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ABSTRACT

The Southwest Educational Developmental Laboratory identified, located, and annotated references to inform the work of the Promoting Instructional Coherence Project, which investigates problems teachers face in their efforts to make their practice more coherent or meaningful for students. The references included in this annotated bibliography are those that researchers found particularly insightful and useful in helping them think about their research. This bibliography is categorized according to: approaches to educational research; learning theory and implications for classroom practice; school reform; the change process; teacher learning; and instructional practice (curriculum, instruction, and assessment). A complete alphabetical listing of the references is included in the final section, since some of the references could have been placed in more than one category. (SM)

The Promoting Instructional Coherence Annotated Bibliography

The Promoting Instructional Coherence [PIC] Project
Southwest Educational Development Laboratory

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February, 1999

The Promoting Instructional Coherence Annotated Bibliography

The Promoting Instructional Coherence project investigates problems teachers face in their efforts to make their practice more coherent or meaningful for students. From our early conversations and excursions into the research literature, we recognized the power afforded teachers when they were able to make their teaching decisions based on an understanding of their students as learners. The literature on learning theories and the implications for teaching practice supported this stance. Before completing the design for the applied research project, we examined several additional bodies of literature, including those on school reform and research approaches. We decided to use a collaborative approach to research, focusing on the experiences of classroom teachers as they struggled to make sense of reform initiatives and change their teaching practices. A study group format encouraged teachers to reflect on and inquire about their practice with colleagues and project staff. The literature on teacher learning and the change process was particularly important in this stage of our work. As the teachers became deeply engaged in conversations about teaching and learning, the need to explore the relationship between curriculum, assessment, and instruction became apparent, so references on these topics were examined.

SEDL identified, located, and annotated references to inform the work of the project. The references we included in the bibliography are those we found particularly insightful and useful in helping us think about our research. The annotations will provide information about these references for other researchers and educators to use in developing their understandings of issues related to educational reform, coherent teaching practice, and improved student learning.

Users of this bibliography should be aware of three caveats. First, the bibliography is not exhaustive. As closer attention is brought to helping teachers make quality classroom decisions, the number of potential references expands dramatically, a fact that leads us to the second caveat. Second, the bibliography is not finished. Staff will continue to add annotations to the bibliography over the life of the project, exploring new lines of inquiry as they become apparent or needed. And finally, like any other bibliography, this one is eclectic, drawn from the interests and knowledge of the staff and the needs of the project. Your favorite resource may or may not be included. However, care was taken to identify current, accessible, and readable references that were accurate, credible, and reliable and were useful to the explication of our topic. All of the references included were found to be useful and relevant to our exploration of meaningful classroom instruction.

After we began our work on the project and this bibliography, it became clear that we needed a way to organize the entries. Certain areas of literature informed our work and the following categories, although they may be imperfect, were found to be a useful way to sort the entries.

- **Approaches to educational research**—This area was reviewed in order to connect our work to accepted educational research strategies that use and value teacher perspectives. References describe collaborative educational research using qualitative (interpretive, narrative) methods, examine the roles of and relationships with teacher-participants, and explore teacher inquiry in school settings.

- **Learning theory and implications for classroom practice**—A good understanding of the literature on cognitive science and learning theory was critical because of the project's emphasis on student learning. References focus on constructivist learning, and the approaches to teaching that are consistent with this understanding of learning.

- **School reform**—Teachers and schools are operating in a climate of reform, so it was important for us to understand the demands and expectations placed on them by state and national reform initiatives. References were chosen to provide a background on current educational reform and implementation efforts as they relate to improving teaching practice and student learning.

- **The change process**—Teachers are being asked to change the ways they work, both by our project and by other reforms, so it is imperative to understand how people react to the process of change. References provide an overview of the literature on change and leadership and describe experiences of change in educational settings.

- **Teacher learning**—The project is an applied research project, so it was critical to consider how teachers grow professionally and how they learn in the context of their work. References were selected that explored current conceptions of professional development with particular attention to teacher learning, teacher growth, and collegial relationships within schools.

- **Instructional practice: Curriculum, instruction, and assessment**—Our actual work with teachers revolved around their approaches to teaching, so research in this area provided necessary background for project staff. References provide a snapshot of current best practice in teaching practice, and this area is expected to grow substantially in the future work of the project.

Some references could have been placed in more than one category, so judgments were made as to the category that made the most sense. A complete alphabetical listing of the references is included in the final section.

Approaches to Educational Research

This section of the bibliography is on educational research. References were chosen that focus generally on qualitative research paradigms and methodology and more specifically on collaborative research and issues of researcher-participant relationships, on teacher inquiry, and on the use of story and narrative in research with teachers.

What does it mean to adopt a qualitative approach to research? Guba and Lincoln (1994) provide an exploration of research paradigms in qualitative research. The general texts by Ely, Anzul, Friedman, Garner, and Steinmetz (1991) and Glesne and Peshkin (1992) chronicle the process of doing a qualitative research study and provide details on methods of data collection, analysis, and interpretation. Specific methods are discussed in the references by Carson (1986) on conversation, by Cortazzi (1993) on narrative analysis, and by Zeller (1995) on writing.

What issues are involved in establishing a researcher-teacher relationship for the purpose of doing a research project? Wagner (1997) provides an overview of the kinds of relationships that can be established in cooperative research. Catelli (1995) elaborates on school/university partnerships. The articles by Cole (1989), Cole and Knowles (1993), and Day (1991) provide insight into the potential benefits of collaborative research projects as well as some of the issues related to relationships between researchers and teachers. Johnston and The Educators for Collaborative Change (1997) provide an extensive discussion of collaboration.

How do teachers participate in the generation of knowledge about teaching? Richardson (1994) compares formal research to that done by practicing teachers. The references by the research team of Cochran-Smith and Lytle (Cochran-Smith, 1994; Cochran-Smith & Lytle, 1990, 1992; and Lytle & Cochran-Smith, 1992, 1994) provide an examination of several issues related to teacher research and teacher inquiry. Duckworth (1986) considers the metaphor of teaching as research.

How are teachers' stories used in research about teaching? The research team of Clandinin and Connelly have done extensive research on narrative methods and the use of teachers' stories in research (Clandinin & Connelly, 1994; Connelly & Clandinin, 1990, 1994). Carter (1993), Marble (1997), and McEwan (1995) discuss narrative and story as ways of knowing and as research approaches.

Carson, T. R. (1986). Closing the gap between research and practice: Conversation as a mode of doing research. ***Phenomenology and Pedagogy, 4*** **(2), 73-85.**

Research should improve practice. However, the influence of research on practice has traditionally been limited. The conduct of educational research seldom has the explicit goal of improving the practice of study participants, and the language used to report research findings is generally inaccessible to teachers. Carson discusses the use of conversation (as opposed to interview) as a mode of doing research. Four interpretive studies which adopt a normative stance (the intention of the researchers is to influence the practice of the participants) are described with specific attention to uses of conversation. All participants in a conversation (teachers and researchers) seek to deepen their understanding of the topic. The purpose of an interview, on the other hand, is for the researcher to gather information from the teacher. In using conversation, the research stance is to allow meaning to emerge through the language. Conversation is characterized by examples, ostensive references, and recollections; allows for an easy exchange of experiences; bridges the distance between the research community and a community of practitioners; and increases the possibility of a cooperative investigation. Carson concludes, "In the final analysis, the practice of conducting conversations with participants is in itself a form of action which helps forge a reformed practice. By engaging in conversation, researchers are helping to create spaces within educational institutions for thoughtful reflection oriented towards improving practice."

Carter, K. (1993). The place of story in the study of teaching and teacher education. ***Educational Researcher,*** **22 (1), 5-12, 18.**

There are growing numbers of researchers using story and narrative to describe both the method and object of inquiry in teaching. Carter's purpose in this paper is to clarify the arguments for incorporating story into research activities, and to consider major issues related to the use of story as a research method. Stories consist of events, characters, and settings arranged in a temporal sequence that implies both causality and significance. Stories capture complexity, interconnectedness, and the richness and nuances of meaning. They accommodate ambiguity and dilemma. Teachers' knowledge is event structured, and stories seem to provide access to their knowledge. Thus, the notion of story as a way of knowing and thinking is of particular significance to those engaged in contemporary research on teaching. A vigorous research agenda is developing around the stories teachers tell. Many in the field have turned to stories out of concern for voice, gender, and power

issues. Previously, stories told about teachers by researchers tended to be stories of the deficient teacher, told by the "invisible" narrator who assumes a superior attitude toward the character. The story of this deficient teacher is, like all stories, a theory of something, although this was not explicitly stated. Although Carter joins in the movement away from those kinds of stories, she cautions against giving special status to teachers' stories. Care should be taken not to imply that teachers are the privileged authors who have direct access to "truth." Their stories are constructions that give meaning to events and should be treated as such. Nonetheless, these stories can advance the knowledge of teaching if used appropriately. Issues of interpretation, authenticity, normative value, and purposes in telling stories in the first place should be of critical importance to researchers using story methods.

Catelli, L. A. (1995). Action research and collaborative inquiry in a school-university partnership. ***Action in Teacher Education, 16*** **(4), 25-38.**

Catelli proposes the use of action research as collaborative inquiry in school-university partnerships. The idea of collaborative inquiry originated in the action research models of the 1940s and 1950s, which described research by teachers in school settings undertaken to solve instructional problems. Collaborative inquiry, according to Catelli, refers to the combined efforts of teachers, researchers, and teacher educators to engage in a systematic and critically-oriented process of inquiry in order to understand and improve on some dimension of educational practice. Catelli describes a partnership project and explains the critical role of action research in the program. Two action research studies conducted by the teachers and researchers in the program are presented as examples of the value and power of this type of inquiry.

Clandinin, D. J., & Connelly, F. M. (1994). Personal experience methods. In N. K. Denzin & Y. S. Lincoln (Eds.), ***Handbook of qualitative research*** **(pp. 413-427). London: Sage.**

What does it mean to study experience and how does one do it? Experience is reflected in the stories people tell, and through an inquiry into these stories—narrative inquiry—researchers hope to understand more about why people do what they do. Experience becomes the starting point for social science inquiries and, ultimately, offers the possibility of individual and social change. Clandinin and Connelly note that the study of experience starts and stops with the researcher's intentionality. The methods of study focus inward (on the internal conditions of feelings, hopes, reactions, moral dispositions), outward (on the environment or context), and backward and forward through time. The authors describe three sets of methodological questions. One set of questions has to do with the field experience, which they see as a

relationship between the experiences of the participants and those of the researchers. Because it is a relationship, issues of negotiation, collaboration, and sensitivity become important. The second set of questions has to do with data collection or field texts. The authors describe a number of methods: oral history, annals and chronicles, family stories, photographs, research interviews, journals, autobiographical writing, letters, conversations, and field notes. The final set of methodological questions has to do with creation of the research text. These questions concern voice, signature (how to say what you want to say), inquiry purposes, narrative form, and audience. Personal experience methods offer the opportunity to create a middle ground where there is conversation among people with different life experiences.

Cochran-Smith, M. (1994). The power of teacher research in teacher education. In S. Hollingsworth & H. Sockett (Eds.), *Teacher research and educational reform: Ninety-third yearbook of the National Society for the Study of Education* (pp. 142-165). Chicago: University of Chicago Press.

In this book chapter, Cochran-Smith discusses teacher research, action research, and other inquiry-based practices, especially as they relate to preservice education. She then introduces the notion of stance as a way of positioning oneself, in this case, as prospective teachers in relation to knowledge (i.e., their positions as generators as well as users of knowledge for and about teaching), agency (i.e., their positions as activists and agents for school and social change), and in terms of collaboration (i.e., their positions as professional colleagues). Cochran-Smith reviews three school-university relationships that include some level of inquiry as part of their preservice programs. Programs may be characterized by (1) consonance, where university and school-based preparation are consistent with each other; (2) critical dissonance, where the goal is for students to question and assess the realities they find in the schools; or (3) collaborative resonance, where students are taught to continue learning within diverse school contexts through teacher research and collaborative inquiry. In collaborative resonance, Cochran-Smith says that the power of teacher research is as a vehicle to help student teachers develop a stance. She describes a preservice program that helps students develop the stance of teaching against the grain. Prospective teachers use teacher research to analyze the learning opportunities that are or are not available to children in various classroom situations. This is a stance toward teaching that places the learner at the center and goes against the grain of common practices in schools.

Cochran-Smith, M., & Lytle, S. L. (1990). Teacher research and research on teaching: The issues that divide. ***Educational Researcher, 19*** **(2), 2-11.**

Efforts to develop a knowledge base for teaching have relied primarily on university-based research, thus ignoring the significant contributions of classroom teachers. Cochran-Smith and Lytle propose that teacher research provides a unique perspective on teaching and learning. Traditions of university-based research on teaching include process-product research and interpretive or classroom ecology research. Those doing process-product research considered teacher behaviors as causes and student learning as effects. Those doing interpretive research presumed teaching to be complex and context-specific, and provided rich descriptions of school and classroom events. The authors believe that both of these paradigms tend to "make invisible" the teachers' role in knowledge generation. They contend that systematic and intentional inquiry carried out by teachers—teacher research—provides insight into the questions teachers ask and the interpretive frames they use to understand and improve their practices, and can be of value to both the teaching community and the academic community. Critical issues divide university research on teaching from teacher research and make it difficult for academics to accept the contributions teachers can make. These issues are institutionalization (ownership and supportive structures) and standards for methodological rigor (research questions, generalizability, theoretical frameworks, documentation, and analysis). The authors conclude with a discussion of strategies to encourage teachers to do teacher research.

Cochran-Smith, M., & Lytle, S. L. (1992). Communities for teacher research: Fringe or forefront? ***American Journal of Education, 100,*** **298-325.**

Cochran-Smith and Lytle are advocates for research by teachers, suggesting that it represents a distinctive way of knowing about teaching that will both contribute to and alter what we understand about teaching. In this article, they consider the obstacles to teacher research and argue that overcoming these barriers requires building and sustaining intellectual communities of teacher-researchers. The obstacles to teacher research are deeply embedded in the cultures of school and university organizations and in the traditions of research. These obstacles include: teacher isolation created by school structures that provide little time for teachers to learn together and by school cultures that value autonomy and privacy; school cultures that perpetuate the myth that good teachers do not admit to having questions about their own practice; the knowledge base for teaching that is thought to be constructed by university researchers; and the negative views of educational research held by most teachers. There has been a growing movement to provide organizational time so that groups of teachers can work together and learn together. Cochran-Smith and Lytle created a framework for helping groups of

teachers plan collaborative work. The framework considers four perspectives: organizing time, using talk, constructing texts, and interpreting the tasks of teaching and schooling. Cochran-Smith and Lytle present rich detail of studies to illustrate how each of these perspectives contributes to teacher research. They believe that communities for teacher research have the potential to move teacher research from the fringe to the forefront and can, thus, play an instrumental role in school reform.

Cole, A. L. (1989). Researcher and teachers: Partners in theory building. ***Journal of Education for Teaching, 15,*** **225-237.**

"Inside-out" research is the term Cole uses for the collaborative research of teachers and researchers that takes place within the classroom. Cole describes this work as a "mutually informed, mutually beneficial, and mutually useful endeavor," undertaken for the purposes of understanding and describing real-life classroom situations and directly improving practice. Collaboration is being rediscovered in educational research. Collaborative research involves the sharing and development of ideas and understandings through reflections and discussions organized around teaching events. While the focus of this article is on the role of collaboration in educational research, Cole does report on a study in which she and two teachers worked as co-investigators to study their expressed beliefs. She includes field notes, written reflections, discussion transcripts, and a written descriptive summary to illustrate the reciprocal, reflexive, and responsive nature of the research as a cycle of experiential learning. She concludes that each partner in the inquiry contributes differently to the attainment of the common goal of understanding classroom practice, and that both partners benefit from the research.

Cole, A. L., & Knowles, J. G. (1993). Teacher development partnership research: A focus on methods and issues. ***American Educational Research Journal, 30,*** **473-495.**

This article focuses on the researcher-teacher relationship in partnership research on teaching. Cole and Knowles conduct partnership research within the interpretive framework, going out into classrooms to observe, participate, and talk with teachers about teaching and learning. In this article, they use a matrix to compare the roles and responsibilities of researchers and teachers in traditional research with those in partnership research. They then consider issues arising from their work with teachers. For example, one story tells of a teacher who withdrew from their study. Issues of intrusion, roles, and relationships in collaborative research were raised. The roles and responsibilities had not been clearly articulated at the onset of the study leading to confusion for the teacher. The research activity proved to be a

intrusive burden for her, especially when her classroom situation became particularly difficult. The authors point out that collaboration requires a fundamentally different stance toward research, a stance that the researcher had not completely understood or adopted at the time of the study in the example. Collaboration goes beyond cooperation, requiring more extensive and ongoing negotiation. Other examples from their work provide evidence that successful collaboration does not require equal involvement on the part of teachers and researcher, but that the involvement of each be mutually agreed upon, again accentuating the role of negotiation. Cole and Knowles describe the issues—technical, personnel, procedural, ethical, political, and educational—involved in partnership research and propose questions to help research partners address each of the issues.

Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative inquiry. ***Educational Researcher, 19*** **(5), 2-14.**

Narrative is increasingly used in educational research studies to investigate the ways people experience education. Connelly and Clandinin use the word "narrative" to mean both the phenomenon (people lead storied lives and tell stories of those lives) and the method (researchers describe those lives, collect and tell stories of them, and write narratives of experience). They outline the possibilities for narrative inquiry within educational studies and explore methodological issues of narrative inquiry. They begin with a discussion of the establishment of a collaborative relationship between researchers and teachers, a prerequisite for narrative inquiry. Of importance is the construction of a relationship in which the voices of both researchers and practitioners are heard. The authors describe a variety of narrative data sources and ways of collecting narrative data, including field notes of shared experience, journal records, unstructured interviews, story telling, letter writing, and autobiographical and biographical writing. Narrative studies require paying attention to criteria other than validity, reliability, and generalizability. Adequacy and plausibility are suggested as being more appropriate criteria. In the construction of the narrative, attention must be paid to time and place, plot and scene, and voice. The authors conclude with the observation that narrative and story generate a somewhat new agenda of theory-practice relations, one of researchers working *with* teachers to construct a collaborative story of inquiry in teaching and learning.

Connelly, F. M., & Clandinin, D. J. (1994). Telling teaching stories. ***Teacher Education Quarterly, 21*** **(1), 145-158.**

The purpose of this paper is to illustrate how teachers' professional and personal stories are central to teacher education, teacher development, and the improvement of schools. Connelly and Clandinin's work focuses on the

role of teachers' and students' lives in education and the use of narrative in educational research. This article illuminates some of the basic assumptions and metaphors of their work, and provides insight into this line of research. The assumptions that they make about teacher education are that it involves the life history of the teacher; that it is lifelong and ongoing; and that teaching is an educative relationship among people. They compare two metaphors of teacher education: teacher education as injection (professors injecting knowledge and skills into prospective teachers) and teacher education as reconstruction (the prospective teachers rethinking and rebuilding the past in order to make sense of their learning). The central metaphors (or conceptual understandings) in Clandinin and Connelly's work include: life is a story we live; education equals growth equals inquiry; people make meaning of their lives through story; if a teacher can tell the story of her own education, she will be better able to tell the stories of her students' education; teacher education is a process of learning to tell and retell educational stories; and teacher education is a sustained education. Telling and retelling stories, they believe, leads to awakenings, to transformations, and to changes in practice.

Cortazzi, M. (1993). ***Narrative analysis.*** **London: Falmer Press.**

Cortazzi proposes that narrative methods of research can allow researchers to develop descriptions of teachers' culture which preserve their voices. This can help those on the outside of classrooms better understand what happens in classrooms, and this is increasingly thought to be important if current reform efforts are to succeed. Cortazzi says, "We need to know how teachers themselves see their situation, what their experience is like, what they believe, and how they think." He reviews recent research literature on the role of reflection in teacher development; the changing perspectives on teachers' knowledge; the recent concern about preserving teachers' voices; the importance of autobiography and biography; the collaboration between researcher and teachers in narrative inquiry; and the use of teachers' curriculum stories and teachers' anecdotes about children. In all of these areas, narratives are used as data and as a reporting style. In the chapters of this book, Cortazzi discusses each model of narrative analysis—sociological and sociolinguistic models, psychological models, literary models, and anthropological models—and then shows the application of narrative analysis to a study of primary teachers in Britain.

