective

Study	Research Questions	Design	Data Collection	Data Analysis
Rampton, B. (1996). Youth, race, and resistance: A sociolinguistic perspective. <i>Linguistics and Education</i> , 8(2), 159-173.	"This article focuses on interethnic interactions in which adolescents of Asian descent put on strong Indian English accents when addressing Anglo teachers and adults," and asks, to what extent "do these code switchings constitute acts of resistance within a racist society" (p. 159).	The researcher conducted two years of fieldwork in one neighborhood in the South Midlands of England. The researcher relied on twenty-three 11-13 year old informants of Afro-Caribbean, Anglo, Indian, and Pakistani descent in 1984, and sixty-four 14-16 year olds in 1987.	The researcher conducted radio-microphone recordings, interviews, participant observation, and retrospective participant commentaries.	Using interpretive sociolinguistic analysis, the researcher analyzed transcripts of classroom interactions. By looking at pitch changes, tune, and accent, the researcher studied the degree to which both teachers' and students' language was playful, serious, oppositional, etc. The researcher was able to examine students' code switchings and to investigate the factors that surrounded these occurrences.
Candela, A. (1998). Students' power in classroom discourse. <i>Linguistics and Education</i> , 10(2), 139-163.	Does IRE always maintain the teacher's power? Is students' resistance to following the teacher's orientation necessarily a resistance to learning?	The researcher observed fifth grade science classes in a public elementary school near Mexico City. She collected data over the course of one year; however, the researcher had been working in this school for several years and developed a strong relationship with the members.	The researcher took ethnographic field notes as well as video and audio recordings.	The researcher conducted conversational analysis of teacher-student interactions within an ethnographic perspective. The conversational analysis was facilitated by the use of transcripts of classroom conversations. Using Edwards & Potter's (1992) model for discourse analysis, the researcher analyzed students' contributions in class discussions to examine whether or not they "follow what the teacher wants them to do or if they manipulate the local construction of discourse to seize

(Continued)

TABLE 43-6
(Continued)

Study	Research Questions	Design	Data Collection	Data Analysis
<p>Rex, L. A., Murnen, T., Hobbs, J., & McEachen, D. (2002b). Teachers' Pedagogical Stories and the Shaping of Classroom Participation: "The Dancer" and "Graveyard Shift at the 7-11. <i>American Educational Research Journal</i>, 39(3), 765-796.</p>	<p>How do teachers' ways of storytelling shape students' identities and their expectations of and opportunities to learn academic subject matter?</p>	<p>Part of an established ethnographic relationship with two experienced English teachers, the university researchers focused on the teachers' pedagogical storytelling practices over the duration of a course. The well-liked, respected, and effective teachers held contrasting views of education and accomplishment, including differing views on the necessity and value of tracking for student achievement. One taught a gifted and talented curriculum for students who self selected into the class; another taught a course that intentionally mixed students from all tracks.</p>	<p>The university researchers utilized collected videotapes, field notes, ethnographic and formal interviews. They selected the instructional narratives told by the two teachers during the first 550 minutes, or two-weeks, of class.</p>	<p>power in order to construct their own representation of the curricular topics" (p. 140). Candela looked specifically at turn sequences to describe what was happening at each shift in the classroom discourse.</p> <p>The researchers coded daily videotapes and field notes from the first weeks of each class for discursive narratives in which the participants were doing something that was important and valued. They conducted discourse analyses of each story to observe how it positioned students, the course work, school, achievement, and other school performance related areas. They identified semantic relationships among the origins of a story's content, its instructional target, and its function. They drew on ethnographic data and findings from prior studies of these classrooms to create taxonomies for the meanings, sources, and purposes of the stories. The teachers reviewed the researchers' interpretations during and after analyses, and they provided their own written analytical report on the data.</p>

Many advocates of teacher research believed that teachers could generate knowledge by conducting research on their own practice; however, Marilyn Cochran-Smith and Susan Lytle (1992) expanded this definition, contending that the very act of teaching, of interactions between teachers and students, generates knowledge. They defined teacher research as "systematic, intentional inquiry by teachers about their own school and classroom work" (p. 450), and argued that the knowledge generated by teachers' interactions with students should be viewed as contributing to the larger knowledge base for teaching—not just individual teachers' knowledge. Lampert (2001) furthers this notion by asking how researching her own practice could help her and others to "know" teaching. She continually interrogates what it means to know teaching, and uses her own practice to shed light on the question.