Day, C. (1991). Roles and relationships in qualitative research on teachers' thinking: A reconsideration. ***Teaching and Teacher Education,*** **7, 537-547.**

Day considers the relationship that must be constructed between researcher and teacher if research on teacher thinking is to be fruitful. The notion of establishing a caring and ethical relationship is stressed. Day considers a key

question to be, What is in this for the teacher(s)? That is, collaborative research should have value to the teachers as well as to the researcher. The researcher moves from being an outsider to being an insider–outsider, and in order to do this, the relationships must become more coequal, where power is shared, knowledge negotiated, and contributions by persons of both groups are valued. Day describes a collaborative researcher paradigm that requires researchers to have "human-relating" skills. He draws on two case studies to explicate the researcher's role in the research. In one case, for example, the researcher described himself as researcher–collaborator–critical friend–mentor. The work described in the case studies was collaborative research where research and staff development were one and the same. The experiences were both practical and emancipatory for the teacher–participants. Day concludes that, "though there are now a steadily growing number of researchers who are going into classrooms, they do not always do so with the purpose of supporting teacher learning." In a truly collaborative approach, teacher learning is a goal.

Duckworth, E. (1986). Teaching as research. ***Harvard Educational Review, 56,*** **481-495.**

Duckworth wondered about her role as a teacher if knowledge must be constructed by each individual. To answer her question, Duckworth describes two features of her own teaching that are based on constructivist learning ideas. The first aspect of her teaching is to put students into contact with phenomena related to the area to be studied and to help them notice what is interesting about the phenomena. She is teaching about teaching and learning in her work with preservice students, so she engages them in a close look at their own learning, in this case about habits of the moon. They engage with the phenomenon by keeping journals of their observations of the moon, and Duckworth shares excerpts from these journals in this article. The second aspect of her teaching is having the students try to explain the sense they are making—of the habits of the moon, of their experiences as learners, and of teaching. Much of their learning is in the explaining to others. Duckworth draws several conclusions from the investigation of these strategies, including that the students determine what they want to understand, they come to depend on themselves, they learn an enormous amount from each other, and they come to recognize knowledge as a human product. In the second part of the article, Duckworth explores the idea that teaching is research. For example, she notes that by attempting to understand how children understand a topic, the teacher learns ways to teach that topic. She concludes that when teaching is practiced as a process of engaging learners in trying to make sense, it becomes research.

Ely, M., Anzul, M., Friedman, T., Garner, D., & Steinmetz, A. M. (1991). *Doing qualitative research: Circles within circles.* London: Falmer Press.

This book portrays the experience of doing qualitative research—the struggles, questions, insights—as an interplay between affect and cognition. The authors write, "we believe that qualitative study is forged in the transaction among what is done and learned and felt by the researcher. It is an intensely recursive, personal process, and while this maybe the hallmark of all sound research, it is crucial to every aspect of the qualitative way of looking at life." The general characteristics of qualitative research are described and then the chapters (each written by one of the authors) chronicle the research process. In the first chapter, for example, they consider the research question and entry, noting that questions for study evolve or shift as the study progresses, and that negotiation is an ongoing process. These issues are, thus, revisited in subsequent chapters. They use many examples from their own and others' work to elaborate on methods involved in qualitative research: participant observation, interviewing, keeping logs, audiotaping and videotaping, data analysis, and leaving the field. The importance of the affective "feel" of each procedure is also discussed. The processes of doing the final analysis and writing the story are intricately woven with examples. The final chapter is called "reflecting" and revolves around five themes that emerged from the authors' work and provides insight into the overall experience of doing qualitative research. One of these themes is that the processes of qualitative research also become processes of professional growth.

Glesne, C., & Peshkin. (1992). ***Becoming qualitative researchers: An introduction.*** **White Plains, NY: Longman.**

This work is an introductory text for university courses on qualitative research. Qualitative inquiry requires a significant paradigm shift for most people as they begin this kind of work. In the introduction to the book, the authors describe qualitative research courses as collaborative learning experiences characterized by camaraderie, anxiety, humor, diversity, and the need for time. The book describes the research process from beginning to end. It starts with a discussion of prestudy tasks such as deciding on a topic, site, timeline, access requirements, and researcher role. Research activities such as participant observation, taking fieldnotes, and interviewing are examined in some detail. For example, details on the nature of questions, the need for rapport, and probing strategies are provided in the section on interviewing. Chapters on rapport, subjectivity, and ethical considerations provide insights on these areas that are somewhat unique to qualitative work. Two chapters, "Finding Your Story" and "Writing Your Story" concern data analysis and writing up the research. Throughout the book, the voices and experiences of typical graduate students are included as examples. Current critical issues are discussed, such as power and control in relation to knowledge, the role of

history and culture in shaping the researcher's perspective, and the interrelationship of researcher and researched.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). London: Sage.

In this book chapter, Guba and Lincoln analyze four research paradigms: positivism, postpositivism, critical theory, and constructivism. A paradigm is a basic belief system or a worldview that guides the researcher. The emphasis of this chapter is on the paradigms, their assumptions, and the implications of those assumptions for research. They begin with a critique of over-quantification and the received view of knowledge, noting such issues as the theory-laden and value-laden nature of facts and the relationship between the inquirer and the object of the inquiry. The four paradigms are then examined with regard to ontology (what is the form and nature of reality), epistemology (what is the nature of the relationship between the knower and what can be known), and methodology (how can the inquirer go about finding out whatever he or she believes can be known). The authors use comparison charts to show the differences between the paradigms. Constructivism is in the early of development as a research paradigm and is distinguished from the others by its relativist stance, which holds that realities are apprehensible in the form of multiple, intangible mental constructions that are socially and experientially based. The authors discuss the implications of each paradigm on selected practical issues.

Johnston, M., & The Educators for Collaborative Change. (1997). *Contradictions in collaboration: New thinking on school/university partnerships*. New York: Teachers College Press.

This book is written collaboratively by the participants in a six-year longitudinal study of collaboration in a professional development school (PDS). The authors are a university professor, researchers, graduate students, and classroom teachers. The text is interspersed with academic asides, which connect the experiences of the group with relevant research literature. Between the chapters are "interludes with a metaphor," which extend the thinking about the experience of the PDS. The book looks at issues and problems in collaboration and at the results of a research project to study collaboration as it developed. Three primary ideas shape the understanding of collaboration—differences, tensions, and dialogue. Differences between university and school perspectives were first thought of as conflicts to be overcome, but, over time, the idea of learning from tensions emerged and guided the group's thinking about differences. Differences challenged thinking and created a productive tension in which perspectives could be

examined. Tensions are commonplace in collaboration and include challenge–support, individuality–community, openness–focus, and so on. Dialogue was the means by which the group examined and learned from the differences. Two case studies are presented in the second part of the book. The concept of collaboration is illuminated through the experiences and reflections of the multiple authors.

Lytle, S. L., & Cochran-Smith, M. (1992). Teacher research as a way of knowing. ***Harvard Educational Review, 62,*** **447-474.**

Some educational researchers have proposed that the knowledge that makes teaching a profession comes from those outside the profession (i.e., university researchers), and what makes teachers professional is using this knowledge base in their practice. Lytle and Cochran-Smith argue for a different theory of knowledge for teaching, one that is drawn from the systematic inquiry into teaching by teachers themselves. Teachers are among those who have the authority to construct knowledge about teaching, learning, and schooling. Research by teachers, the authors contend, is a way of generating knowledge that contributes to both local knowledge (for use by the teachers for themselves) and public knowledge (for use by the larger school and university communities). Six examples show how individual teacher-researchers generated local knowledge through an inquiry process. The authors also describe groups of teachers using collaborative inquiry to design curriculum. These groups built knowledge in community through an inquiry process and then developed curriculum through analysis of data. Teacher research can also contribute significantly to the public knowledge by bringing the unique perspectives of teachers to light. Lytle and Cochran-Smith propose that knowledge for teaching is "inside/outside" rather than "outside-in." This proposal calls attention to teachers as knowers. Lytle and Cochran-Smith posit that when teacher development is reconfigured as inquiry and teacher research is thought of as challenge and critique, these activities become forms of social change—of classrooms, schools, and school communities.

Lytle, S. L., & Cochran-Smith, M. (1994). Inquiry, knowledge, and practice. In S. Hollingsworth & H. Sockett (Eds.), ***Teacher research and educational reform: Ninety-third yearbook of the National Society for the Study of Education*** **(pp. 22-51). Chicago: University of Chicago Press.**

The teacher research movement prompts new questions about how inquiry functions to inform and alter classroom practice and the cultures of teaching. Lytle and Cochran-Smith propose a theoretical framework for teacher research and discuss characteristics of this work, as they have done in other articles. In the first section of this book chapter, oral inquiries and conceptual research are described as two forms of teacher research. Oral inquiries are

collaborative, oral, and social; teachers work together to examine educational concepts, texts, student work, and other data, building on one another's insights. In conceptual research, teachers recollect and reflect on their experiences to build a conceptual understanding of teaching, learning, or schooling, and issues around these topics. Lytle and Cochran-Smith review the notions of local knowledge and public knowledge and the relationship of teacher research to both. They then discuss the implications of teacher research for professional development. They say that teacher research takes the view of teaching as an intellectual activity that hinges on "the deliberative ability to reflect on, and make wise decisions about practice." Teaching is assumed to be "complicated and intentional." Treating teaching as an inquiry process is tied to the view of learning as the construction of meaning. An inquiry-based view of teaching suggests that the role of professional development is to provide processes that prompt teachers to construct their questions and begin to develop courses of action that are valid in local contexts. Teachers, thus, become collaborators. Two examples are provide to illustrate these points and a research agenda is proposed.

Marble, S. (1997). Narrative visions of schooling. ***Teaching and Teacher Education, 13,*** **55-64.**

Three teams of preservice teachers created and presented school "portraits" based on research in an elementary school setting. Each of the portrait teams chose a different point of view for their research—students, administrators, or researchers of teachers' practice. The last is a classic educational research perspective. The stories of their efforts and narrative decisions reveal that each team moved from a point of view external to the school to one more internally situated in the actions of teaching. As the students constructed their own stories of the school, their relationships with others in the school setting, their knowledge about schooling, and their educational decision making were all affected, resulting in powerful visions of schooling.

McEwan, H. (1995). Narrative understanding in the study of teaching. In H. McEwan & K. Egan (Eds.), ***Narrative in teaching, learning, and research*** **(pp. 166-183). New York: Teachers College Press.**

McEwan tells a story about the philosophy of teaching and the empirical study of teaching. The story begins with these two fields being distanced from the practice of teaching and ends with the notion that, through a narrative approach, they can be reconciled with teaching practice. The two themes of his story are (1) the conflict between philosophers and those who study teaching and (2) the quest for a logical description of the essential nature of teachers' thinking. McEwan begins the story with the conflict between philosophers and the proponents of behavioral objectives, and then moves to the essentialist project in philosophy that aimed to understand teachers' thinking

processes. McEwan says that the focus was too narrow, that by limiting the inquiry to what goes on in teachers' heads, the rich social contexts in which teaching takes place were minimized. He also notes that this research agenda suggested that we could improve teaching by getting teachers to think in the right way, as if there was one right way. As he continues his story, he describes new forms research on teaching, research that aims at interpretation instead of analysis. This movement represents a move from the search for a theory of teaching toward an exploration of the multitude of ways that teaching can be meaningfully understood. He concludes with an exploration of narrative as a link between research (theory) and practice. One consequence of this approach is the realization that stories have the power to change practice.

Richardson, V. (1994). Conducting research on practice. ***Educational Researcher,*** **23 (5), 5-10.**

The purpose of this article is to explore two forms of research on practice—formal research and practical inquiry—and their benefits to educational practice. Research on the practice of teaching is undergoing significant change as a result of changing perceptions of teachers, knowledge, and teaching. Formal research is conducted by researchers, sometimes in collaboration with practitioners, to contribute to the knowledge base about teaching. There has been a shift from process-product research on effective teaching behaviors to research on teachers' thinking, knowledge, and beliefs. Those conducting this kind of research reject the view of the teacher as a recipient and consumer of research; rather, the teacher is seen as an actor who mediates ideas, constructs meaning and knowledge, and acts upon the new understandings. The ideas come from different sources, including other teachers, readings, and reflection on practice. Practical inquiry is undertaken by teachers to improve their practice, is not expected to be generalizable, and does not follow formal research methodology. Several conceptions of teacher research are described: the notion that teaching is research; conceptions of the teacher as reflective practitioner; action research; and the teacher as formal education researcher. The first three describe practical inquiry whereas the fourth is an example of formal research. Richardson suggests that practical inquiry may be turned into formal research, although this will require new conceptions of methodology.

Wagner, J. (1997). The unavoidable intervention of educational research: A framework for reconsidering researcher-practitioner cooperation. ***Educational Researcher,*** **26 (7), 13-22.**

Critiques of traditional educational research have led researchers into cooperative relationships with teachers in schools. Wagner describes three

forms of direct researcher-practitioner cooperation: data-extraction agreements, clinical partnerships, and co-learning agreements. Data-extraction agreements are the most traditional form of cooperative research. The researcher is clearly the agent of inquiry, the person who reports the findings, and the person who constructs the knowledge to be reported. The teachers' work is described, analyzed, and reported, usually to other researchers. In clinical partnerships, practitioners and researchers work together to improve the knowledge about schooling, often through collaborative action research. Practitioners and researchers work to develop shared understandings of the issue, and both are engaged in inquiry. The purpose of the research is to stimulate change and improvement. The knowledge generated may be reported both to other researchers and to practitioners. Co-learning agreements are more interactive as both researchers and practitioners are regarded as agents of inquiry and as objects of the inquiry. Researchers and practitioners are both participants in processes of education, both are engaged in action and reflection, and both may learn something about his or her own world of education. Wagner provides tables to characterize these three styles of cooperation according to questions asked, research stance, inquiry roles, methodology, and so on. He considers research to be a social intervention, saying that all forms of cooperative research have the potential to alter the social life of individuals and institutions. He suggests that research should be designed to prepare for this intervention.

Zeller, N. (1995). Narrative rationality in educational research. In H. McEwan & K. Egan (Eds.), *Narrative in teaching, learning, and research* (pp. 211-225). New York: Teachers College Press.

Zeller makes a case for reporting case study research in a style that is informal, narrative, and accommodates the multiple realities encountered in qualitative studies. Narrative models that have potential value for the case study writer are the nonfiction novel, ethnography, and new journalism. In this article, she explores new journalism, noting the similarity of this model with qualitative case study research in education. Zeller illustrates this model by providing two passages from a case report. The first is written in traditional narrative (she does not provide an example of a third-person writing style). In this passage, the writer has a central role in the action as an involved observer, and so it is written in the first person. In the second example, she employs the new journalism style, using a scene-by-scene strategy. In this passage, Zeller is able to include more data, and make the story more compelling. She suggests that adopting alternative writing styles to report case study research offers the possibility of enlarging access to and impact of research. She concludes by saying that "it is by design that a case narrative becomes not simply a record of experiences, but a product of the case study."

Learning Theory and Implications for Classroom Practice

This section of the bibliography is on learning theories and their implications for classroom practice. References were chosen that focus on basic theories of learning that are being used to guide reform in classroom practice, including general references on cognitive research, constructivist learning theory, and research on the brain. Additional references provide extensive information on the implications of constructivism for teachers and their teaching and creation of classroom environments.

How has recent work in cognitive psychology provided guidance for educational research and practice? References by Bruer (1993), Mayer (1992), and Reilly (1989) provide a historical perspective on research in cognitive psychology and discuss the guidance for teaching and learning practices provided by this field of study.

What is the constructivist theory of learning? Classic articles by Pope (1982) and Posner, Strike, Hewson, and Gertzog (1982) discuss constructivism as personal construction of meaning and conceptual change within the individual. Driver and Bell (1986) and Yager (1991) consider constructivism in science learning. Articles by von Glaserfeld (1989, 1993) introduce the theories of Vygotsky and Bahktin and the notion of social constructivism, which are explored further by Wertsch and Toma (1995) and O'Loughlin (1992). Articles by Brown, Collins, and Duguid (1989) and Meyer (1993) examine the specific concepts of scaffolded instruction, the zone of proximal development, and cognitive apprenticeship. Bayer (1990) uses these notions in the development of a teaching model. Fosnot (1996), Tobin and Tippins (1993), and Wilson and Peterson (1997) present constructivism as a complex learning theory incorporating both personal and social aspects of meaning construction.

What are the implications of constructivism for the creation of learning environments? Marshall (1988), in a classic article, explores metaphors for classrooms and schools that have implications for the development of classroom environments. Brooks and Brooks (1993) provide a rationale for and examples of constructivist classroom environments in general. Applebee (1991) talks about effective environments for language arts learning, and Pirie and Kieren (1992) discuss those for mathematics learning.

What are the implications of constructivism for teaching and teachers? Confrey (1992), Schoenfeld (1988), and Wheatley (1993) consider the implications of this theory of learning on the teaching of mathematics, and Glasson and Lalik (1993) and Tippins, Tobin, and Nichols (1995) do the same for science teaching. Marzano (1992) presents a teaching model. The references by Gallas (1994), Glamser (1998, April 19), Lambert (1990), Osborne (1997), Shapiro (1994), and Watson and Konicek (1990) provide a picture of teaching and learning from teachers' perspectives, and include details of the impact of these new teaching approaches on students and their learning. Walker and Lambert (1995) relate learning theory to the notion of teachers as learners and leaders.

How does the new research on the brain inform teaching practice? Three books by Caine and Caine (1991, 1997a, and 1997b) and one by Jensen (1998) provide details of possible implications of brain research for classroom practice.

Applebee, A. N. (1991). Environments for language teaching and learning: Contemporary issues and future directions. In J. Flood, J. M. Jensen, D. Lapp, & J. R. Squire (Eds.), *Handbook of research on teaching the English language arts* (pp. 549-556). New York: Macmillan.

Applebee discusses ongoing debates about effective learning environments and the English language arts curriculum. These debates revolve around changing perceptions of three components—teacher, student and curriculum—and of the metaphors that govern how these components interact in teaching and learning. A new image is emerging of the teacher as a professional educator—a teacher researcher, reflective practitioner, and participant in educational dialogues—who bases her decisions on an understanding of who her students are, what they know, and what they need to know. Educators are developing new conceptions of students that result in a renewed commitment toward developing effective programs for at-risk students and providing programs that will help all students develop skills needed for reasoned and disciplined thinking. Curriculum methods such as process-oriented writing instruction and whole-language programs are part of a general shift toward the cognitive and linguistic processes underlying school learning and, while there have been difficulties in implementation, appear promising. Applebee proposes the metaphor of "instructional scaffolding" as one alternative to traditional models of teaching and learning, suggesting five criteria for effective environments based on this metaphor: ownership, appropriateness, support, collaboration, and internalization. Applebee concludes that in classrooms of the future, teachers will make decisions to insure that learning can take place.

Bayer, A. S. (1990). *Collaborative-apprenticeship learning: Language and thinking across the curriculum, K-12.* Mountain View, CA: Mayfield.

Bayer advocates greater student responsibility for learning, heterogeneous class groupings, and the use of collaborative activities. In this book, she presents a new teaching model—Collaborative-Apprenticeship Learning—that relies on language and learning principles to guide teaching decisions. She draws from Vygotsky's theory that learning is social, and from the Vygotskian notions of the zone of proximal development (ZPD) and scaffolded instruction. She proposes that students become the primary language users in the classroom, and elaborates on ideas such as the roles of peer collaboration, expressive or exploratory talk, and expressive writing in learning; language as a tool for thinking; and the teacher's role as a collaborator. The Collaborative-Apprenticeship Learning model is based on four broad language and learning principles: (1) learners are actively

attempting to make sense out of their world; (2) working in collaboration with an instructor and peers within the apprenticeship process, learners construct knowledge beyond what they could do independently (ZPD); (3) language is used as a tool for learning; and (4) students develop language and thinking competencies by using these processes regularly for meaningful problem-solving tasks. The model involves starting with what students know, sharing that prior knowledge, building on that knowledge collaboratively, embedding language as a tool for learning throughout the process, and increasingly supporting student initiative. Bayer presents case studies to illustrate the model in real classroom situations and offers practical advice for teachers interested in changing their approaches to teaching.

Brooks, J. G., & Brooks, M. G. (1993). *In search of understanding: The case for constructivist classrooms.* Alexandria, VA: Association of Supervision and Curriculum Development.

This book provides a rationale for the development of classrooms based on constructivist learning. To change from traditional to constructivist classrooms, teachers must make important paradigm shifts in their views of knowledge and learning, and rethink their current teaching strategies in light of these new ideas. The authors describe five guiding principles for teaching derived from constructivism: (1) posing problems of emerging relevance to learners; (2) structuring learning around 'big ideas' or primary concepts; (3) seeking and valuing students' points of view; (4) adapting curriculum to address students' suppositions; and (5) assessing student learning in the context of the teaching. They provide research support for and classroom examples of each principle. The final section of the book includes a set of descriptors of constructivist teaching behaviors that serves as a framework within which teachers can experiment with this new approach. Examples make the descriptors fairly concrete and highlight the practices of teachers who are mediators of students and environments rather than presenters of information. The authors make suggestions for bold changes in the institutional settings of schooling to create new norms that support constructivist approaches to teaching and learning. For education reform to have value, they say, it much begin with "how students learn and how teachers teach," not with political or policy mandates.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18* (1), 32-42.

Drawing on research into cognition as it is revealed in everyday activity, the authors argue that knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used. Concepts are developed in the context of their use in much the same way as meanings of

words are developed. The authors compare knowledge to a set of tools. Tools (and knowledge) can only be fully understood through use, and using them entails changing the user's view of the world and adopting the belief system of the culture in which they were produced. The authors discuss how this view of knowledge affects our understanding of learning. They note that conventional schooling often ignores the influence of school culture on what is learned in school. For example, the ways schools use dictionaries, math formulae, or historical analysis are very different from the ways practitioners use them. Many of the activities students undertake are simply not the activities of practitioners and make little sense outside of school. They propose cognitive apprenticeship as an alternative to conventional practice. Cognitive apprenticeship methods try to enculturate students into authentic practices through activities and social interactions. Examples from mathematics classes are provided to illustrate this idea.

Bruer, J. T. (1993). *Schools for thought.* Cambridge, MA: MIT Press.

Bruer holds that we must apply what we have learned from cognitive research to improve teaching and learning in schools. He suggests that an applied science of learning is needed and explains the break from behaviorism that began in 1956 with Chomsky's work on language. From that point through the early 1980's, the field has been influenced by information science, the theory of computation, and studies of problem-solving by novices and experts. The result has been a theory of learning as a developmental psychology of performance changes. Bruer explores the notion of representations, the symbol structures we construct to encode our experience, process it, and store it in our memories. He presents an extensive amount of background on the research about such concepts as prior knowledge, problem solving, and transfer. Bruer looks at specific educational practices in mathematics, science, and reading and writing. These sections are extensive, provide numerous examples, and give an overview of the use of cognitive science in each domain. Bruer also discusses educational reform. He suggests that we consider teaching as a form of problem solving, that we look at teaching as an art, and that we change our representations of intelligence, learning, and teaching so we can change the interactions between students and teachers in the classroom.

Caine, R. N., & Caine, G. (1991). *Making connections: Teaching and the human brain.* Alexandria, VA: Association for Supervision and Curriculum Development.

This is the first of three books on brain function and the process of learning, what Caine and Caine call brain-based learning. They feel that educators must consider the way in which students learn and the type of environment that

promotes learning when curriculum is designed and schools are structured. Each person's brain is able to detect patterns, memorize, self-correct, learn from experience and create. Teachers should actively take advantage of these natural processes by designing and orchestrating lifelike, enriching and appropriate experiences for learners, and ensuring that students process experience in such a way as to increase the extraction of meaning. The authors have developed twelve principles of brain-based learning: (1) the brain is a parallel processor capable of doing multiple tasks; (2) learning engages the entire physiology; (3) the search for meaning is innate; (4) the search of meaning occurs through 'patterning'; (5) emotions are critical to patterning; (6) the brain processes parts and whole simultaneously across and within hemispheres; (7) learning involves both focused attention and peripheral perception; (8) learning always involves conscious and unconscious process; (9) there are least two types of memory (spatial memory system and a set of systems for rote learning); (10) people understand and remember best when facts and skills are embedded in natural, spatial memory; (11) learning is enhanced by challenge and inhibited by threat; and (12) each brain is unique. In order for teachers to make effective use of these principles, Caine and Caine suggest that they begin by investigating their own understandings. Once educators have changed their way of thinking about curriculum, then they can begin to successfully integrate these concepts into classroom practice.

Caine, R. N., & Caine, G. (1997a). *Education on the edge of possibility.* Alexandria, VA: Association of Supervision and Curriculum Development.

While providing anecdotal and theoretical suggestions for the reader, Caine and Caine's second book on brain-based learning describes the outcomes of a process to bring the authors' holistic interpretation and application of brain research to the teachers in two schools. The process begins with small group sessions, building on the existing mental models that teachers have about student learning and brain principles, a process the authors call an "experimental partnership." As they create an environment of learning, they begin to change the existing mental models that teachers have about students through a process of "ordered sharing." The Caines use the Wheel of Experience Design Model as a tool to develop dialogue and reflection in the process. The participants use a framework that begins with an instructional design focus, moves to an in-class peer group interaction, and then to an out-of-class and cross-age peer group interaction. Once the group has gone through these stages, they move to participation with the entire school community, then to home and family connections, then to local community resources and support, and finally to wider community involvement and media participation. It is an approach to instruction that involves the teacher in a systemic change process built on the way students learn.

Caine, R. N., & Caine, G. (1997b). *Unleashing the power of perceptual change: The potential of brain-based teaching.* Alexandria, VA: Association of Supervision and Curriculum Development.

Using anecdotal evidence, scenarios, and theoretical suggestions, the Caines' second book on brain-based learning describes the outcomes of a process to educate teachers in the authors' holistic interpretation and application of brain research in classroom instruction. Continuing their work with groups of educators, the authors introduce the idea that all teachers design their lessons based on their perceptual orientation The authors describe three perceptual orientations: (1) teachers rely on the power of others, on a narrow prescribed teaching focus, on control as coercion and an almost exclusive reliance on an external focus; (2) teachers moving or transitioning between the two extreme perceptions; and (3) teachers rely on self-efficacy grounded in authenticity, on one's own broad cognitive horizons, on building relationships that facilitate self-organization, and an internalized sense of self-reference and process. It is through the recognition of their orientation that teachers are able to rethink their attitudes toward student learning and, in the end, design a learning environment that offers students meaningful learning.

Confrey, J. (1992). What constructivism implies for teaching. In R. B. Davis, C. A. Maher, & N. Noddings (Eds.), *Constructivist views on the teaching and learning of mathematics* (pp. 107-122). *Journal for Research in Mathematics Education Monograph No. 4.*

Direct instruction in mathematics follows a familiar pattern—introductory review, a development portion, a controlled transition to seatwork, and a period of seatwork. The assumptions underlying direct instruction, however, are subject to challenge from a constructivist perspective. In this book chapter, Confrey relates two major aspects of constructivism—construction and reflection—to mathematical learning. Reflection, she says, functions as the "bootstrap" for the construction of mathematical ideas. Students receiving direct instruction tend to memorize and imitate examples so as to produce the "right" answer. Confrey's premise is that instruction compatible with constructivist ideas will help students learn how to create "powerful" constructions that are internally consistent and can be applied to a range of problems. Confrey presents results of a case study of a teacher committed to constructivist beliefs. The focus of the study was on teacher-student interactions. From the study, a model of practice is generated which has six components: promotion of student autonomy; development of reflective processes; construction of case histories; identification and negotiation of a tentative solution path; retracing and group discussion of the paths; and

adherence to the intent of the materials. Examples are provided of each component of this alternative to direct instruction.

Driver, R., Asoko, H., Leach, J., Mortimer, E., & Scott, P. (1994). Constructing scientific knowledge in the classroom. ***Educational Researcher,*** **23 (7), 5-12.**

Underpinning contemporary perspectives on science education is the view that knowledge cannot be transmitted but must be constructed by the mental activity of learners. This article presents a theoretical perspective on teaching and learning science in the social setting of classrooms. The authors compare the view of science learning as an individual activity to the view of science learning as the social construction of knowledge. They conclude that learning science involves both personal and social processes. They argue that it is important for science educators to appreciate that scientific knowledge is socially constructed and validated. Learning science thus involves being initiated into scientific ways of knowing. Students need appropriate experiences and access to the cultural tools and conventions of the science community. Science views may be in conflict with the learner's prior knowledge schemes, and this presents a challenge for teachers. Negotiation and scaffolding are two discursive practices that support knowledge construction in classrooms. Episodes from science classrooms are presented to illustrate the development of personal meaning in the social context of the classroom. The authors conclude with the image of the teacher as "the often hard-pressed tour guide mediating between children's everyday world and the world of science."

Driver, R., & Bell, B. (1986). Students' thinking and the learning of science: A constructivist view. ***School Science Review,*** **67, 443-456.**

What is our view of science? What is our view of the learning process? How can understanding of these issues help address problems of science education in schools? These are the questions that Driver and Bell address in this classic article. Science, they say, is about the ideas, concepts, and theories used to interpret the world. They then elaborate on six key aspects of the constructivist view of learning, using examples from science classrooms to illustrate the principles. The principles state that learning outcomes depend on what the learner already knows; learning involves constructing meanings; learning is a continuous and active process; meanings are evaluated and accepted or rejected; learners have responsibility for their learning; and some meanings are shared. Adopting a constructivist view of learning has implications for science education, including the importance of understanding students' prior assumptions; of providing opportunities for students to reflect, have new experiences, and construct meaning; of revising

the curriculum to be more developmentally appropriate; and of examining the conceptions which are most useful for students.

Fosnot, C. T. (1996). Constructivism: A psychological theory of learning. In C. T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (pp. 8-33). New York: Teachers College Press.

What is this constructivist theory of learning that is the basis of the current reform movement, and how is it different from other models of learning? Fosnot thus begins an extensive review of behaviorism, maturationism, and constructivism. Constructivism comes from the field of cognitive science, particularly the works of Piaget, Vygotsky, Bruner, and Gardner. Fosnot describes the work of these theorists and develops a synthesis to describe and define the psychological theory of constructivism. She refers to the debate between cognitive (or Piagetian) constructivists and social constructivists, and concludes that a constructivist learning model can be depicted as a dialectical tripartite drawing of self, others, and medium connected by symbols (primarily language). This theory pictures learning as an "interpretive, recursive, building process by active learners interacting with the physical and social world." While constructivism is a theory of learning, not a description of teaching, it does have applications for instruction. Fosnot challenges educators to learn how to use this new paradigm to inform teaching.

Gallas, K. (1994). *The languages of learning: How children talk, write, dance, draw, and sing their understanding of the world.* New York: Teachers College Press.

First-grade teacher and researcher, Karen Gallas watches children, collects their artwork and notes, listens to their conversations, and talks with them. In this book, she uses narrative to explore how young children communicate their knowledge of the world and the ways in which that understanding can transform teaching practice. Narrative, for Gallas, includes all forms of communication, so the book includes children's art as an important part of the stories she tells of children learning. Through these stories, she shows how children can be encouraged to interpret language freely and use that potential to expand and develop as learners. She tells stories of a homeless child, of an immigrant child, and of a typical bad boy. In each, the focus is on the particular child and that child's learning, and on the understandings that emerge from relationships within a classroom. She tells stories about learning science, about how children talked and wrote about science, and about the complexities of the language and the stories they used to understand the world of science. She tells stories about art as a means of enabling children to think about new knowledge in more complex and meaningful ways. And finally, woven through the book is the story of a

teacher-researcher. She concludes by offering four aspects of the languages of learning that must be paid attention to in order to best serve children: valuing silence, using language self-consciously, contextualizing language, and exploring multiple texts.

Glamser, M. C. (1998, April 19). Notes from a teacher/soldier in the learning revolution. ***The Houston Chronicle.***

What is the learning revolution? In this short editorial, Glamser describes her transition from a teacher-centered teacher to student-centered teacher. The learning revolution—a new focus on students taking charge of their learning through direct exploration, expression, and experience—has pushed or drawn her in this direction. It is not easy for teachers to undergo this transition. Glamser describes her personal feelings as a "teacher/soldier," thus making the dilemmas and tensions teachers face come alive for the reader.

Glasson, G. E., & Lalik, R. V. (1993). Reinterpreting the learning cycle from a social constructivist perspective: A qualitative study of teachers' beliefs and practices. ***Journal of Research in Science Teaching, 30,*** **187-207.**

Social constructivists emphasize the importance of the interplay between language and activity as students learn in social settings. Teachers, they believe, should provide their students with opportunities to discuss and test their own ideas and consider the ideas of others. The learning cycle model for science instruction—exploration, invention, and discovery—allows for active language use and thus appears consistent with the notion of social constructivism. Glasson and Lalik report on a case study to explore the changing beliefs of a physics teacher as she used the learning cycle in her science classes. The teacher initially expressed the positivistic view that the goal of science instruction was for students to arrive at scientifically acceptable conclusions. She changed her practice to give students more time to discuss and test ideas during problem solving. However, she experienced tension between her efforts to give her students opportunities to develop their own understandings and her efforts to present scientific information. She did, however, move toward giving students more control of their learning and more time to explore and clarify their understanding through dialogue, writing, and collaborative problem solving. The authors conclude by proposing a modification to the learning cycle model, the language-oriented learning cycle with three interactive phases—exploration, clarification, and elaboration.

Jensen, E. (1998). *Teaching with the brain in mind.* Alexandria, VA: Association of Supervision and Curriculum Development.

The author contends that this book offers the latest practical, easy-to-understand research on learning and the brain along with techniques for using this research in the classroom. A simple explanation of current brain research leads to a model for interpreting the research and assessing the degree of confidence to be placed in it. The highest level of reliability in this model involves action research done in schools or businesses under actual conditions. The book then presents scientific information about the brain, its functioning, and how learning takes place. The author concludes that we already know enough to design better assessments, create more productive learning environments, and do a better job in staff development. He is concerned that too much interest in the biology of the brain-based learning movement will take up valuable time that should be spent on the transformation of education. Educators are exhorted to engage in systemic, action research to find the answers that will help them do their jobs better.

Lambert, M. (1990). When the problem is not the question and the solution is not the answer: Mathematical knowing and teaching. *American Educational Research Journal, 27,* 29-63.

In popular culture and in classrooms, mathematics is associated with certainty, with knowing how to get the right answer. On the other hand, mathematicians make conjectures, examine assumptions, ask questions, explain their reasoning, and reflect on their thinking and that of others. Lambert questions whether it might be possible to produce lessons in which students exhibit the qualities of doing mathematics in the way that mathematicians do. In this article, she describes a research and development project designed to explore this question. She presents an episode of teaching and learning involving a lesson with fifth graders on exponents. The students are given a problem but no method to solve the problem. The problem is chosen for its potential to expose a wide range of students' thinking about mathematics. The level of discussion in the class was quite sophisticated as students considered possible solutions, challenged each other, and refined their thinking. The students were engaged in mathematical discourse. What did it take to get the students to do this? Lambert designed lessons that engaged students in authentic mathematical activity. She initiated and supported social interactions appropriate to making mathematical arguments in response to students' conjectures. This is in direct contrast to the conventional activities that characterize school mathematics.

Marshall, H. H. (1988). Work or learning: Implications of classroom metaphors. *Educational Researcher, 17* (9). 9-16.

Metaphors imply a theory about the nature of the object or event to which they are applied. In this classic paper, Marshall reminds us that it is important to consider carefully the metaphors that we select to guide research (and the subsequent application of the research to teaching practice) because the metaphors limit what we see and do. Marshall explores one pervasive metaphor for classroom teaching—the workplace or factory metaphor—that has been used to drive research and to develop teaching models. She notes some words used to describe classrooms that come from this viewpoint—management, homework, schoolwork, seatwork, work habits, and so on. The workplace metaphor has guided research in classroom management (students are workers, the teacher is the manager), task assignment and evaluation (students produce products which are graded), motivation (learners are rewarded for their performance), and interpersonal relations (the teacher is the authority). Marshall proposes an alternative, more productive metaphor for classrooms—as a learning place—and for students—as apprentice-artisans or professionals-in-training. These metaphors are derived from cognitive psychology; the workplace metaphor comes more from behaviorist conceptions. Marshall then compares work, recreational, and learning settings. For example, learning is the intent in learning place, but not in work or recreational settings. She concludes with the observation that changes need to be made so that students see the purpose of schooling as learning rather than work. The focus should be on the student as a learner rather than as a worker.

Marzano, R. J. (1992). *A different kind of learning: Teaching with dimensions of learning.* Alexandria, VA: Association of Supervision and Curriculum Development.

This book presents a practical model that teachers can use to improve the quality of teaching and learning in their classroom. The model, Dimensions of Learning, is based on educational research into how children learn, emphasizing that learning is a process of constructing meaning. The five dimensions are loose metaphors for how the mind works during learning. Given a learner has attitudes and perceptions conducive to learning and is using effective habits of mind, the learner's first job is to acquire and integrate new knowledge. Over time, the learner develops new knowledge through activities that extend and refine current knowledge. The ultimate purpose is to use this knowledge in meaningful ways. Teachers plan for instruction, design curriculum, and assess student performance using instructional strategies within each dimension.

Mayer, R. E. (1992). Cognition and instruction: Their historic meeting within educational psychology. *Journal of Educational Psychology, 84,* 405-412.

The purpose of this paper is to examine the emergence of cognitive approaches to instruction. Mayer presents an historical analysis of the relationship between psychology and education, noting the failure of educational psychology to contribute as a guiding science to educational practice, a failure partially attributable to the behaviorist movement. Many of the problems in the field of psychology have been overcome with the paradigm shift toward the study of the cognitive processes of students in natural settings. Mayer details three metaphors of learning that have influenced views of instruction: learning as response acquisition, learning as knowledge acquisition, and learning as knowledge construction. If learning is response acquisition, then drill and practice are appropriate instructional strategies since the goal would be to increase the number of correct behaviors in the learner's repertoire. When learning is viewed as knowledge acquisition, the teacher dispenses information, primarily through lectures and having students read from textbooks. With the most recent metaphor for learning as knowledge construction, the focus of instruction is on helping the student develop learning and thinking strategies. Mayer presents a cognitive model of knowledge construction with the following components: learner characteristics (prior knowledge, interest, and motivation), instructional manipulations (what is taught and how), learning processes (internal cognitive structures constructed during learning such as selecting, organizing, and integrating), and outcome performance (external performance on tests). The final section of the paper is devoted to an examination of specific aspects of learning to read and write.

Meyer, D. K. (1993). What is scaffolded instruction? Definitions, distinguishing features, and misnomers. In D. J. Leu & C. K. Kinzer (Eds.), ***Examining central issues in literacy research, theory, and practice: Forty-second yearbook of The National Reading Conference*** **(pp. 41-53). Washington, DC: National Reading Conference, Inc.**

Meyer maintains that we should not separate the implications of scaffolded instruction for practice and research from their theoretical foundations, but rather should strive to understand how theory, research, and practice contribute collectively to our understandings of the basic principles of effective teaching and learning. Three theoretical tenets serve as the foundation for defining scaffolding: (1) knowledge is a constructive process for giving personal meaning to experience; (2) our interactions within a particular context influence our construction of knowledge; and (3) neither knowledge nor context remains stable, but co-evolve as a natural part of human interaction and development. The construct of scaffolding evolved from a Vygotskian perspective that described how a more knowledgeable

"other" plays a necessary role in supporting learning. Vygotsky defined an essential feature of learning as the zone of proximal development (ZPD), the distance between the competencies the child has and those that could be developed under adult guidance or in collaboration with capable peers. The metaphor of scaffolding is used to describe the adult's necessary but temporary support of the child through the ZPD. Meyer describes scaffolding as a pedagogical approach involving: teacher support, transfer of responsibility, dialogue, non-evaluative collaboration, appropriateness of the instructional level, and co-participation. Meyer says, "the teacher and student jointly place the scaffold and construct an outer structure of shared meaning. The scaffolding is removed gradually, and the student completes the constructive process."