While some researchers have continued to sing teacher research's high praises, others have called their praises into question. Kenneth Zeichner (1994) attempted to challenge, "the uncritical glorification of teacher research that is so often apparent among its proponents" (p. 66), and suggested that more attention be paid to whether individual programs of teacher research actually lead to improved practice as well as "personal renewal and social reconstruction" (p. 80). Zeichner also pointed out that although more teachers were conducting teacher research, AERA's 1986 *Handbook of Research on Teaching* did not include anything written by a teacher or any references to anything written by a classroom teacher. Although teacher research may have been on the rise in the 1980s, it was not yet making an impact among professional researchers.

The increase in publication of teacher research in the 1990s seems to reflect the seriousness with which teacher research has begun to be treated. Although these studies may resemble Paley's teacher narrative from twenty years past, books such as Cynthia Ballinger's (1999) *Teaching Other People's Children* display an explicit self-awareness of the ways in which they are contributing to a knowledge base for teaching. Researchers such as Deborah Ball (2000), Gail Burnaford (2001), and Joseph Fischer (2001) have written at length on the benefits and advantages of practitioner research. Ball explores the epistemological differences of what she calls "first-person research," arguing that outsiders to classroom interactions often "miss questions that lie at the heart of the puzzles of practice" (p. 366). While she acknowledges the perspectives outsiders have to offer teachers and understands the difficulties insider research may pose, she is concerned with finding a way for teachers to account for these perspectives while maintaining their unique relationship to the interactions under study. Additionally, Ball calls for greater dialogue between insider and outsider research in order that insider research might become a part of the knowledge base for teaching. Although Burnaford (2001), unlike Ball, is not as concerned with the generalizability of teacher research, she does contend that in order to demonstrate to students "that the process of inquiry is valuable and valued" (p. 50), teachers must be researchers. She gives basic guidelines for new teacher researchers to begin studying their own teaching, as does Fischer (2001) who claims that "effective teaching is informed by personal knowledge, trial and error, reflection on practice, and conversations with colleagues" (p. 29).

Rick Moon's (2001) self-narrative serves as a good example of precisely this kind of teaching and reflection. As a K-8 physical education teacher and coach, Moon conducted a two-year research project that focused on gender stereotypes. In his narrative, Moon explains how the births of his two daughters prompted him to interrogate his own and others' assumptions about girls and athletics in order that he might try to change them. Having previously taught boys in physical education classes that separated boys from girls, Moon decided to reunite boys and girls into coed classes and to see how the move affected their cooperation and competition. While Moon claims that his research led to a change in his thinking and teaching, by recounting it, he serves as a model of a particular kind of teacher researcher and contributes to our understanding of what it might mean to know teaching.

Along with stressing the potential of teacher research to contribute to a generalizable knowledge base, Ball (1997) also highlights the essential interplay of subject matter knowledge and student knowledge within the classroom. In order to make subject matter knowledge accessible to students, a teacher, she contends, must possess understandings of students in general, but more importantly, of her students in particular and suggests that shared professional development experiences (discussing cases of student thinking, employing redesigned curriculum materials, and investigating artifacts of teaching and learning) may provide the base teachers need to effectively know and assess the learning of their students. For a more comprehensive history of practitioner research, consult Zeichner and Susan Noffke (2001) who trace its origins (as research with “transformative intentions”), its development, and questions surrounding its validity, funding, and organization.

Although teacher research and action research are often conflated, it does seem important here to distinguish between the two. While some teacher researchers do conduct their research in order to change the practices in which they are involved, other teacher researchers conduct research in order to communicate with wider audiences. The latter type of teacher research may empower the teachers researching and writing about their own practices by giving them wider audiences; however, since the research may not be designed explicitly for the purpose of changing practices, it should not be viewed as action research. Ball (2000) further distinguishes “first-person research” from other types of teacher research. Narrative research, she contends, involves teachers representing their experience to colleagues; action research involves teachers studying what is intended compared to what actually occurs. With first-person research,

Instead of [teachers] merely studying what they find, they begin with an issue and design a context in which to pursue it. The issue with which they begin is at once theoretical and practical, rooted in everyday challenges of practice but also situated in a larger scholarly discourse, and they create a way to examine and develop that issue further (p. 386).

In other words, teachers design a methodology to study phenomena that they create.

Looking at Table 43–7, Lampert’s (1990) study may be taken as an example of first-person research because of the ways in which she designed the type of classroom she wished to study. By teaching Polya’s moral qualities for mathematics, she was able to measure the degree to which a teacher can successfully change the way her students know a discipline. In contrast, Ballinger’s (1999) and Moon’s (2001) studies may be classified as narrative research studies because through their studies, they communicated with colleagues the ways in which their reflection and analysis of their own teaching changed the way they thought about teaching.