O'Loughlin, M. (1992). Rethinking science education: Beyond Piagetian constructivism toward a sociocultural model of teaching and learning. ***Journal of Research in Science Teaching, 29,*** **791-820.**

O'Loughlin presents a thorough critique of Piagetian constructivism. He believes that using the underlying assumptions of Piagetian constructivism limits the possibility for radical change in science education. The focus on the subjective and individualistic nature of mental constructions moves curriculum ever further from people's lives. Value is placed on more abstract cognitive skills, teaching students to intellectualize their relationship with the world rather than transform it. O'Loughlin questions the purpose of active learning, raising issues of authority, culture, and power in the classroom. He does not advocate discarding constructivism, but rather presents an argument for a sociocultural approach to teaching and learning, based on the work of Vygotsky and Bakhtin. This approach stresses the critical role of language in the relationship between culture and thought. It can accommodate the subjectivity of the person, the multivoiced and dialogical nature of meaning making, the sociocultural context of schooling, and the patterns of power associated with modes of discourse. The challenge for science teachers is to enable students to negotiate the scientific modes of discourse effectively so that they may master and critique scientific ways of knowing without sacrificing their own personally and culturally constructed ways of knowing.

Osborne, M. D. (1997). Balancing individual and group: A dilemma for the constructivist teacher. ***Journal of Curriculum Studies, 29,*** **183-196.**

Osborne tells a story from her elementary school science teaching practice of a creative, imaginative boy (Cory) whose behavior is disruptive. His creativity adds to the group conversations about science, but his behavior often exceeds the tolerance of the teacher. Osborne's goal for the class is for students to

explore science together and create meaning through group conversations. The individuality of the child and the child's ability to work within the group are both important in this class, and Osborne expresses the tension she feels in maintaining both facets of the classroom environment. In her story, she shows how the conversation flows when Cory is present—he introduces insightful ideas that stimulate responses from the other students—and why he must sometimes be removed from the classroom—his disruptive behavior often exceeds her tolerance and distracts the other students from the topic of the conversation. Without Cory involved in the conversation, however, the discussion falls flat. Osborne realizes that both components—Cory as his individualistic self and Cory as a member of the group—are important for him and for the class. She maintains that she must not resolve the tension because of the creative potential inherent in the conflicts between individual beliefs, desires, and actions and the behavioral norms of the classroom. She concludes that "Cory's individualism could not be allowed to run rampant, however, but neither could the norms of the group . . . be allowed to suppress him."

Pirie, S., & Kieren, T. (1992). Creating constructivist environments and constructing creative mathematics. ***Educational Studies in Mathematics,*** **23, 505-528.**

The authors suggest that the original notion of constructivism is in danger of being distorted and simplified by users who wish to be seen as doing the "right thing" in their teaching or research. Constructivism is more than having students use manipulatives and engage in group discussions. Many educators would like to have a list of behaviors that they could perform that would label them as "constructivist teachers." The authors note that there is no constructivist teaching model "out there" waiting to be implemented, but rather, that teachers can and do create environments based on constructivist beliefs in action. Four tenets of belief are seen as critical for the creation of a constructivist environment: (1) there is no mathematical understanding "out there" waiting to be acquired or achieved by students; (2) students develop their own unique understanding; (3) there are different pathways to similar mathematical understanding; and (4) there are different levels of understanding exhibited by different students. The authors report on a study of mathematics classrooms in which the teachers' intentions are to create environments based on constructivist beliefs. Seven episodes are presented of students learning fractions. The episodes validated the four tenets, showing that students do show individual understandings of the mathematics being taught and that the student's response to a situation creates the student's pathway to understanding.

Pope, M. L. (1982). Personal construction of formal knowledge. *Interchange, 13* (4), 3-14.

In this classic paper, Pope discusses the personal construct psychology developed by Kelly as an alternative to behaviorism. Pope concentrates on the personal construction of "formal" scientific knowledge—the material presented in school as representing the "official" view of scientific "facts." Kelly said that people understand themselves and their surroundings by constructing tentative models. This construction of reality was, for Kelly, a subjective, personal, active, creative, rational and emotional affair, and could be replaced by a "better" theory as a result of new experiences. In addition to the shift to this "new" idea about learning, the thinking in the field of philosophy of science shifted to a view of formal scientific knowledge as a progression of the personal constructions of individual scientists toward some consensus among a community of scientists. These ideas—personal construction and the nature of knowledge—should have a significant impact on education, according to Pope. She stresses the importance of teachers and students becoming aware of students' initial constructions and of teachers planning teaching strategies and learning opportunities that encourage transition to scientist's views. She recognizes that the outcome may not be a full transition to scientists' science. Pope concludes by saying that "differences between the learner's personal meanings and formal knowledge could be dealt with in open forum where both are valued for what they are—constructive alternative ways of seeing the world."

Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. ***Science Education, 66,*** **211-227.**

In a classic paper, the authors present a model of conceptual change which articulates the process by which people's central, organizing concepts change from one set of concepts to another set that is incompatible with the first. Learning, they believe, is a rational activity whereby ideas are accepted because they are intelligible and fit with available evidence. Students use existing concepts to deal with new phenomena (assimilation), but when these concepts are inadequate, the student must replace or reorganize the central concepts (accommodation). What does it take for the student to change his or her central concepts? The authors propose the following conditions as necessary for conceptual change: there must be dissatisfaction with existing conceptions; a new conception must be intelligible; a new conception must appear initially plausible; and a new conception should have the potential to be extended. A study was conducted to explore the conceptual change of physics students. Based on the interview data collected, the authors conclude that conceptual change around a complex topic is gradual and piecemeal.

Educational implications are discussed including the suggestion that teaching strategies include the creation of cognitive conflict in students.

Reilly, D. H. (1989). A knowledge base for education. ***Journal of Teacher Education,*** **40 (3), 9-13.**

This paper suggests that there is only one knowledge base for education—how children learn and how this learning can be enhanced. Reilly believes this requires a paradigm shift for most educators who tend to view children as passive receptors of information presented by the teacher rather than as the prime actors in the teaching-learning process. The need for this paradigm shift is attributed to the cognitive revolution in psychology in the 1970s and 1980s. Prior to this time, most of American pedagogy was dominated by the behaviorist model, and classroom instruction still emphasized this model at the time this article was written. Reilly says that schools should be organized around the increased understanding of how children learn and must be reorganized to assist children to learn more effectively. He states that "this will require a shift from a primary focus on teaching to a primary focus on the learning process and the learner."

Schoenfeld, A. H. (1988). When good teaching leads to bad results: The disasters of "well-taught" mathematics courses. ***Educational Psychologist,*** **23 (2), 145-166.**

How can students be successful at school mathematics without understanding how to apply it to the real world? Schoenfeld reports on a qualitative study of a geometry class in which he examined the instruction and results of that instruction. The class was well managed and well taught, and the students did well on standardized tests. It appeared to be a very successful class. The author explicates how, from a mathematicians' point of view, the class may have actually done as much harm as good to the students. Specifically, he explores the way students gain proficiency at doing the procedures of mathematics without understanding. He found that the students failed to connect the processes of formal mathematics (e.g., geometry proofs) with other kinds of problems such as geometric constructions. Instead, the focus was on accurately performing a series of steps. The students believed that getting the right answer and expressing it in the right form was what counted. They believed that all problems could be solved in just a few minutes. And finally, they viewed themselves as passive consumers of others' mathematics. The subject matter was presented, explained, and rehearsed. There was little sense of exploration or of the importance of understanding. Schoenfeld concludes that reexamination of curricular goals, materials, and tests is needed if the purpose of mathematics instruction—to help students think mathematically rather than simply master algorithmic procedures—is to be fulfilled.

Shapiro, B. (1994). *What children bring to light: A constructivist perspective on children's learning in science.* New York: Teachers College Press.

Bonnie Shapiro says that when we teach science, we are asking children to accept initiation into a particular way of seeing and explaining the world, to step around their own meanings and personal understandings into a world of publicly accepted ideas. The primary purpose of this book is to help teachers develop new insight into the learner's experience of science learning in schools. She introduces the idea of constructivism and its value as an alternative to traditional views of learning and reviews the literature on children's science learning, specifically with regard to the topic of light. The book reports on case studies of children in a fifth-grade classroom as they learn about light. She develops the idea of a personal orientation to science learning that places the learner, not the curriculum, at the center. Some of the themes she elaborates on are the view of self as a science learner; views on the nature of the relationships, roles, and responsibility of the teacher; the meaning of "getting help"; images of science and scientists; and ideas about the nature of phenomena. She concludes with a discussion of the implications of her study and an understanding of constructivism for science teaching practice that builds on learners ideas and actions in science.

Tippins, D., Tobin, K., & Nichols, S. (1995). A constructivist approach to change in elementary science teaching and learning. ***Research in Science Education, 25*** **(2), 135-149.**

The authors use a fictional story to communicate what they have learned from their research and experience with teacher learning and curriculum reform. They create a composite teacher, Mrs. Halfaday, from the teachers they have worked with, and use vignettes and interview data from their research to tell her story. The story is essentially a review of their own research in the form of an engaging narrative that demonstrates the application of constructivism to science teaching. Through this story, we see the change in Mrs. Halfaday's thinking and teaching practice as she participates in a partnership project to examine teachers' beliefs about science teaching and learning. At the beginning of the story, she held the transmission view of teaching; objectivism and control were her key referents. As the group of teachers began to deliberate about what it means to learn, they confronted their personal beliefs and began to modify their visions of science teaching and learning and made commitments to change. By the end of the story, Mrs. Halfaday used constructivism and the belief that students should have control over their learning as her key referents. While the use of this kind of narrative is unusual in research journals, it created a highly accessible and believable account of changing teaching practice.

Tobin, K., & Tippins, D. (1993). Constructivism as a referent for teaching and learning. In K. Tobin (Ed.), *The practice of constructivism in science education* (pp. 3-21). Washington: AAAS Press.

What does it mean to use constructivism as a referent? Tobin and Tippins consider constuctivism as a set of beliefs about knowing and knowledge that can be used to analyze the learning potential of any situation. In this way, it becomes a tool for critical reflection, a referent for deciding whether teacher and learner roles are likely to be more productive in given situations. Constructivism provides a different way of thinking about education. In science education, for example, it makes no sense to think solely about the disciplines of science in the absence of learners if all knowledge must be individually constructed. Likewise, the debate over whether to emphasize concepts or process has little meaning because, from a constructivist point of view, making sense of science is a dialectical process involving both content and process. The authors provide numerous examples from research studies to enliven the presentation of their position. They extend the discussion to include use of constructivism as a referent for educational research, proposing that the metaphor of researcher as truth seeker be replaced with one of researcher as learner. They conclude with the observation that constructivism is not a unitary construct nor is it the only referent for educational actions. However, it is an important one.

von Glaserfeld, E. (1989). Cognition, construction of knowledge, and teaching. *Synthese, 80,* 121-140.

This is a classic article, widely read and often quoted. The existence of objective knowledge and the possibility of communicating it by means of language were rarely questioned by educators until 1970 when Kuhn's book, *The Structure of Scientific Revolutions,* was published. Since that time, work in the area of philosophy of science has suggested a different view of knowledge. In this article, von Glaserfeld presents an alternative theory of knowing that takes into account the thinking organism's cognitive isolation from "reality," and draws on the writings of Vico and Piaget, as well as Kuhn and others. Vico wrote in 1710 that individuals can know nothing but the cognitive structures they themselves have put together. This is a very different view of knowledge than commonly accepted (i.e., as a objective representation of an observer-independent world). von Glaserfeld posits that knowledge is the collection of conceptual structures that are viable within the knowing subject's range of experience. He goes on to elaborate on the role of social interaction and language in the "construction" of knowledge and understanding. The implication for education is that knowledge cannot be simply transferred from one individual to another by means of words.

von Glaserfeld, E. (1993). Questions and answers about radical constructivism. In K. Tobin (Ed.), *The practice of constructivism in science education* (pp. 23-38). Washington: AAAS Press.

Ernst von Glaserfeld has been very influential in the development of the constructivist theory of knowing. He was asked questions about this theory at a meeting of National Association of Research in Science Teaching in 1990. Those questions and his responses are compiled in this book chapter. Radical constructivism, according to von Glaserfeld, refers to the movement that broke with the tradition of cognitive representationism and posits a different relationship between knowledge and the outside world. This conception is now generally assumed by the term "constructivism." Constructivism replaces the notion of correspondence between reality and our knowledge of it with the notion of viability. He considers the role of social interactions in learning and then discusses the implications of constructivism for instruction.

Walker, D., & Lambert, L. (1995). Learning and leading theory: A century in the making. In L. Lambert et al., *The constructivist leader* (pp. 1-27). New York: Teachers College Press.

Constructivism is a theory of learning and a theory of knowing. This book chapter provides a survey of the constructivist theory of learning and explicates the relationship between theories of learning and school leadership. A useful chart is included that traces recent learning theories and their parallel theories of leadership. Most of the chapter is devoted to the evolution of constructivist learning theory, showing how it was influenced by the work of Dewey, Piaget, Bruner, Vygotsky, and Feuerstein, and continues to be clarified and supported by recent work in cognitive psychology. A new image of the learner emerges from this work that has profound implications for schooling. Does this theory apply to adults as well as children? The authors state that there are no reasons to believe that the cognitive processes are different at different ages. They conclude that "constructivism possesses a richness of thought, a different world view, that offers a sense of possibility rather than limitation to human growth and development."

Watson, B., & Konicek, R. (1990) Teaching for conceptual change: Confronting children's experience. *Phi Delta Kappan, 71,* 680-685.

"What is heat? . . . Sweaters are hot . . . Let's find out." Thus began a study in a fourth-grade classroom. Students put thermometers in sweaters and were baffled when the temperature did not rise. They did experiment after experiment. They created explanation after explanation. The teacher faced a dilemma—should she tell them the difference between holding heat and emitting heat? The authors describe the students' investigations and the teacher's decision-making process in this article about conceptual change. For these students, the substitution of one theory for another is not an easy matter. Several barriers to their conceptual change may be their own stubbornness, language (everyday meanings vs. scientific meanings), perception, the children's developmental stage, and the difficulty of the concept itself. In this class, the teacher promoted changes in their thinking by asking relevant questions, by having students make predictions, by stressing consistency of statements, and by giving them the time to explore. Finally, with their old theory on the ropes, she offered them a choice of two alternatives, their old theory or a new one that was scientifically correct. This challenged their thinking, they created a new experiment to test the new theory and were on their way to new understanding.

Wertsch, J. V., & Toma, C. (1995). Discourse and learning in the classroom: A sociocultural approach. In L. P. Steffe & J. Gale (Eds.), ***Constructivism in education*** **(pp. 159-174). Hillsdale, NJ: Lawrence Erlbaum.**

Wertsch and Toma employ a sociocultural approach to mediated action which claims that mental functioning is assumed to be inherently situated with regard to cultural, historical, and institutional contexts. According to this approach, a research question could be "How does the thinking of Japanese children differ from that of American children when solving a problem?" The authors describe three general themes in Vygotsky's work: a developmental method; the social origins of higher mental functioning; and the mediation of mental functions by tools and signs. Signs include the forms of speaking—the "social languages" idea of Bakhtin—that are used by different groups of people, as well as mathematical systems or diagrams. Vygotsky believed that the inclusion of signs in action transformed the action. Another important idea is the functional dualism of texts and discourse—univocal, transmission aspects and dialogic, meaning-making aspects. Two segments of interaction in a Japanese elementary classroom are provided to explicate the two functions of discourse. The authors focus on the role of teacher-student interactions on learning, pointing out that the typical pattern of questions in classrooms—initiation, reply, evaluation—is an enactment of the transmission function of discourse. A dialogical interaction, on the other hand, encourages students to actively engage in thinking.

Institutional forces often interfere with establishment of this form of discourse, and yet it appears critical to learning.

Wheatley, G. H. (1993). The role of negotiation in mathematics learning. In K. Tobin (Ed.), *The Practice of constructivism in science education* (pp. 121-134). Washington: AAAS Press.

When instruction is informed by constructivism, negotiation plays a prominent role. This book chapter describes the negotiation between two ninth-grade boys who were in a mathematics program based on problem-centered learning. The goal of problem-centered learning is the construction of mathematics knowledge by students. The teacher selects tasks that have a high probability of being problematical for students, and the students work on the problems in small groups. The role of the teacher in this classroom is as a facilitator. Wheatley describes and analyzes an episode of negotiation between Brett and Sam as they worked on the solution of a problem. They held conflicting views about the solution and were attempting to come to a consensus. The negotiation process was complex because the two boys' intentions were different. Sam was generally ego-oriented, trying to "win" by following the rules without understanding. Brett, on the other hand, was task-oriented, trying to make sense of the problem. Wheatley asserts that teachers can increase the probability that meaningful learning will occur by creating classroom conditions where negotiation of mathematical meaning is the norm. In this case, a student like Sam could shift from his ego-orientation to a more productive stance.

Wilson, S. M., & Peterson, P. L. (1997). *Theories of learning and teaching: What do they mean for educators?* (Working Paper, Benchmarks for Schools). Washington, DC: Office of Educational Research and Improvement.

What are the foundational beliefs and theories that should drive teaching? Wilson and Peterson say these must concern how children learn, what they should learn, and how teachers need to think and act to enable student learning. They describe four ideas about learning which represent a shift in contemporary educational thought and underlie most of the current reforms: (1) learning as a process of active construction; (2) learning as a social phenomenon; (3) learning as context-specific; and (4) learner differences as a resource. Several implications for teachers and teaching are presented as images: teaching as intellectual work, teachers as listeners and inquirers, and teachers as coaches. An example of a third-grade class struggling to understand fractions shows what this looks like in practice. The example provides rich detail of a teacher making decisions as she thoughtfully weighs options in light of her goals and the needs of the students. The authors conclude by stressing the importance of meaningful school-based dialogue

about teaching and learning. They suggest three key questions to focus that dialogue: What kinds of teaching is present in the school? Why are teachers teaching in these ways? and What have teachers learned individually and collectively through and about their teaching?

Yager, R. E. (1991). The constructivist learning model: Towards real reform in science education. ***Science Teacher, 58*** **(6), 52-57.**

How can a teacher apply ideas from the constructivist learning model to classroom teaching? This article reviews the main ideas of the constructivist learning theory as well as the epistemological shift in the view of scientific knowledge, and suggests ways of applying these ideas to science teaching. Yager presents a teaching model developed by the National Center for Improving Science Education that is based on the constructivist learning model and includes four aspects: invitation, exploration, proposed explanation and solution, and taking action. Specific strategies that science teachers can use to help students construct their own meaning are listed. In addition, the article contains a self-check instrument that can be used to determine the extent to which a teacher is basing his or her practice on constructivist learning theory. Yager concludes with the recommendation that this model should also be used in preparing new teachers.

School Reform

This section of the bibliography is on school reform. References were chosen that focus on the standards movement, school-site reform or school restructuring, and systemic reform. Issues addressed in these references include connecting reform to changed teaching practice and increased student learning, providing opportunities for teacher learning, determining criteria for evaluating reform success, and developing school and system capacity.

What is the standards movement? A rationale for developing standards is presented by Barrett (1996) and Ravitch (1995), who also presents an historical overview of the standards movement. Kendall and Marzano (1996) compiled standards and benchmarks developed by professional groups in each of the major subject areas.

What is the reasoning behind the push for systemic reform? What is the progress of systemic reform? A rationale for a more systemic approach to school improvement is provided by Cohen (1995), the Education Commission of the States (1992), and Smith and O'Day (1991). These references provide information and perspectives on the issues of policy coherence. Beane (1995) addresses curriculum coherence. Fuhrman (1994), Goertz, Floden, and O'Day (1995), and Lusi (1997) present descriptions of the approaches to systemic reform taken by a number of states. Fullan (1996) provides a critique of systemic reform.

What are critical issues in school restructuring? Donahoe (1993), Lieberman and Miller (1990), Newmann and Wehlage (1997), Peterson, McCarthey, and Elmore (1996), and Shields and Knapp (1997) have studied school restructuring, and these references provide a critique of recent restructuring efforts. Connell (1997) and Schmoker (1996) provide strategies for insuring that restructuring efforts remain focused on results.

How can we connect school reform to changed practice and improved student learning? Grant, Peterson, and Shojgreen-Downer (1996) and Jennings (1996) conducted case studies to examine the influence of reform on practice. Elmore (1995, 1996) considers the link between reform and practice from a theoretical perspective, whereas Throne (1994) provides a personal story of reform and practice. Levine and Lezotte (1990) describe characteristics of effective schools. Tirozzi and Uro (1997) consider the role of school psychologists in school reform, with special attention to Title I.

What is needed for teachers to be able to teach in the manner described in the reforms? Darling-Hammond (1998), Kennedy (1998), Newmann (1993), and Wilson, Peterson, Ball, and Cohen (1996) examine specific aspects of teachers' professional learning necessitated by the reform efforts.

How successful is the current school reform movement? Cuban (1998) and Knapp (1997) consider criteria for measuring reform success. Corcoran and Goertz

(1995) discuss capacity, and Slavin and Fashola (1998) present a case for using proven and promising programs of reform to insure success.

School Reform

Barrett, M. (1996). *The standards primer: A resource for accelerating the pace of reform.* Washington, DC: Educational Leaders Council.

The standards movement has its roots in the perceived failure of American schools to achieve their academic mission. This publication presents a case for developing high academic standards to improve schools, not as the one answer to all problems in American education, but as a guidepost for school improvement efforts. The author discusses approaches to school reform, which have changed from a focus on inputs to a focus on results. He notes that it is critical to determine what we want our children to learn and be able to do, and yet this question has only recently come to the forefront. Standards can be a way to determine the effectiveness of various teaching strategies and curricula, and have become the focal point for systemic reform. After establishing the need for high academic standards, the author examines the progress of states in setting standards. He reports that the effort is going slower than might be expected. Vignettes of seven states are used to portray standards-setting efforts as disheartening, promising, wait and see, or succeeding. For each vignette, a "lessons learned" section is included. Model resources for creating standards are described and a list of contacts is provided.

Beane, J. A. (Ed.). (1995). *Toward a coherent curriculum: The 1995 ASCD yearbook.* Alexandria, VA: Association for Supervision and Curriculum Development.

In too many schools, curriculum is like a pile of jigsaw pieces without the picture—a disconnected, fragmented, incoherent collection. Many students feel that school experiences have no meaning in their lives, a fact that can be partially attributed to incoherence in the curriculum. In the introductory section in this edited book, Beane proposes that creating coherence is a matter of design, content, connections, and meaning. Developing coherent curriculum involves resolving tensions, as well. The authors of the chapters in the second section of the book describe attempts to create coherence in the curriculum, using both theoretical perspectives and school stories. Concepts discussed include curriculum integration, language across the curriculum, curriculum blocks (Project 2061), curriculum organized around culture, curriculum frameworks, and outcomes-based education. The final section includes commentaries on the search for coherence based on politics, philosophy, pedagogy, and history. The editor, in the final chapter, suggests that coherent curriculum is a two-way transaction: the individual making sense of what the school offers and the school offering something that can be made sense of and in such a way that making sense is possible.

Cohen, D. K. (1995). What is the system in systemic reform? *Educational Researcher, 24* (9), 11-17, 31.

Systemic reform advocates promote the creation and alignment of new policy instruments (standards, frameworks, assessments, and curricula) to change teaching. Cohen states that, while systemic reform has had significant effects, it has not yet made guidance for instruction more "coherent." He suggests that reforms that seek more coherence in instructional policies have actually helped create more variety and less coherence by sending mixed or conflicting messages about instruction. New policies are generating more awareness, positive attitudes, and dialogue on the part of teachers. However, the incorporation of new ideas into practice has been more limited. Cohen argues that three elements of practice are crucial to the progress of systemic reform. These are teachers' knowledge of academic subjects, teaching and learning; their professional values and commitments; and the social resources of practice. These three elements are distinctively weak in U. S. education. The systemic reform approach assumes that instruction is a homogeneous and unified system that can be driven by policy. In reality, instruction includes several related systems, and changes in one may not produce changes in the others. Cohen concludes that coherence in policy is different from coherence in practice.

Connell, J. (1997). *First things first: A framework for successful school-site reform.* Kansas City, MO: E. M. Kauffman Foundation.

Connell presents a framework for successful school-site reform, clarifying what early, intermediate, and long-term outcomes must be present for success to be achieved. He feels that successful reform begins at the school level, for, if restructuring does not begin at this juncture, then its effect at the classroom level will be minimal. He presents seven critical features of school-site reform. Four features apply to students—lower student adult ratios; continuity of care (teaching the same students in successive years); high, clear, and fair academic and conduct standards; and enriched and diverse opportunities. Three features apply to adults—collective responsibilities; instructional autonomy and supports; and flexible allocation of resources. To implement these critical features, a large collaborative of parents, community members, social service providers, and educators must undertake the process. The establishment of successful collaboratives, however, is not sufficient to insure continued success; schools must also establish a means of communicating and authenticating the implementation of these features. Connell suggests that successful evaluation will involve a time line for implementation, data collection, analysis of assessment results, and accommodation to fit new information.

Corcoran, T. & Goertz, M. (1995). Instructional capacity and high performance schools. *Educational Researcher, 24* (9), 27-31.

Capacity is a current topic of discussion among those interested in school reform efforts. The views on capacity vary. Among those advocates of systemic reform, the focus is on the capacity for policy alignment, adoption of standards, development of curriculum and assessments, and changes in governance. Among those who advocate a school-by-school change, capacity means the creation of learning communities, changes in governance, and opportunities for teachers to share knowledge. The authors suggest "capacity" could mean the maximum production of a school or educational system if the product is defined as high-quality instruction. The instructional capacity of a school appears to be determined by the intellectual ability, knowledge, and skills of the faculty; the quality and quantity of resources available for teaching; and the social organization of instruction. The authors describe nine issues related to capacity and capacity-building drawn from their review of the research literature. These include the role of student readiness, the fit between reform vision and strategies, the knowledge about instruction, the sequence of implementation, the effect of incentives, the strategies for professional development, the instructional materials available to support reform, the role of the school district, and the level of understanding of the relationships between pedagogy and effects.

Cuban, L. (1998). How schools change reforms: Redefining reform success and failure. *Teachers College Record, 99,* 453-477.

Judging the success or failure of an innovation is not an easy task. Cuban sets the stage by telling the story of a reform of the 1900s—the Platoon School or Gary Plan—that is largely forgotten. Core notions of this reform, however, became persistent features of elementary education. Was it a success or a failure? It depends on what criteria are used. The author states that it is crucial in evaluating reform to identify what criteria are used to judge the reform, whose criteria they are, and how schools change reforms as they implement those reforms. From the point of view of policymakers, the criteria for the success of a reform program are effectiveness, popularity, and fidelity. These criteria reflect a top-down view of authority and a technical view of knowledge and teaching practice. On the other hand, practitioners use the criteria of adaptiveness and longevity. These criteria are based on the view that organizations need to cope with a wide range of problems in order to survive. Cuban uses the example of the Effective Schools reform to demonstrate how the use of these criteria plays out. Depending on the criteria used, the Effective Schools reform was successful (popularity, adaptiveness, longevity), partly successful (effectiveness), or a failure (fidelity). Cuban challenges policymakers and researchers to understand how the journey of

school reform is a story of adaptation that ultimately undermines the common criteria used to judge success or failure.

Darling-Hammond, L. (1998). Teachers and teaching: Testing policy hypotheses from a national commission report. ***Educational Researcher, 27*** **(1), 5-15.**

The National Commission on Teaching and America's Future (1996) defined every child's birthright as access to a competent, caring, and qualified teacher. Darling-Hammond reviews the research behind the commission's analysis and recommendations, and describes the research and programmatic work needed to test their policy proposals. The Commission's proposals (which are essentially hypotheses based on theories about teaching, learning, and schooling) are that (1) what teachers know and can do is one of the most important influences on what students learn; (2) recruiting, preparing, and retaining good teachers is the central strategy for improving our schools; and (3) school reform cannot succeed unless it focuses on creating the conditions in which teachers can teach and teach well. Darling-Hammond concludes that if all children are to have the opportunity to learn to the new standards, both research and practice must be focused at increasing the knowledge base of individual educators and the profession as a whole. Critical investments should be made to redesign teacher preparation programs and professional development approaches and restructure schools to support teacher learning and collaboration.

Donahoe, T. (1993). Finding the way: Structure, time, and culture in school improvement. ***Phi Delta Kappan, 75,*** **298-305.**

How does a school generate and sustain the characteristics of effectiveness? There are lists of the characteristics of effective schools identified by research, but little work has been done to study how a traditional school takes on these features to become an effective school. What is missing, Donahoe claims, is an adequate consideration of the relationship between structure, time, and culture. Traditional school organization minimizes collective, collegial behavior on the part of teachers and encourages rule-prone direction from the top. From his work with Pacific Telesis Foundation Schools, Donahoe found that for school restructuring to be successful, an external change agent is needed; new forms of organization (teams, shared-leadership) must be formal and comprehensive; and the role of leadership must be examined. Schools involved in restructuring typically suffer from "organizational stress." One source of this stress is time—time could be bought for school staffs by the reform program, but the school had no space to install it. The traditional school lacks flexibility to allow teachers the kind of time needed for activities other than teaching. On the question of culture, Donahoe says

that changing culture—the values, beliefs, behaviors, rules, products, signs, symbols that bind us together—is not simple. He suggests that by changing what we do, we begin to change what we are. Reform must address changes in structure, time, and culture in ways that make these changes an inherent part of the school.

Education Commission of the States. (1992). *Bringing coherence to state policy: Restructuring the education system.* Denver, CO: Author.

An effective educational reform plan creates a compelling vision, develops a new policy environment conducive to change, and lays out strategies for involving educators, parents, business people, and community members in implementation. This publication begins by comparing traditional educational policy to systemic education policy. The key to major educational system improvement lies in redefining the policy area that should drive state reform and linking other policy areas to that effort. This report outlines the policy components providing high leverage for K-12 education system reform—standards and curriculum, assessment and accountability, governance, professional development, higher education, finance, cross-agency collaboration, and diversity/choice options—and provides examples of each states' progress in these areas. Five key strategies for coordinating and sustaining policy change are summarized. Contact information for reform organizations is also provided.

Elmore, R. F. (1995). Teaching, learning, and school organization: Principles of practice and the regularities of schooling. ***Educational Administration Quarterly, 31,*** **355-374.**

Changes in policy, such as pressures for increased student achievement, have not resulted in the large-scale changes in teaching practice and school organization that might be expected. There is a gap between policy and practice. Another gap exists between ordinary practice and best practice. In this article, Elmore develops a framework that connects current ideas about student learning and teaching practice with the regularities of school organization. Elmore describes emerging views of learning that inform best practice in teaching and should have implications for school organization. These views are that (1) the object of teaching is to nurture understanding, or intentional learning; (2) understanding occurs in the context of specific bodies of knowledge; (3) understanding requires the active construction of knowledge by learners; (4) understanding requires the development of both basic and higher order knowledge; (5) learners differ substantially in experience, cognitive dispositions, and competencies; and (6) learning is a social as well as individual process. Elmore believes that adoption of these principles has been limited because it would require knowledge and skills few

teachers have, and because they challenge basic patterns in the organization of schooling. Translating principles of best practice into organization and policy requires abandoning traditional solutions to problems in favor of new solutions. Principles of practice should drive structure, rather than vice versa.

Elmore, R. F. (1996). Getting to scale with good educational practice. *Harvard Educational Review, 66* (1), 1-26.

Why do good ideas about teaching and learning have so little impact on educational practice? Elmore says that innovations that require large changes in the core of educational practice are seldom widely incorporated into practice. The core is the relationship between knowledge, teachers, and student, i.e., how teachers understand the nature of knowledge, how they relate to students around knowledge, how these ideas are manifested in practice, and how schools are structured. Most changes in schools do not touch the core, so while schools do change, the basic conceptions of knowledge and the role of teachers and students in constructing knowledge remain relatively stable. Elmore suggests that the problem of getting new ideas about teaching and learning into practice resides primarily with the incentive structures that teachers work under. Current incentives tend to mobilize teachers who are already intrinsically motivated to question their practice. How can good educational practice move beyond pockets of excellence? Elmore offers four proposals: develop external norms for best practice; develop organizational structures that intensify and focus norms of good practice such as those that encourage collaboration between teachers; create intentional processes for reproduction of successes; and create structures that promote learning of new practices and incentive systems that support them.

Fuhrman, S. H. (1994). *Challenges in systemic education reform* (CPRE Policy Brief, RB-14-9/94). New Brunswick, NJ: Consortium for Policy Research in Education.

Systemic reform, or standards-based reform, is prevalent in this country. In this Policy Brief, Fuhrman examines the challenges facing policymakers and educators as they implement new policies, and describes strategies being used by the states to address these challenges. The difficulties in accomplishing the reform agenda include an overwhelming workload as states make changes across a broad range of policy areas; limited resources in both money and people; sequencing difficulties as different elements of the reform run on different schedules; articulation of the nature and intent of the reform; development of appropriate incentives, professional development opportunities, accountability systems, and plans for scaling up; strategies for addressing equity issues; and lack of leadership. Fuhrman uses specific

examples from the states to illustrate ways that these issues are being addressed.

Fullan, M. G. (1996). Turning systemic thinking on its head. *Phi Delta Kappan, 77,* 420-423.

Reform efforts have been fragmented, disjointed, and incoherent as each new innovation or reform is added to the previous one. Many educators believe that the answer to this problem lies with the concept of systemic reform. The author asserts that there are problems with systemic reform as a solution, problems which stem from the nonlinearity of the change process. Even when flexibility is built into systemic reform, teachers may still face overload and fragmentation. Fullan states that it is easier to identify effective system changes in the top half of the system—development of goals, curriculum and instructional frameworks, and aligned assessments—than in the bottom half of the system. Strategies used to date may have involved only about five percent of those who need to be involved. The question is, what can the top and bottom do in combination that will maximize the impact of reform on learning outcomes? Several strategies seem likely to bring about changes at the bottom so that system change can occur on the large scale. These strategies are networking (linking schools through support networks organized around powerful visions or themes for improvement), reculturing (building new values, beliefs, and norms), and restructuring (changing roles, structures, and other mechanisms to enable new cultures to thrive). These strategies can "mobilize the conceptions, skills, and motivation in the minds and hearts of scores of educators." In the final section of the paper, Fullan sets forth implications for evaluating systemic reform.

Goertz, M. E., Floden, R. E., & O'Day, J. (1995). *Studies of educational reform: Systemic reform.* New Brunswick, NJ: Consortium for Policy Research in Education.

This systemic reform study was undertaken to expand the knowledge of state approaches to systemic educational reform; to examine district, school, and teacher response to state reform policies; and to study how states build capacity to support reform. Intensive case studies of schools and districts in three states undertaking systemic reform—California, Michigan, and Vermont—are reported in this three-volume document. Systemic reform stresses coherence among policies with the hope that coordinated policies will lead to classroom practices that are in line with the vision of the reform. State policy, however, is only one influence on teaching practice; teachers in the study reported that their own beliefs and knowledge about the subject and their students were a greater influence. This study focused on capacity building. Capacity is defined as the ability of the educational system to help all

students meet more challenging standards. Systemic reform can be a tool to build capacity, but challenges must be addressed. The study resulted in a set of lessons for states considering a standards-based, systemic approach to instructional improvement. This study is also the topic of two CPRE Policy Briefs, *The Bumpy Road to Reform*, (June, 1996), and *Building Capacity for Educational Reform* (December, 1995), by the same authors.

Grant, S. G., Peterson, P. L., & Shojgreen-Downer, A. (1996). Learning to teach mathematics in the context of systemic reform. ***American Educational Research Journal*****, 33, 509-541.**

This article looks at how three elementary teachers understand recent mathematics reform in California. California policymakers assumed that aligning textbooks, tests, and the Framework would bring greater coherence to the system and ultimately leverage teachers' classroom practice. The researchers found, however, that California teachers are just like their students in that they learn in different ways, construct different understandings, and respond with different behaviors. While each teacher changed his or her practice, their practices continued to vary considerably. The cases revealed that policy documents offer only visions of reform that remain to be embellished, made real, and enacted in practice. Reforms push in two directions—away from old ideas and practices and toward new ideas and practices. New learning is always shaped by old learning. The authors conclude that policymakers must consider the crucial role of teacher learning in reform and teacher learning is more complex than simple access to opportunities to learn about reform.

Jennings, N. E. (1996). ***Interpreting policy in real classrooms: Case studies of state reform and teacher practice*****. New York: Teachers College Press.**

In 1985, the Michigan State Board of Education approved a revised definition of reading, thus creating a new state policy on the teaching of reading. The new policy reflects reading research and implies changes for teachers. The state took greater than usual care in providing opportunities for teachers to learn about and from the new policy. This book is an examination of the implementation of the new reading policy, told through the stories of three teachers and their learning. Jennings shows how the three teachers interpreted the policy and the learning opportunities in vastly different ways, depending on their beliefs, ideas, and experiences. She points out that the policy assumed a constructivist view of learning, while the policymakers used a transmission view to develop in-service opportunities. She concludes that policy implementation is an incident of teaching and learning rather than a process by which ideas are filtered through the educational system and

enacted by teachers. She argues that "the worth of a policy is in what teachers learn from it."

Kendall, J. S., & R. J. Marzano (1996). *Content knowledge: A compendium of standards and benchmarks. for K-12 education.* Aurora, CO: Mid-Continent Regional Educational Laboratory.

This document provides an overview of current efforts to develop standards across subject areas, describes differences that have become apparent since the beginning of the standards movement, provides a model for standards and benchmarks identification, and applies this model to identify standards and benchmarks in the subject areas. A number of issues were identified that must be reconciled in order to develop internally consistent models of standards and benchmarks. The authors developed a model for this study that included: a literacy approach to content; a dedicated set of standards on thinking and reasoning (called life skills); a focus on content standards; and benchmarks for grade clusters. Implementation issues are also discussed. This report reprints, with little or no revision, standards that were identified in mathematics, science, history, language arts, geography, the arts, health, civics, economics, foreign language, physical education, and behavioral studies. Also included are standards for life skills—thinking and reasoning, working with others, self-regulation, and life work—as well as a bibliography.

Kennedy, M. M. (1998). Education reform and subject matter knowledge. *Journal of Research in Science Teaching, 35,* 249-263.

This article explores what K-12 teachers need to know to teach mathematics and science well. Reform documents are examined for definitions of good teaching practices in mathematics and science. The research literature is reviewed to reveal the kinds of knowledge teachers would need to teach as described in reform documents. Kennedy concludes that teachers should have conceptual understanding of the subject, pedagogical content knowledge, beliefs about the nature of science and mathematics, and attitudes toward these disciplines. Conceptual understanding of subject matter can be further described as having a sense of proportion, as understanding the central ideas, as seeing relationships among ideas, as possessing elaborated knowledge, and as having reasoning ability. Two problems in the area of subject matter knowledge are the lack of knowledge on how to foster teachers' deep understanding and reasoning ability and how to measure it, and the lack of evidence of how any of the characteristics of knowledge contribute to actual teaching practice.

Knapp, M. S. (1997). Between systemic reforms and the mathematics and science classroom: The dynamics of innovation, implementation, and professional learning. *Review of Educational Research, 67,* 227-266.

Can reform initiatives conceived at the highest levels of educational systems stimulate new thinking and improve practices in K-12 mathematics and science classrooms across the country? To answer this question, Knapp reviews studies and analyses of large-scale reform initiatives. These reforms share several premises: that a major constraint on the quality of teaching is the lack of alignment among elements of the system; that better teaching will result when there is alignment with challenging standards; that the lack of alignment is best addressed at the level at which policies are set; and that systemic reform strategies are not incompatible with local discretions. What is the influence of systemic reform on classroom practice? Knapp interprets the evidence from three vantage points: systemic reform as innovation and change (how new practices diffuse and are replicated); systemic reform as policy implementation (how policy intentions interact with contextual factors); and systemic reform as professional and organizational learning (what learning is necessary to realize the intentions of the reform agenda). He concludes that more must be done to provide support systems that sustain the teachers through the long-term learning required by the reforms. Finally, he proposes four standards for policy success: full embodiment of reform visions, grafting of reform ideas onto familiar practices, professional learning among teachers, and incremental increases in indicators.

Levine, D. U., & Lezotte, L. W. (1990). *Unusually effective schools: A review and analysis of research and practice.* **Madison, WI: The National Center for Effective Schools Research and Development.**

This articles outlines the correlates of the effective schools movement, the driving force behind much of the school reform that has occurred in the last ten years. There are eight key areas that characterize unusually effective schools: productive school climate and culture, focus on student acquisition of central learning skills, appropriate monitoring of student progress, practice-oriented staff development at the school site, outstanding leadership, salient parent involvement, effective instructional arrangements and implementation, and high operationalized expectations and requirements for students. The authors also added five other qualities that had not been researched or completely investigated at the time of publication: student sense of efficacy or futility, mutlicultural instruction and sensitivity, personal development of students, rigorous and equitable student promotions, policies and practices, and student responsibility for learning.