IN CONCLUSION

Each of the seven frameworks has described chronologically and topically related programs of research. Their purpose was to demonstrate similarity in their perspectives about what constitutes classroom interaction and how we can understand and study it. Each perspective assumes a conceptual stance, or a cluster of conceptual relationships among the purpose of a study and its research questions, epistemological framework, and methodology. Each framework is not a recipe or a protocol, but rather a dynamically interrelated grouping of concepts and the logical ways of proceeding they imply.

Reading across the seven perspectives provides a summative, comparative view of the methodological landscape of classroom interaction research. Comparing the research in each of the seven categories according to focus of investigation, logic of inquiry, and methods used distinguishes their differences.

TABLE 43-7
Teacher Research Perspective

Study	Research Questions	Design	Data Collection	Data Analysis
Lampert, M. (1990). When the problem is not the question and the solution is not the answer: Mathematical knowing and teaching. <i>American Educational Research Journal</i> , 127(1), 29-63.	Was it possible "to make knowing mathematics in the classroom more like knowing mathematics in the discipline" (59)?	Lampert, also a university researcher, studied her own fifth grade classroom over the course of a year. She sought to teach her students' Polya's moral qualities for mathematics through the way she taught. These qualities include: "Intellectual Courage: we should be ready to revise any one of our beliefs; Intellectual Honesty: we should change a belief when there is good reason to change it...; Wise Restraint: we should not change a belief wantonly, without some good reason, without serious examination" (pp.7-8, 31).	The researcher took field notes and videotaped every class, over the course of a year. She deliberately adjusted her teaching to try and teach Polya's moral qualities. She encouraged her students to demonstrate intellectual courage, intellectual honesty, and wise restraint.	The researcher examined her field notes and watched the videotapes to study whether or not her students exhibited signs of having acquired Polya's moral qualities for mathematics. She looked at the effect her interaction with students had on students' knowledge.
Ballinger, C. (1999). <i>Teaching other people's children</i> . New York: Teachers College Press.	How does a teacher's own culture affect her teaching when she is teaching students of a different culture?	Ballinger studied her own classroom at St. George's, a preschool run by the Catholic Church, which was attended by many Haitian immigrants. She conducted her teacher research with the Brookline Teacher-Researcher Seminar (BTRS).	The researcher kept a journal, and also studied transcripts from audiotapes of her classes.	By keeping a journal, rereading it, and examining transcripts of her classes, Ballinger arrived at a better understanding of both herself and her students. Her reflection helped her to continually modify her teaching to most effectively reach her students. Ballinger published a narrative on her teacher research to contribute her findings to the knowledge base for teaching.

(Continued)

TABLE 43-7
(Continued)

<i>Study</i>	<i>Research Questions</i>	<i>Design</i>	<i>Data Collection</i>	<i>Data Analysis</i>
<p>Moon, R. (2001). The personal and the professional: learning about gender in middle school physical education. In G. Burnaford, J. Fischer, & D. Hobson (Eds.) <i>Teachers doing research</i> (2nd ed., pp. 151-56). Mahwah, N.J.: Lawrence Erlbaum Publisher.</p>	<p>Moon sought to explore and understand his own and others' assumptions about girls and athletics in order that he might try to change those assumptions.</p>	<p>A K-8 physical education teacher and coach, Moon conducted a two-year research project that focused on gender stereotypes. He looked specifically at competition and cooperation (with regards to gender) in physical education. He "sought to explore [stereotypes] and experiment with methods in physical education that could challenge...these gender stereotypes" (p. 152).</p>	<p>Moon's research was prompted by the births of his own two daughters. He explains how prior to their birth, he focused almost entirely on male athletics. Moon decided to interrogate his own beliefs and assumptions about girls. Having previously taught boys in physical education classes that separated boys from girls, Moon decided to reunite boys and girls into coeducational classes.</p>	<p>The researcher reflected on how his teaching changed as a result of his self-interrogation. He became aware of his own potential to learn from his students.</p>

For example, process-product research focuses on observing the direct and indirect impact of teacher behavior upon student performance. Interactional processes between teachers and students are viewed discretely in terms of specific actions causing reactions, recorded as general properties, and measured quantitatively using checklists, tests, scales, and descriptions of properties. Comparatively, research from a cognitive perspective is concerned with interaction between the learning environments teachers construct and the sense students make of them through existing cognitive structures. Cognitivists take into account that teachers and students interpret what they encounter and want to understand. They describe students and teachers' sense making by observing them during instructional classroom activity, interviewing them about it, and giving them questionnaires. Research from a critical perspective, on the other hand, is concerned with deconstructing power differentials and noted or unnoted struggles among teachers and students to observe who benefits and who does not. By focusing on the discourses which teachers and students invoke, engage, and produce, research with a critical perspective is looking at discourse as the social medium that produces knowledge, status, and identity. Transcripts of spoken interactions and written texts produced or consumed by the classroom participants are usually analyzed.