Lieberman, A., & Miller, L. (1990). Restructuring schools: What matters and what works. *Phi Delta Kappan, 71,* 759-764.

The focus of this article is on the constraints and possibilities posed by the realities of school restructuring. The authors discuss approaches to school restructuring, building blocks of the restructuring movement, and issues that are emerging from practice. Restructuring seems to focus either on procedures (i.e., legislation allowing schools to restructure) or on principles or values (i.e., the nine core principles of the Coalition of Essential Schools). Building blocks that form the foundation for school change include: (1) rethinking curriculum and instruction; (2) rethinking the structure of schools; (3) focusing on the learning environment for students and the professional environment for adults; (4) building partnerships and networks; and (5) increasing the participation of parents and the community. To restructure schools, the following issues must be confronted: administrative and teacher leadership, the dilemma of process versus content, balancing the needs of students and teachers, and achieving a balance between action and reflection. The authors state that it is crucial to remember that the ultimate goal of restructuring is to make schools better places for children.

Lusi, S. F. (1997). *The role of state departments of education in complex school reform.* New York: Teachers College Press.

State departments of education play a pivotal role in the implementation of state-level school reform. Lusi uses in-depth case studies of two models of statewide school reform—Kentucky and Vermont—to examine the role of state departments of education (SDEs) in the reform process. These two states are attempting to change curriculum, assessment, and governance, among other things. Lusi reviews the literature on systemic reform, bureaucracies, and innovative organizations, and develops a framework of the changes expected when SDEs are successfully implementing complex reforms. The framework is then applied to the two case studies to examine the activity in each state and to judge the consequences of that activity. Lusi concludes that contextual factors are important in influencing the actions of the SDEs; that the internal organizational structure of the SDE influences the reform; that the leadership of the SDE matters; that complex reform requires an active SDE role; that local practitioners seek a more active involvement of SDE staff in the schools; and that regulatory roles on the part of SDEs may be counterproductive in some situations. Lusi articulates the problems faced by SDEs in complex school reform and presents a number of recommendations.

Newmann, F. M. (1993). Beyond common sense in educational restructuring: The issues of content and linkage. *Educational Researcher*, 22 (2), 4-13.

Common sense proposals for restructuring schools suggest promising directions, but in order for this potential to be fulfilled, two major issues must be addressed: What content is needed to give educational direction to the structures, and how can the many factors that influence this content be linked? The common sense proposals claim that new organizational structures will either increase the commitment (motivation) of adults to teach and students to learn, or they will increase the competence (technical capacity) of adults to offer a better learning environment. Newmann proposes an agenda of content for teacher commitment and competence needed to give direction to structural innovation. The following themes would be addressed: (1) depth of understanding and authentic learning; (2) success for all students; (3) new roles for teachers; and (4) schools as caring communities. Newmann then explains that if policy is to be designed to affect teachers' commitments and competencies, the different parts of the educational system should be aligned. No theory adequately explains both how to change all the separate agencies that influence education and how to link them to have more cumulative impact. Four prominent ideas, however, may constitute a loose theory about what is needed: high standards, high incentives/high stakes, local empowerment, and collaborative organization. These ideas are insufficient, however, because they fail to explain how the disparate institutions that affect teachers will change to support the new agenda in a coordinated fashion; they fail to resolve a potentially fatal contradiction between local empowerment and high external standards; and they fail to explain how the society at large will make the necessary financial investments in both schools and the building of social capital.

Newmann, F., & Wehlage, G. (1997). ***Successful school restructuring: A report to the public and educators by the Center on Organization and Restructuring of Schools.*** **Madison, WI: Document Service, Wisconsin Center for Education Research.**

The authors synthesize five years of research by the Center on Organization and Restructuring of Schools with 1,500 elementary, middle, and high schools participating in various district and state restructuring efforts. The report concludes that structural reforms alone do not bring about increased learning. However, organization of human and social resources to support improved teaching and learning is a powerful strategy. The report includes in-depth case studies and survey data portraying general trends. The report concludes that student learning can meet high standards if educators and the public give students three kinds of support: (1) teachers who practice authentic pedagogy, (2) schools that build organizational capacity by strengthening professional

community, and (3) external agencies and parents that support schools to achieve the high quality student learning described.

Peterson, P. L., McCarthey, S. J., & Elmore, R. F. (1996). Learning from school restructuring. ***American Educational Research Journal,*** **33, 119-153.**

This article describes a study that explores the connection between school organization and classroom practice. Successful restructuring experiments from three elementary schools were analyzed. Changes included new student grouping patterns, new ways of allocating time for subject matter, teachers meeting together as a whole school or in teams, and access to new ideas through professional development. The study found that (1) teaching and learning are mainly a function of the teacher's beliefs, understandings, and behaviors within the context of specific classroom problems; (2) changing classroom practice is primarily a problem of continuous learning resulting in improved practice for teachers, not a problem of school organization; (3) school structures can provide opportunities for learning, but structures by themselves do not cause learning to occur; and (4) where teachers have a shared vision, teaching practice and student learning are successfully connected.

Ravitch, D. (1995). ***National standards in American education: A citizen's guide.*** **Washington, DC: The Brookings Institution.**

This book provides a good overview of the movement to establish national standards and assessments. As she develops her argument for educating students to high standards, Ravitch describes the history of the movement and the rationale behind it. She reviews evidence about student achievement in the United States by examining a variety of measures. She considers the purposes of schooling, the influence of cognitive science and technology on views of education, and the work by groups to reform the way their subject matter is taught. She presents both sides of the debate about national standards, while still making her own position clear. Ravitch concludes with recommendations regarding the role of states in setting standards, the role of universities and businesses in promoting them, and the role of assessments in maintaining standards.

Schmoker, M. J. (1996). ***Results: The key to continuous school improvement.*** **Alexandria, VA: Association of Supervision and Curriculum Development.**

The author sees tangible, measurable results as the key to successful school improvement. He explores the conditions under which dramatic results may be achieved and the theory behind them. Creating opportunities for

meaningful teamwork, setting clear and measurable goals, and regularly collecting and analyzing data are stressed as the means to improvement. Examples are given to illustrate successful applications by schools from around the country. Schmoker concludes with the note that, "Schools improve when purpose and effort unite. One key is leadership that recognizes its most vital function: to keep everyone's eyes on the prize of improved student learning."

Shields, P. M., & Knapp, M. S. (1997). The promise and limits of school-based reform. ***Phi Delta Kappan, 79,*** **288-294.**

The authors take a generic look at school-based reform by summarizing a national study sponsored by the U. S. Department of Education. Shields and Knapp identify six dimensions to distinguish among school based reform efforts: the scope (how many aspects of the school are addressed); the degree of focus on teaching and learning; the time frame; the locus of authority for decision making; the collaborative engagement of schoolpeople and others; and the depth and range of professional development opportunities offered. Relying on survey data, site visits, and case studies, the authors describe the ways in which reform efforts vary across the six dimensions. The logical question is which of the reforms hold greatest promise for improving schools. To answer this, it is necessary to decide what constitutes effective reform, and the authors posit that promising reforms focus on creating quality learning experiences for students. Using quality learning experiences as the touchstone, the authors suggest that certain combinations of variations seem to bring schools closer to the goal of offering high-quality learning opportunities for their students. For example, they list strategies such as combining an instructional focus with appropriate professional support and setting attainable goals with long time times for accomplishing them. Actions by districts or states influencing a school's reform efforts are also explained in this article.

Slavin, R. E., & Fashola, O. S. (1998). ***Show me the evidence: Proven and promising programs for America's schools.*** **Thousand Oaks, CA: Corwin Press.**

The authors argue that the daunting task of improving teaching and learning in all schools might be accomplished more effectively if schools choose from rigorously researched and well-documented reform designs that provide networks of support for implementation. They also suggest that the adoption of these well-evaluated programs by policy makers would lead to more efficient and effective use of professional development funds. This book presents information on widely available programs that the authors feel have been tested against a set of rigorous standards of evidence.

Smith, M. S., & O'Day, J. (1991). *Putting the pieces together: Systemic school reform* (CPRE Policy Brief, RB-06-4/91). New Brunswick, NJ: Consortium for Policy Research in Education.

This issue summarizes "Systemic School Reform," an analytic essay by Marshall S. Smith and Jennifer O'Day discussing research into the effectiveness of current education policies and policy system development in numerous states. The authors propose a design for a systemic state structure that supports school-site improvement efforts and is based on clear, challenging standards for student learning. Policy components would be tied to these standards and reinforce one another in providing instructional guidance to schools and teachers. This brief begins with several observations concerning policy, examines current barriers to school improvement, and sketches an ameliorative strategy. School-by-school restructuring efforts are unlikely to produce substantial change because our educational system lacks coherence and emphasis on basic skills pervades both policy and practice. Change is hampered by fragmented authority structures, conflicting goals and policies, and deficiencies in college teaching, professional development, and curriculum. A strategy for systemic reform would combine both top-down and bottom-up approaches and feature a unifying vision and goals, a coherent instructional guidance system, and a restructured governance system. A sidebar examines teacher professionalism and educational equity issues.

Throne, J. (1994) Teaching and practice. *Harvard Educational Review, 64,* 195-208.

A kindergarten teacher describes educational reform and its effect on classroom teachers as a pendulum, swinging from one opposing ideology to another. Reading teachers, in their effort to become more effective teachers, may find different reading theories in conflict with the needs of specific students. Or they may find that one theory does not provide all of the answers to assisting a particular student. The author uses her students' learnings and stories about her classroom practice, as examples of integrating several theoretical perspectives to ensure her students' success. She advocates that researchers must go beyond a particular ideological stance to incorporate the realities of the classroom and create a dialogue between teachers and researchers to foster a more comprehensive view of how students learn to read.

Tirozzi, G. N., & Uro, G. (1997). Education reform in the United States: National policy in support of local efforts for school improvement. *American Psychologist, 52* (3), 241-249.

Tirozzi and Uro review recent school reform efforts. They state that school reform must be systemic and coherent, must expect accountability for student progress, and must ensure that all of its component parts are in alignment. The professionals involved in education, including school psychologists, must work collaboratively in new ways to effect reform. In their review, the authors place particular emphasis on the reauthorization of the Elementary and Secondary Education Act, now called the Improving America's Schools Act (IASA), and the rethinking of Chapter I, now called Title I, which is intended to help poor children improve their educational opportunities. Tirozzi and Uro describe five major themes of the legislation: high standards for all children, a focus on teaching and learning, promotion of partnerships with parents and communities, flexibility, and accountability for results. Finally, the authors include a discussion of the role of school psychologists as partners in creating environments that respond to the complex needs of children and in helping to ensure that all children will be given increased opportunities because of the school reforms. Meeting the social and academic needs of children is critical to the success of school reform.

Wilson, S. M., Peterson, P. L., Ball, D. T., & Cohen, D. K. (1996). Learning by all. *Phi Delta Kappan, 77,* 468-476.

The teaching and learning envisioned by reformers is not what occurs in most school classrooms, in part because most teachers do not know how to create this kind of education for their students. The reforms are visions, not programs for practice; schoolpeople must construct practice from these sketches of what teaching and learning could be. The authors report on a longitudinal study of the ways policymakers and practitioners think about curricular reform in elementary mathematics and literacy in three states, California, Michigan, and South Carolina. The new policies demand many changes, but more critically, they represent different views of knowledge, of school subjects, of learning, of diversity, and of teaching. In this article, the authors present three stories of learning—by some policymakers, by a teacher educator, and by a teacher. These stories illustrate the complexity of the learning required by the reform policies. However, many of the actors in the reform efforts have not yet committed themselves to participate as learners. In each of the stories, the notion of "community" was important. They conclude that reform-related learning can be facilitated when concrete classroom examples and experiences are used to ground the conversation about practice; when inquiry and reflection are components of the learning; when people from different parts of the system come to the table to talk together; and when all of the actors view themselves as learners.

The Change Process

This section of the bibliography is on the change process. References were chosen that provide an overview of the change process as it specifically relates to educational change. References also focus on the role of leadership in the change process, the implications of change for individual roles and staff development, and the experience of change by individual teachers, groups of teachers, and schools.

How do schools change? Fullan and Miles (1992) argue for the importance of understanding the process of change in school reform, and the book by Hord, Rutherford, Luling-Austin, and Hall (1987) provides an overview of the change process as enacted in school settings. Sashkin and Egermeier (1993) describe models of school change, and Schlechty (1990) discusses the reasons why schools must change. Odden and Wohlstetter (1995) examine one school change strategy for factors influencing its effectiveness. O'Neil (1995) considers schools as learning organizations and relates change to the process of schools becoming learning organizations.

What are the characteristics of leadership necessary for school change? Covey (1990) describes a comprehensive theory of leadership. Hord (1992) considers leaders as change agents, and Boyd and McGree (1995) and Lambert (1998) consider the role of teachers as leaders.

What is the role of staff development in the change process? Fullan (1991a, b, c) expands on the meaning of change for individuals and organizations, specifically for teachers and professional development providers. Hord (1994) and Richardson and Anders (1994) explore the relationship between change and staff development.

How do individuals, groups, and schools experience change? Shaw and Etchberger (1993) describe the experience of change for one teacher. Wasley, Donmoyer, and Maxwell (1995) consider the approach to change by a group of teachers, and Wallace (1996) relates stories of change from several perspectives.

The Change Process

Boyd, V., & McGree, K. M. (1995). Leading change from the classroom: Teachers as leaders. *Issues . . . about Change, 4* (4). Austin, TX: Southwest Educational Development Laboratory.

As schools begin to restructure, teachers are becoming leaders of change. Teacher leaders do not subscribe to hierarchical definitions of leadership, but rather prefer the view of leadership as a collaborative effort. Teachers who become leaders often experience personal gains, intellectual and professional growth, and decreased isolation. There are problems associated with leadership roles, however, including lack of definition of the role, lack of time, andconstraints of the school culture. This case study describes the efforts of teacher leaders in one school district to implement change, focusing on one teacher's story of her experience as a teacher leader. Necessary to the success of new teacher roles and responsibilities are vision, structure, time, and skills.

Covey, S. R. (1990). *Principle-centered leadership*. New York: Simon & Schuster.

How do individuals and organizations survive and thrive amid tremendous change? Stephen Covey illustrates a humanistic process for developing leaders that involves promoting circumstances in which leaders can emerge. He begins by outlining key leadership traits from a previous book, *The Seven Habits of Highly Effective People* (reprint 1990): be proactive, begin with an end in mind, put first things first, think win-win, seek first to understand, synergize, and sharpen the saw continually. In developing principle-centered leaders, he emphasizes the need for trust and patience as individuals become involved in paradigm shifts. Principle-centered leadership introduces a new paradigm, one founded on the belief that there are certain "true north" principles—trustworthiness, trust, empowerment, and alignment—that should guide personal and interpersonal relationships and form the foundation of effective leadership. Principle-centered leadership and living reaffirms four internal sources of strength—security, guidance, wisdom, and power—and is practiced on four levels—personal, interpersonal, managerial and organizational. Characteristics of principle-centered leaders that emerge include: an ongoing quest for knowledge, the thirst to fulfill the mission, a positive image, a belief that all people are good, a life of self-renewal, a life of balance, a synergistic life and a sense of freshness and newness. Covey also states the importance of the abundance manager, one who promotes the achievement of the dreams. In this new paradigm for leaders, it is possible to defuse overloaded bureaucracies and empower staff to participate in a process that leads to quality decision making.

Fullan, M. G. (1991a). The meaning of educational change. In M. G. Fullan, *The new meaning of educational change* (pp. 30-46). New York: Teachers College Press.

Change may come about because it is imposed on us. Or, we may voluntarily participate in or initiate change when we find something significantly wrong in our current situation. The personal and collective experience of change is characterized by uncertainty, anxiety, and struggle. If it works out, it can result in a sense of mastery, accomplishment, and professional growth. In this chapter of his book, Fullan examines the subjective meaning and objective reality of change in educational settings. He describes three themes that characterize the subjective meanings of change: the typical situation of teachers is one of fixity with many forces tending to keep things that way; there is little room for change and change is resented when imposed from the outside; and there is a strong tendency for people to adjust to change by doing as little as possible. He looks at the objective reality of educational change, saying that people generally do not understand the nature and ramifications of most changes. Implementation of any new program or policy involves changes in materials, teaching approaches, and beliefs. An individual may implement none, one, two, or all three of these. Fullan illustrates the objective reality of change with three examples. He describes six implications of the subjective and objective realities of change that relate to: (1) the soundness of the proposed changes; (2) understanding the process of change; (3) understanding the nature and feasibility of particular changes; (4) the realities of the status quo; (5) the deepness of change; and (6) the question of valuing.

Fullan, M. G. (1991b). Professional development of educators. In M. G. Fullan, *The new meaning of educational change* (pp. 315-344). New York: Teachers College Press.

Fullan contends that effective teacher development and effective change processes are one and the same. He compares unsuccessful and successful staff development approaches, using several cases to illustrate successful strategies. Effective staff development fosters the development and integration of several aspects of teacher effectiveness—technical skill development, critical reflection, inquiry, and collaboration. Fullan then describes opportunities for professional development throughout the teacher's career. Professional development of administrators and consultants is explored, and Fullan concludes that these individuals do not typically receive much preparation for their roles as change agents. He concludes this book chapter with a set of guidelines for effective professional development. Guideline 1 recommends that faculties and schools use three interrelated strategies—faculty renewal, program innovation, and knowledge production. Guideline 2 is that learning must permeate everything the district and school does. Guideline 3 is that all

promoters of professional development should pay attention to incorporating attributes of successful professional development into as many activities as possible and ensuring that the ultimate purpose of professional development is to create individual and organizational habits and structures that make continuous learning a part of the school culture.

Fullan, M. G. (1991c). The teacher. In M. G. Fullan, *The new meaning of educational change* (pp. 117-143). New York: Teachers College Press.

Educational change depends on what teachers do and think. If educational change is to happen, teachers must understand themselves and be understood by others. In this book chapter, Fullan describes the current situation for most teachers, a situation dominated by routine and overload that limits reform. He summarizes several studies about the daily classroom lives of teachers. Given this, innovation can either aggravate the teachers' problems or provide a glimmer of hope. Fullan then discusses what happens when a change is introduced. Many have suggested that teachers are most often governed by the "practicality ethic" when it comes to implementing an innovation. Teachers have concerns about the impact of the innovation on themselves and on their students. If these concerns are not addressed, the change has little likelihood of success. Fullan examines what makes change work for teachers, with a focus on the workplace conditions necessary for success. These include an emphasis on teacher learning, collaboration, and shared goals. He suggests that teachers can better cope with the process of change by analyzing the proposed change, examining the supports for the change, and assessing the roles and responsibilities implied in the change. He concludes with an examination of professionalism in teaching.

Fullan, M. G., & Miles, M. B. (1992). Getting reform right: What works and what doesn't. *Phi Delta Kappan, 73*, 745-752.

The authors of this article argue that an understanding of the change process is critical if education reform is going to be successful. Rather than develop a new strategy for each wave of reform, the authors suggest that we must use basic knowledge about the do's and don'ts of bringing about continuous improvement. In this article, they present seven basic reasons why reform fails: faulty maps of change, complex problems, emphasis on symbols over substance, impatient and superficial solutions, misunderstanding resistance, attrition of pockets of success, and misuse of knowledge about the change process. They then offer seven propositions that could lead to success: change is learning, change is a journey, problems are our friends, change is resource-hungry, change requires the power to manage it, change is systemic, and all large-scale change is implemented locally. These propositions embody the

idea that local implementation by everyday teachers, principals, parents, and students is the only way that change happens.

Hord, S. M. (1992). *Facilitative leadership: The imperative for change.* Austin, TX: Southwest Educational Development Laboratory.

This review and synthesis of the literature begins with a brief history of approaches to change and the emerging notion that facilitating leaders, or change agents, are needed in any change effort. Hord describes the individuals who might serve as leaders, noting that leadership is not the same as management. Leadership is most often provided by the principal, by leadership teams, or by the superintendent. Hord identifies six categories of actions used by leaders to guide and support change: creating an atmosphere and culture for change; developing and communicating the vision; planning and providing resources; providing training and development; monitoring and checking progress; and continuing to give assistance. Finally, she describes the "higher order" leadership—transformational, ethical, shared—needed in restructuring and systemic change. Skills or competencies that restructuring leaders need are listed, and the roles of leaders throughout a process of change are described.