On the other hand, looking within each perspective to note qualities that studies share with research in other perspectives demonstrates creative and productive mixing and merging. In the ethnographic perspective, for example, ethnographers Moll, Diaz, Estrada, and Lopes (1992), in studying classroom practices that highlight culturally based ways of knowing, applied a Vygotskian concept of the zone of proximal development. In the situated cognition perspective, we pointed out that a Vygotskian approach is adhered to by many situated cognitivists. In Moll, Diaz, et al.'s study, researchers used ZPD to understand how the classroom's cultural ways of knowing translated into learning. Though these ethnographers were interested in the study of bilingual schooling culture, they were primarily focused on classroom conditions that helped or hindered students' reading learning. Through a ZPD lens, reading instruction interactions could be understood in terms of what students were encouraged to do independently and what was scaffolded. This microethnographic study, by combining ZPD with ethnographic approaches, was able to compare the effectiveness of reading instruction in children's native Spanish and in English.

Another ethnographic study, which also illuminates the permeable boundaries of the categories, was ethnographer Tapia's (1998) study of the effects on students' classroom learning of their households' ways of dealing with poverty. By spending three years in close relationships with teachers and families of five students, Tapia was able to describe the strategies and activities used by household members during times of economic difficulty. By viewing these strategies and activities in relation to students' academic performances, he observed the importance of maintaining household stability as more centrally relevant to student achievement than economic hard times. Indirectly, Tapia was concerned with issues of power, since the families were members of the economically marginalized. Yet, his study is more directly concerned with drawing a larger and more complex picture of familial cultural norms in response to their economic circumstances. Nevertheless, Tapia's research seems well aligned with critical research purposes. His research challenged commonly held assumptions about the unremitting negative influence of poverty on student school achievement. It was purposefully deconstructive in intent, and he appeared to have taken on the role of advocate for the Puerto Rican children he studied.

By delving further into clusters of research in the ethnographic perspective, more alliances between perspectives become apparent. Microethnographers Erickson (1982b), Au (1980), Au and Mason (1983), and McCollum (1989) in looking at classroom participation structures attended to turn allocations, or to who talked when during classroom activities, and how those

sequential turns of talk were relevant. The cultural element is central in these studies of talk. It grounds the researchers in wanting to understand how classroom practices enact and build cultures, and how classroom and school cultures enact and build classroom practices. Yet, this analytical method for observing classroom instructional talk draws from an established field of linguistics—conversational analysis, and is in keeping with methods applied in research from the sociolinguistic and discourse analytic perspective. Close analyses of who said what to whom, about which topics, and through which ways of speaking were preeminent.

A close look at each research program in each perspective brings to light the originality and inventiveness with which the researchers have combined research elements to build powerful studies. One lesson from this diverse, evolving landscape of classroom practice research is that purposes for research, the conditions in which research is conducted, and the conceptual ways of knowing what is studied change and so should research.

A second lesson from the studies spotlighted in this review is that to achieve one's purpose often requires creativity in designing the research as well as coherence and consistency in combining research elements. Research questions should be suited to the problem in need of research and the purpose for which the problem needs addressing. The study design—e.g., the site, participants, and data—should be well matched to serve the research question. The logic of the inquiry, how one proceeds to actuate the design of the study by collecting and analyzing data, should produce results that are satisfying realizations of the question being asked and the purpose being served. For that to happen, consistency and coherence among how one conceptualizes the nature of the research problem, the design, and the logic of inquiry must be intact.

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In preparing this chapter, we wrote an earlier, longer version with a more extensive introduction and conclusion. These provide more extensive explanations of key concepts, processes, and stances. In the introduction we explain how the studies were selected, how we are conceptualizing classrooms and classroom practices, and how selection and conceptualization relate to the way we are presenting the research. In the conclusion, we make explicit the rhetorical stance we took in writing the chapter and explain more thoroughly how we mean this stance to work heuristically for the reader. Copies of this longer version can be acquired from the first author: Lesley A. Rex at rex@umich.edu.

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