Hord, S. M. (1994). Staff development and change process: Cut from the same cloth. *Issues . . . about Change, 4* (2). Austin, TX: Southwest Educational Development Laboratory.

This paper describes the Joyce and Showers staff development model and relates it to a change model derived from school improvement studies. The staff development model has five components: (1) presentation of theory, new skill, or strategy; (2) modeling of skills or strategic models; (3) practice; (4) structured and open-ended feedback; and (5) coaching for application, with follow-up work to help with implementation. Studies have found that the fifth component is the most critical in effecting a change in the largest number of participants. From school improvement studies, five functional categories of interventions for change were identified: (1) developing and communicating the vision, goals and expectations; (2) planning and providing resources; (3) providing training; (4) monitoring and evaluating; and (5) providing consultation and reinforcement. Studies have found that the first category is critical and is provided primarily through the leadership of the principal. Noting the fit of the two models, Hord suggests thinking about staff development as the process of change. Successful strategies for a comprehensive approach to changing teachers' practices would then include: developing and articulating a vision, planning and providing resources, investing in training, monitoring progress, providing continuous assistance, and creating a context conducive to change.

Hord, S. M., Rutherford, W. L., Luling-Austin, L., & Hall, G. E. (1987). *Taking charge of change*. Alexandria, VA: Association for Supervision and Curriculum Development.

This book is built around the Concerns-Based Adoption Model (CBAM). The authors first share some of their conclusions about change: change is a process, not an event; change is accomplished by individuals; change is a highly personal experience; change involves developmental growth; change is best understood in operational terms; and the focus of facilitation should be on individuals, innovations, and the context. The book uses the story of change in one school district to provide the reader with a clear sense of CBAM and its applications. The CBAM model describes a process whereby a change facilitator uses various techniques for probing individuals involved in or contemplating a change process in order to understand them and their needs. The facilitator may use the Stages of Concern, Levels of Use, and Innovation Configuration diagnostic tools. With the information from this diagnosis, the facilitator can make decisions about how to use resources and provide interventions to facilitate the school improvement process. The stages of concern dimension, for example, focuses on the concerns people have about the change, described as awareness (I am not concerned about it), informational (I would like to know more), personal (How will it affect me?), management (How much time will it take?), consequence (How is it affecting my kids?), collaboration (How do I relate it to what others are doing?), and refocusing (I have ideas for improving on the idea). The authors describe the role of effective change facilitators. The book provides an overview of the roles people and their personal needs play in the change process.

Lambert, L. (1998). How to build leadership capacity. *Education Week, 55* (7), 17-19.

Lambert provides anecdotal and theoretical evidence that the best means to create successful and long term change is harnessing the "energy and commitment" of staff and community rather than simply creating strong individual leaders. When a strong leader leaves a district, campuses typically tend to ease back into their prior routines, abandoning positive improvement efforts. By developing the leadership potential of all of the members of the system and garnering the involvement of the community, improvements are not lost when a strong leader leaves a campus or district. The author defines leadership as "the reciprocal learning processes that enable participants in a community to construct meaning toward a shared purpose," and shares her assumptions about leadership as learning. Building capacity in schools includes developing a new understanding of leadership capacity. She presents a matrix of four school types and their capacities for leadership, and details ways that schools and districts can encourage leadership.

Odden, E. R., & Wohlstetter, P. (1995). Making school-based management work. *Educational Leadership, 52* (5), 32-36.

The site-based management system has been promoted as the most effective means of instituting school change. Odden and Wohlstetter provide a explanation for why some districts flourish under site-based management and others flounder, based on their three-year study in the United States, Canada and Australia. The organization traits of a successful implementation include the district developed a cohesive and accepted vision for curriculum and instruction; the district passed the control and authority for budgeting, personnel and curriculum to the site-based committees; the changes were started by administrative staff; the district shifted the control of information dispersal and professional development to the site-based committees; and the principal of the campus was a true believer in the program. They found that when the administrative staff held onto the control of the change process and tried to force their rules and frameworks onto the staff, the system failed. They conclude their article with practical suggestions for successful site-based-management implementation: use both site councils and subcommittees, spread the power of decision making, promote professional development, use a school/campus wide focus, expand communication about changes, use work groups that meet regularly, use community outreach strategies, develop more school leaders, and reward the accomplishment of individuals and groups.

O'Neil, J. (1995). Our schools as learning organizations: A conversation with Peter Senge. *Educational Leadership, 52* (7), 20-23.

John O'Neil interviewed Peter Senge, questioning him about the application of his ideas about "learning organizations" to educational environments. Senge promotes the concept that a true learning organization must involve educators from all levels of the system in collaborative efforts. He feels that educators can and should continually assess and improve curriculum and programs to meet the needs of the students, and therefore the society. He cautions against the continuation of the present system which causes most teachers to feel weighted down by rules, guidelines, and deadlines. Additionally, he feels that adult educational practices compound current educational problems by not encouraging teachers to reach for collective learning. To combat this problem, districts should diffuse the power within the system and create ways for educators at all levels to bring about change.

Richardson, V., & Anders, P. L. (1994). A theory of change. In V. Richardson (Ed.), *Teacher change and the staff development process* (pp. 199-216). New York: Teachers College Press.

This last chapter in a book summarizes the findings about teacher change and the staff development process from a research study—the Reading Instruction Study—that engaged reading teachers in a collaborative examination of their beliefs and practices. The staff development process used in the study was based on Aristotle's notion of "practical arguments." This constructivist process helped teachers examine their beliefs about teaching and learning, construct and reconstruct practical arguments about classroom actions, and experiment with alternative practices. In this chapter, the authors describe their understanding of teacher change based on this study. Teachers change all of the time by experimenting with new activities. These are then assessed on how well they worked based on the teachers' tacit beliefs and personal needs. Sometimes the beliefs driving action are contradictory, a realization that comes to light only in dialogue with others. The authors propose a normative conception of teaching that builds on their ideas about teacher change and provides a direction for professional development. They describe the teacher as an inquirer who questions assumptions and is consciously thoughtful about goals, practices, students, and social contexts. The question for staff development becomes one of how to help teachers become inquiring, reflective individuals whose educative goals are in the forefront of their reflection. A staff development process is described that works against the norms of teacher isolation and top-down mandates; this process involves dialogue and inquiry over an extended period of time. Recommendations are made for policies that could encourage reflective teaching.

Sashkin, M., & Egermeier, J. (1993). *School change models and processes: A review and synthesis of research and practice.* Washington, DC: Office of Educational Research and Improvement.

This document identifies differing perspectives, strategies, and useful principles from the 30 year history of educational change. The three most influential perspectives in educational change are the rational-science perspective (research and development approach of the 1950s to 1970s) which posits that change is created by the dissemination of innovative techniques; the political perspective (top-down approach of the 1980s) which brings about change by legislation and other mandates; and the cultural perspective (bottoms-up approach of the 1990s) which emphasizes changes in meanings and values within the organization. Four strategies for improving school performance are described, along with examples and reviews of related research studies. The focus of the "fix the parts" strategy is on the transfer and implementation of specific innovations. The focus of the "fix the people" strategy is on improving the knowledge and skills of teachers and

administrators through professional development (preservice and inservice). The focus of the "fix the school" strategy, which grew out of a practice field called organizational development, aims to help people in a school solve their problems more effectively. The most recent strategy is "fix the system" or systemic reform. This strategy incorporates the other three strategies in a broader context and includes the notion of restructuring. The systems approach is described as the third wave of reform. The document includes a reference bibliography, illustrative programs, and additional sources.

Schlechty, P. C. (1990). *Schools for the 21st century: Leadership imperatives for educational reform.* San Francisco: Jossey-Bass.

Schlechty states that the change process that schools face today is the most significant endeavor that school leaders have ever faced. This era is characterized by new technological, cultural, and political impacts that frame evolving educational needs and goals. In order for schools to be successful, he feels that schools must find a shared vision by answering the following questions: What are the present rules, roles, and relationships that impede the capacity of schools and teachers to respond to needs of the students and invent school work products that satisfy those needs? What are the resources that the schools can allocate? What are the present structures that preclude flexible distribution of these resources available in schools? How can a new system provide structure that an educational organization needs and still destructure those things that stifle education? As the questions are answered, a new vision will emerge that incorporates the community's culture and economics. This restructuring will be characterized by participatory leadership from all levels, dispersed power and authority, purposeful action, knowledge work, and success recognition. This process will also create a curriculum based not on content knowledge but on applied knowledge (Schlechty calls this the "uncommon curriculum"). This curriculum creates a situation where quality instruction rather than standardized tests becomes the focal point of concern. One other element that Schlechty includes is marketing education. He promotes the idea that it is not enough that a quality school is created; educators must make an effort to gain recognition for systemic and individual success both within and out of the educational institution. This book presents a view of the future that combines the needs of both the society and the educational system.

Shaw, K. L., & Etchberger, M. L. (1993). Transitioning into constructivism: A vignette of a fifth grade teacher. In K. Tobin (Ed.), *The practice of constructivism in science education* (pp. 259-266). Washington, DC: AAAS Press.

This book chapter examines change from the perspective of a teacher. The teacher realized that good grades did not mean that a child was understanding the concepts. She knew that she needed to change her instruction, but was unsure how to proceed. She returned to school to pursue an advanced degree, and learned a new way of viewing the learning process which had clear implications for instruction. Her commitment to change led her to seek out an alternative. She learned about constructivism, and this became the alternative enabling her to create a vision of what she wanted her classroom to be like. The authors describe the teacher's struggle to enact her vision. The transition from a teacher-dominated classroom to a student-centered one was not smooth. They tell of the ups and downs, and of the learning that took place in the classroom on the part of the students and the teacher. The authors then examine the process of the change as the teacher experienced it. First was the perturbation, the need to change. Next was the development of commitment to make the change. Next was the construction of a personal vision of what teaching and learning should be like in the classroom, and a plan to implement the change. The cultural environment plays a significant role in change (i.e., is it supportive?). Finally, reflection is an integral part of the change process. The authors conclude that collaboration with others provides teachers with the help and support they need to move through the process of change.

Wallace, D. K. (Ed.). (1996). *Journey to school reform: Moving from reflection to action through storytelling.* Washington, DC: National Education Agency Professional Library.

This book offers ideas, tips, and examples to serve as a guide to school change and reform. The content includes a framework for building a new culture of educational leadership that focuses on reflection and action; guidelines for storytelling and dialoguing; scenarios and suggestions for facilitating and guiding reflective activities; and an action guide filled with ideas and suggestions to advance site-based school improvement. The guide to advance site-based school improvement includes the topics: developing personal reflection and leadership for improved schools; expanding leadership and establishing ownership by all members in the school restructuring process; retooling schools; and building relationships between school leadership and community members. The stories and questions throughout the book reflect and provide insight for an understanding of the process of change.

Wasley, P. A., Donmoyer, R., & Maxwell, L. (1995). Navigating change in high school science and mathematics: Lessons teachers taught us. *Theory into Practice, 34* (1), 51-59.

Science and mathematics teachers appear to be more resistant to change than teachers from other disciplines. In the study reported here, 17 teachers from schools participating in the Coalition for Essential Schools were invited to investigate the barriers to change. They discussed reform documents, participated in a problem-based learning activity, and conducted an action research project. The most significant barrier to change was identified as the absence of concrete strategies for operationalizing reformers' vision. The teachers wanted heuristics rather than recipes or formulas to guide them in implementing the new ways of teaching advocated by the reform efforts. The authors also found that teachers tended to overestimate the significance of certain external barriers to change and to underestimate their own ability to overcome some barriers. The authors conclude that teachers are not so much resistant as they are lost at sea.

Teacher Learning

This section of the bibliography is on teacher learning. References were chosen that explore professional development and professional growth, that look at specific strategies to engage teachers in their own learning, and that relate personal stories of teacher growth.

What are the current views of professional development? The references by Bell and Gilbert (1994), Caldwell (1997), Lieberman (1995), Little (1997, March), and Sparks and Hirsh (1997) provide an overview of professional development as professional learning. Louis, Kruse, and Raywid (1996) connect professional learning with organizational learning. Kaufman (1997) advocates an equity stance for professional development.

How can groups of teachers work together for professional development? Study groups are increasingly viewed as forms of professional development. References by Anders and Richardson (1991), Birchak and others (1998), Duckworth and The Experienced Teachers Group (1997), LaBonte, Lieghty, Mills, and True (1995), Meyer and Achinstein (1998, April), and Murphy (1995, 1997) describe various aspects and configurations of study groups for teachers. Lieberman and McLaughlin (1992) discuss networks of teachers learning together.

How can teachers inquiry into their practice? Action research is another avenue for teacher learning that is often included as part of the activities of study groups. References by Johnson and Button (1998), Newman (n.d./1998, June), Sagor (1992), and Tonack and Dean (1997) specifically discuss action research by teachers.

What activities support reflective practice? Reflective practice is a desired outcome of professional growth by teachers. Reflective journals provide a means of encouraging teacher learning. Lewison (1997) and Newman (1988) discuss journaling as a learning tool. Baird, Fensham, Gunston, and White (1991), Shymansky (1992), and Zeichner and Tabachnick (1991) examine various reflective strategies leading to a more reflective practice.

How can teachers relate their inquiry to student outcomes? Teacher groups can learn together through the examination of student work. Cushman (1996) and Lewis (1998) describe practices for using this strategy. Newman (n.d./1998, August) suggests ways to listen to students, and Greenleaf, Hull, and Reilly (1994) use a case method to aid teachers in learning about their students.

How do teachers experience inquiry and learning? Personal perspectives on teacher learning are provided by Beattie (1995), Briscoe (1996), Hole (1998), Jalongo and Isenberg (1995), McDonald (1992), and Wyshynski and Paulsen (1995).

Teacher Learning

Anders, P. L., & Richardson, V. (1991). Research directions: Staff development that empowers teachers' reflections and enhances instruction. ***Language Arts, 68,*** **316-320.**

Anders and Richardson explored the barriers to teachers' use of research-based practice in reading comprehension. They created an environment that encouraged teachers to consider their own explanations for classroom practices and relate those to explanations found in current research. They met with the teachers in individual and study group sessions. The groups evolved through an "introductory" stage (the teachers learned about each other), a "break-through" stage (one or more of the participants moved to a new way of thinking about the topic), and finally to the "empowerment" stage (the teachers claimed ownership of the staff development itself). The authors noted that the involvement of the teachers was significantly greater when the group was involved in dialogue than when they were presented with information. The authors sensed that the teachers were touched at a deeper, more concrete level during the dialogue sessions and may have been more induced to change their ideas. Their findings indicate that research methods and concepts play a small role in the larger picture of teaching, so the importance of research-based practice was often lost to other issues. In their concluding remarks, the authors suggest that there has not been enough research to determine the effectiveness of study groups as professional development, but the results in this study suggest that this process has the possibility of being an effective strategy to improving teaching and learning.

Baird, J. R., Fensham, P. J., Gunston, R. F., & White, R. T. (1991). The importance of reflection in improving science teaching and learning. ***Journal of Research in Science Teaching, 28,*** **163-182.**

Three fields of theory and research—metacognition, constructivism, and the nature of individual change—were explored in this three-year science education study. The authors state that constructivism complements metacognition in effecting personal change. Their study was designed to explore the role of personal and collaborative reflection in changing teaching practice. The first component of the study involved preservice teachers who did reflective writing and participated in clinical interviews and group discussions. The authors concluded that reflection is important for individual teacher development—attitudes, perceptions, conceptions, and abilities—and that collaboration fosters reflection. The second component of the study involved first year and experienced teachers and their students. The teachers and their students completed written responses about a lesson, and the consultant facilitated a classroom discussion about those responses. The

teacher and the students then agreed to make specific changes. They reflected on their progress during classroom discussions and in reflective journals. Overall the process was successful and improvements were seen in both teaching and learning in these science classrooms. Findings from the study affirm the importance of personal and professional reflection and collaboration on change.

Beattie, M. (1995). ***Constructing professional knowledge in teaching: A narrative of change and development.*** **New York: Teachers College Press.**

Beattie tells the story of a collaboration between an educational consultant (Beattie) and a classroom teacher (Anne). Her study is situated in the group of studies that explore the personal, practical knowledge of teachers. The purpose of this study was to gain an understanding of teaching and teacher learning from the teacher's perspective and to understand how the teacher's personal practical knowledge develops through narratives of practice. She uses literary forms—story, poetry, dialogue—to describe the everyday details of classroom life, to reveal the qualities and complexities of professional development, and to evoke the lived experiences of learning and change through stories of practice. Beattie presents three interwoven stories: her story of teaching and learning, Anne's story of professional growth and development, and the story of the collaboration. She develops the concept of research as increased self-knowledge and explores the literature on narrative, story, and personal practical knowledge. She tells how Anne, through experience and the reflection on experience during inquiry, was able to gain new understandings of herself as a professional and of her knowledge of teaching. The process of the reconstruction of her story as a professional was bound up with her interactions with colleagues and with her environment. Beattie documents Anne's professional learning, and says that "Anne's new sense of competence, coherence, and confidence empowered her to take on new challenges and to deal with the ongoing dilemmas..." The concluding chapters in this book describe the collegial partnership and the opportunities for learning it provided. It was not always an easy process, but was one that offered openings for learnings for both participants.

Bell, B., & Gilbert, J. (1994). Teacher development as professional, personal, and social development. ***Teaching and Teacher Education, 10,*** **483-497.**

After attending an inservice course, many teachers feel frustration when they are unable to use the new teaching strategies effectively to help students learn. Bell and Gilbert report on a three year Learning in Science Project, which investigated the development of science teachers as they learned new teaching activities based on how children learn. The data were analyzed to give an overview of the adult learning process. The authors describe three

main types of development—professional, personal, and social—that occurred within the context of the teacher development program. The program was characterized by support, feedback, and reflection. Development in each area seemed to occur in a loose and flexible sequence. For example, there were three stages in personal development: (1) accepting an aspect of teaching as problematic; (2) dealing with restraints; and (3) feeling empowered. Stages in social development were (1) seeing isolation as problematic; (2) valuing collaborative ways of working; and (3) initiating collaborative ways of working. On the professional side, stages were (1) trying new activities; (2) developing ideas and classroom practice; and (3) initiating other development activities. The interactions between personal, social, and professional areas are explicated in this paper. The authors conclude that teacher development can be viewed as teacher learning rather than as others getting teachers to change; learning can be viewed as a purposeful inquiry.

Birchak, B., Connor, C., Crawford, K. M., Kahn, L. H., Kaser, S., Turner, S., & Short, K. G. (1998). ***Teacher study groups: Building community through dialogue and reflection.*** **Urbana, IL: National Council of Teachers of English.**

Teachers can come together to talk about teaching and learning in study groups. School-based study groups seem to provide the context for critical dialogue about professional issues of importance to teachers. A study group is not a staff meeting or inservice, but it is a place where learning takes place. The study group builds community and challenges teachers' thinking, and can be instrumental in helping teachers become better teachers. This book provides guidelines and examples for teachers and facilitators who want to establish a study group of their peers. It includes a chapter on organizing study groups that provides answers to questions about the types of meetings, resources, numbers of teachers, and so on. Another chapter discusses the facilitation of study groups—selection of a facilitator, what she does, and so on—and provides guidelines for facilitators. The authors include transcripts from some of the conversations of a study group to give the reader a sense of what a study group sounds like. While having a teacher study groups seems like a good idea, there are issues that will likely be encountered. The authors discuss several of those and provide suggestions based on their experiences with study groups. In the last chapter, they look at the influence of the study group on the individual teachers and on larger school setting.

Briscoe, C. (1996). The teacher as learner: Interpretations from a case study of teacher change. ***Journal of Curriculum Studies, 28,*** **315-329.**

What counts as a knowledge source for the teacher as learner? How do existing conceptualizations of teaching and learning influence a teacher's learning and construction of alternative images? What kind of knowledge is

valued as a basis for constructing new images and changing practices? Briscoe's questions imply that part of the change process for teachers is the creation of a personal curriculum for learning. She reports on the learning process of a science teacher who was attempting to incorporate cooperative learning into his teaching practice. The study involved weekly conversations with the teacher as well as classroom observations. Through the promotion of reflection and provision of feedback and resources, the research process itself sustained and influenced the teacher's change. Briscoe describes the teacher's multiple images of teaching and learning and relates these images to the teacher's construction of teaching roles. His success in changing his practice depended on his being able to learn new ways of interacting with his students. However, the understanding of his students' learning needs that led him to consider cooperative learning conflicted with how he made sense of his teaching role. His personal orientation toward technical interests—predicting and controlling action—had to be reconciled with an innovation that is grounded in practical interests—understanding how individuals make sense of their actions. Although he did not change his practice to the extent desired, he did shift his orientation to teaching. Implications for creating learning environments which foster conceptual change among teachers are discussed.

Caldwell, S. D. (Ed.). (1997). *Professional development in learning-centered schools*. Oxford, OH: National Staff Development Council.

This edited book features many of the leading authors in the fields of staff development and instructional reform, and focuses on learning organizations, learning-centered schools, and collaborative development. There are chapters on site-based development, teacher leadership, and the role of the principle and central office administration that describe the shift in roles and responsibilities in learning and school reform. There are chapters that discuss the new models which guide designs for professional learning (e.g., constructivism). The issue of building capacity within the system is also discussed. The view of teacher learning threads through the chapters, with particular emphasis on professional communities and job-embedded learning, as well as characteristics of educational organizations that support teachers and their learning.

Cushman, K. (1996). Looking collaboratively at student work: An essential toolkit. *Horace, 13* (2), 1-12.

Cushman describes a strategy used by teachers in Essential Schools. The teachers come together to examine student work and use specific protocols to focus their discussion on the qualities of the work and what they can learn from it about their students and themselves. Cushman describes this "tuning

protocol" that creates a ritual of presentation and response, and provides structure for conversations among teachers. She describes strategies used by groups of teachers to reflect on the authenticity of the learning tasks, thus allowing teachers to consider the quality of the assignments they are giving. Other strategies provide teachers with new ways of thinking about the child as a learner, including development of portfolios, exhibitions, descriptive reviews, and student learning records. These also provide opportunities for reflecting on curriculum and practice. Cushman reports that teachers say the examination of student work has had far-reaching impact on their practices.

Duckworth, E., & The Experienced Teachers Group. (1997). *Teacher to teacher: Learning from each other.* New York: Teachers College Press.

This book is the account of thirteen experienced teachers who came together with a teacher educator (Duckworth) in a year-long graduate program in which they learned from each other to become better teachers. The book is a collection of essays, discussions, and journal entries by the teachers and Duckworth that revolve around a seminar, Teaching as Collaborative Inquiry. The seminar was student-run and was intended to reflect the interests of the group. They talked about curriculum, motivation, cooperative learning, assessment, and teacher learning. They talked about their concerns and about their lives. The book gives insights into the processes involved when teachers struggle to talk together about teaching, learning, and their students. It is an honest book portraying the feelings the teachers have as they engage in this seminar, and as they learn about, from, and with each other.

Greenleaf, C., Hull, G., & Reilly, B. (1994). Learning from our diverse students: Helping teachers rethink problematic teaching and learning situations. *Teaching and Teacher Education, 10,* 521-541.

This paper presents research on helping teachers use reflection and inquiry to think about increasingly diverse student populations. The authors begin with a discussion of the changing demographics of American classrooms—more diverse students and less diverse teachers—that is causing disparity between teachers and their students. One result is that teachers can underestimate the skill, knowledge, and potential of diverse students because they do not understand ways of thinking and communicating that are different from the mainstream. Teachers may bring little personal experience of diversity into their pedagogical decision-making. The authors use a case method to engage teachers in active problem-solving and decision-making. The case described concerns a minority student and her remedial writing class. The authors hoped that the case materials and group inquiry would expand the experiential base of teachers, giving them practice in approaching student performances in an inquiry mode. They found that teachers did engage in

inquiry, and many teachers reflected critically on common instructional practices, on power and authority in the classroom, and on the potential significance of cultural differences and diversity. However, not all of the conversations resulted in productive accounts, as some reverted to stereotypical explanations. They concluded that teachers working together could both challenge and reinforce harmful views of students. Group dynamics could influence the problem-solving process. The authors believe that the case method is helpful for most teachers and groups, but they suggest that the case materials may need to augmented by additional materials.

Hole, S. (1998). Teacher as rain dancer. ***Harvard Educational Review, 68,*** **413-421.**

The metaphor of the teacher as rain dancer is used to explore some aspects of being a teacher. During a year-long sabbatical, Hole observed classrooms and engaged in conversations with teachers about what he was seeing. In this article, he describes the responses of a teacher focus group to a vignette about a teacher's dilemma between her desire to satisfy one student's interest and her desire for a democratic classroom. The vignette captured the tension inherent in trying to meet conflicting needs of the group and of the individual student. The teachers expressed concern for the child and made suggestions as to how the teacher might have solved the problem. Some of the teachers used storytelling to express their thoughts, relating the dilemma to examples in their own practices. Using the metaphor of rain dancer, Hole discusses how being a teacher is, like the rain dancer, more than "knowing the dance." It is a way of orienting the self to the world. And, like a rain dancer, the teacher might not have known that the steps were right until the "rain came." The question becomes, "What does it mean to be a teacher?" From his research, Hole concludes that being a teacher means finding a way to live in an environment filled with dilemmas and the inner tensions created by these dilemmas. Hole relates an incident from his own teaching where he let his own needs take precedence over his students needs, thus creating a tension in him over whose needs are being met in the classroom. Awareness of the tension is a beginning, Hole believes, to improving practice.

Jalongo, M. R., & Isenberg, J. P. (1995). ***Teachers' stories: From personal narrative to professional insight.*** **San Francisco: Jossey-Bass.**

Storytelling—or narrative—is gaining acceptance as an important tool for professional development, research, and teaching. This book shows how teachers can use stories of their teaching to reflect on their own practice, articulate values and beliefs, give shape and form to teaching theory, and better understand the decision-making processes. This book offers strategies for generating, sharing, and using narrative. The authors use classroom

stories to illustrate points made throughout the book. Individual chapters built around specific themes show how teachers use narrative to forge connections, learn from students, reflect upon experience, understand dilemmas and resolve conflict, develop as professionals, and enter the educational dialogue. In the chapter on professional development, the authors note that teacher stories contribute to teacher growth in several ways. Teachers' stories invite reflective practice, chronicle growth and change, promote the "ethic of caring," help teachers find their "voice," and can enhance cross-cultural understandings. Throughout the book, a picture is drawn of the reflective practitioner and a value is placed on teachers' knowledge and understanding. The authors say that "stories are both mirrors of our own practice and windows on the practice of others."

Johnson, M. J., & Button, K. (1998). Action research paves the way for continuous improvement. ***Journal of Staff Development, 19*** **(1), 48-51.**

In a graduate course, teachers conducted action research projects that impacted their professional development and the school culture. The course was conducted on the school site and included teachers from the site. The teachers selected projects based on their own concerns. Seminar topics were generated from the teachers' practices. Teachers felt empowered from engaging in a dialogue with colleagues who were part of their teaching environment and felt they belonged to the group of educational researchers. When asked how they changed as teachers, they reported needing to know why they were using a particular teaching strategy or book. The culture of isolation was broken down as a result of the teachers' action research projects and the seminars. Suggestions for action research include inviting teachers to read about education literature, using teaching dilemmas to identify action research topics, arranging action research projects that are ongoing and long term, encouraging connections between universities and school faculty members, and finding ways for teacher researchers to share their work.

Kaufman, M. (1997). A professional development stance for equity. ***SSI Perspectives,*** **2 (3), 4-5.**

Kaufman describes a professional development process that assists teachers in developing successful instructional strategies by using equity as a framing tool for decision making. Teachers are able to improve the educational outcomes for all students by creating a framework around which to initiate change. Teachers learned to approach change using the following elements: (1) a stance of critique and inquiry; (2) data-driven decision-making; (3) investigation of best practices, including instruction, curriculum, and materials; and (4) teacher leadership development. It is a means of

eliminating the fragmentation that typically accompanies the implementation of reform.

LaBonte, K., Lieghty, C., Mills, S. J., & True, M. L. (1995). Whole-faculty study groups: Building the capacity for change through interagency collaboration. ***Journal of Staff Development, 16*** **(3), 45-47.**

The authors created a step-by-step process to implement a school-wide faculty study group. By developing a process that gave special consideration to the 15 to 20 initiatives that each school is addressing at any given time, the authors were able to devise strategies that allowed for the staff to spend quantities of time in reflective process to promote the development of quality teaching practice. The participants in this group met for 45 minutes to an hour each week, kept logs, and met on a rotating basis with other teams once a month. Based on the data they collected, the authors found that whole-faculty study groups led to more effective teaching practice.

Lewis, A. C. (1998). Teachers in the driver's seat. ***The Harvard Educational Letter,*** **14 (2), 1-4.**

When teachers look at student work together and talk about how it could be better, they become student focused. This is not an easy process, but Lewis says that three things have made it more possible: a political and policy climate that wants proof that students are learning to high standards; reform efforts that encourage teachers to share responsibility for student success; and the emergence of a research base that is giving teachers better clues as to how to move to higher levels of learning. With the development of state and national standards, teachers are finding it beneficial to get together to discuss the standards and what high-quality student work looks like. This has become an effective form of professional development as conversations move from student work to students to subject areas to teaching and learning. The use of a formal protocol is advised for groups beginning to look at student work.

Lewison, M. (1997). Writing became a chore like laundry: The problems and potential of using journals to encourage a reflective approach to teaching. ***The Professional Educator, 19*** **(2), 13-31.**

Lewison provides practical descriptions of the potential problems and solutions to the use of journals to promote reflective practice. She recommends a less structured style of prompts and writing that allows the journals to become a life-long reflective tool for the teachers. She also found that although there was an overwhelmingly negative reaction by the teachers to journal writing, the teachers found the writing to be a beneficial tool in

their reflective process. It was a love/hate relationship. She advocated three strategies for making reflective journal writing more effective: providing collaborative support, striving for sociocultural authenticity, and encouraging ongoing inquiry.

Lieberman, A. (1995). Practices that support teacher development: Transforming conceptions of professional learning. ***Phi Delta Kappan, 76,*** **591-596.**

According to Lieberman, the current reform effort seeks to develop new practices that support teacher learning. The traditional view of staff development as a transferable package of knowledge to be distributed in bite-sized pieces needs radical rethinking. A critical aspect of the reform is the transformation of schools into learning organizations, and a significant part of this vision is professional learning for teachers. Professional development is thus viewed as an integral part of the life of the school, not as an add-on. Teachers in these reformed schools must be given opportunities to discuss, think about, try out, and hone new practices. Lieberman suggests that this involves learning by building new roles, by creating new structures, by working on new tasks, and by creating a culture of inquiry. She elaborates on and gives examples of this kind of learning in schools, making a case for her new conception of teacher development.

Lieberman, A., & McLaughlin, M. W. (1992). Networks for educational change: Powerful and problematic. ***Phi Delta Kappan, 74,*** **673-677.**

Networks of teachers offer a new way to approach staff development as teachers grow professionally and assume new leadership roles. Networks have a clear focus yet offer a variety of activities. In networks, the knowledge of teachers is respected. Several problems can arise: failure to assess and modify their practices; difficulty in assimilating networks into schools; maintaining stability; uncontrolled growth; threat to outside groups from the powerful ownership by teachers; lack of knowledge about change; lack of new models of leadership and accountability; and goals created outside of the network. Teachers support professional growth that offers challenges and gives them incentives to change their practice. Policy makers must take care not to attempt to exert control over networks, but should take an indirect approach, concentrating on providing a supportive and stimulating environment.

Little, J. W. (1997, March). *Excellence in professional development and professional community* (Working paper, Benchmarks for schools). Washington, DC: Office of Educational Research and Improvement.

The basic premise of the paper is that a school that is effective with students is also likely to play a powerful, deliberate, and consequential role in the support of teacher development. Professional development is moving away from models that emphasize acquisition of discrete skills and behaviors toward a vision of professional communities that support teacher learning through diverse experiences. In this paper, Little focuses on the environments (structures or practices, traditions or culture) that are conducive to teacher learning. She begins with an overview of a broadened conception of professional development, then describes the aspects of school organization and culture that affect professional development, and concludes with a method for assessing the school's contribution to professional development.

Louis, K. S., Kruse, S., & Raywid, M. A. (1996). Putting teachers at the center of reform: Learning schools and professional communities. *National Association of Secondary School Principals Bulletin, 80* (580), 9-21.

The authors examine two concepts that have importance in the reform movement—learning organizations and professional communities. Literature on organizational learning suggests three features of school culture and practice have an impact on teachers' ability to sustain an openness to learning: organizational memory, shared knowledge base, and information distribution and interpretation. Professional communities are characterized by shared norms and values, reflective dialogue, de-privatization of practice, collective focus on student learning, and collaboration. The authors propose that the two notions become linked through the concept of reflective practice. Using two school examples, they describe how one school becomes a thriving example of reform and the other does not. The schools were similar in many ways, but differences were identified using the two frameworks—learning organizations and professional communities. The less successful school failed to develop into a learning organization or profession community because the teachers did not have a deep understanding of the vision underlying the reform, nor did they have adequate knowledge of the reform strategies. They did not have opportunities to work together or talk together. The study has implications for school leaders which are detailed in the article.

McDonald, J. P. (1992). *Teaching: Making sense of an uncertain craft.* New York: Teachers College Press.

McDonald describes his personal efforts to better understand teaching and change his teaching practice, and his collegial interactions as a member of a group of teachers—the Secondary Study Group. He calls his inquiry "reading teaching." Reading teaching involves "textmaking," the constructing of a text by keeping journals, taking notes, recording conversations, and so on. It also involves "gripping," the bringing the texts into the grip of some set of ideas, perspectives, or values, which are often supplied by another text. Finally, reading teaching demands "doubting," which involves questioning assumptions and being critical. McDonald began his inquiry, his reading of teaching, alone. He kept a journal and then reflected on his writings. Then he became a member of a collaborative study group, who gathered regularly to talk about teaching, share reactions to readings about teaching, and tell stories from their teaching. The book includes extended excepts from their conversations, showing the nature of their inquiry and of their learning. A theme that runs through the book is that teaching is an uncertain profession. Teachers have to be able to live with the dilemmas and tensions. He says that to be professional about teaching requires reflecting on practice, conversing with peers, looking critically at the circumstances of the work, and attending to the voices of experience.

Meyer, T., & Achinstein, B. (1998, April). ***Collaborative inquiry among novice teachers as professional development: Sustaining habits of heart and mind.*** **Paper presented at the Annual Conference of the American Educational Research Association, San Diego, CA.**

This paper explores a model of professional development that is meant to extend inquiry-oriented preservice preparation into the first year of teaching. In the preservice program, prospective teachers developed habits of reflection, experimentation, and collaboration, habits which are difficult for novice teachers to maintain in schools where these practices are not the norm. The study was a three-year voluntary collaboration among nine novice teachers and two university researchers, who met once a month for about three hours. Each meeting started with a "check-in" when participants reported what was happening in their lives, personally and professionally. This was followed by the "charrette," a formal inquiry-based protocol centered around the presentation and subsequent discussion of teacher-selected artifacts. Through the meetings, the group was developing into a teacher learning community, taking an "inquiry stance" toward students, reforms, and teaching. Core activities of the group are enactments of "critical friendship" and "inquiry." The authors provide extensive examples of conversations to give the reader an understanding of critical friendship, inquiry, and the impact of the learning community on participants' beliefs and actions. The enactment of

critical friendship is, however, a difficult balance to maintain. The authors concluded that critical friendship offers potential to sustain the habits of heart and mind begun in preservice. It must, however, be fostered with care and attention to the dilemmas raised by its enactment for novice teachers.

Murphy, C. (1995). Whole-faculty study groups: Doing the seemingly undoable. ***Journal of Staff Development, 16*** **(3), 37-44.**

Murphy presents a model for whole-faculty study groups to implement and integrate effective teaching and learning practices to increase student learning and decrease student negative behaviors by supporting the implementation of innovations, integrating and bringing coherence to the school program, planning for whole-school improvements, and studying research on teaching and learning. Murphy found that focusing the study groups on a specific problem to improve the school as a whole was an effective tool in bringing positive to change at the classroom level.

Murphy, C. (1997). Finding time for faculties to study together. ***Journal of Staff Development, 18*** **(3), 29-32.**

Murphy describes the whole faculty study group process as professional development in which each teacher is a member of a small group that focuses on learning about curriculum and instruction. The most common barrier to enacting this form of professional development is the issue of time. Murphy presents examples of how schools have solved this problem including early dismissal days for students, use of substitutes, teaching assistants, or volunteers to release groups of teachers from teaching duty, use of study group meetings in lieu of faculty meetings, substitution of after-school meetings for professional development days. The key is to effectively use the time for teacher learning.

Newman, J. M. (1988). Sharing journals: Conversational mirrors for seeing ourselves as learners, writers, and teachers. ***English Education, 20*** **(3), 134-155.**

Newman discusses her first experience with using journal dialogues as a tool for reflection. She found, at first, that the journals were guarded and cautious. There was a lack of trust. To alleviate this problem, she began to write and share her own journals with the group. The strategy was effective. Through examples, she shares her strategies for successful journals: give feedback, ask questions, answer questions, encourage thinking on key issues, offer encouragement, empathize with writers, provide moral support, suggest strategies, disagree with ideas, extend their thoughts, share feelings, challenge ideas, and examine beliefs. She provides examples of the kinds of learning

that can occur through journals, for example, the importance of English teachers examining their own writing, the difficulty in reading technical materials for adults and children, or the mechanisms of reader-response theory. As the teachers moved through this process, they became more reflective about the impact of their own actions in the classroom; their journals became mirrors for reflecting and illuminating their own beliefs.

Newman, J. M. (n.d./1998, June). Action research: Exploring the tensions of teaching. [WWW document]. http://users.andara.com/~jnewman/ar.html

This article describes an approach that the author uses with a course on action research for teachers, using Tony Hillerman's novel *Sacred Clowns* as a tool to help the teachers understand the components of action research. By using the fictional investigations of the characters, she is able to illustrate the difficulty in trying to impose a linear structure on this type of research since it does not follow the patterns typically associated with traditional research. An action research project may begin in the middle, at the end, or at the beginning; the data that is collected may seem to have no relationship to other pieces of data until after the project has been underway for a considerable period of time. Moreover, since this research does not follow a linear pattern, she states that it is important to habituate the researcher and those involved in the research to journal writing or reflective logs as a process for bringing order. As the students read the novel, she has them also read action research studies: MA theses, doctoral dissertations, articles and anthologies. When she has her students correlate what happens in the novel to research documents, she finds that her students have extreme difficulty in moving away from a linear process defined in the samples to open their minds to the lack of linear thinking in the novel and therefore in action research. She feels that this process helps the students to find the connections that are much more difficult to find in action research than in traditional research. She concludes that the most difficult aspect of action research is the confrontation of self. Everyone in the action research project will be forced to confront their own practice, their own belief systems.

Newman, J. M. (n.d./1998, August). Building a supportive classroom. [WWW document]. http://users.andara.com/~jnewman/judith.html

Using vignettes from classroom situations, Newman discusses the key elements to a supportive classroom environment: the learner must feel that s/he has the possibility of success; the teacher monitors and observes the learning that is occurring in the classroom and attempts to support the needs of all of the students; the focus becomes learning from the child, not fixing the child; and the teacher assists the student in taking control of his/her own learning. In supportive classrooms, it is common to see teachers and students

working together, student to student collaborative efforts, student work created for audiences other than the teacher, guided question strategies, student choice, discussion of strategies and feelings about learning, exemplar demonstrations and student recognition and recognition of the diversity of learners. However, the most important element of this process is designing practice around the cues given to the teacher by the student.

Sagor, R. (1992). *How to conduct collaborative actions research.* Alexandria, VA: Association for Supervision and Curriculum Development.

Sagor explains that the isolation of the teacher is the key inhibitor to education improvement and that when teachers are involved in action research, they move out of isolation and into collegial relationships with their fellow teachers. He goes on to say that these new researchers must establish their own focus, but he does provide two guiding principles for the work: (1) the phenomena chosen for study must concern the teaching/learning process, and (2) those phenomena must also be within the practitioner's scope of influence. As teachers move through the process of action research, they will identify issues of worth, create a means of data collection, establish a systematic analysis of data, communicate findings to appropriate persons, and establish a plan of action to address the issues.

Shymansky, J. A. (1992). Using constructivist ideas to teach science teachers about constructivist ideas, or teachers are students too! *Journal of Science Teacher Education, 3* (2), 53-57.

Shymansky describes a program at the University of Iowa that promotes the concept of inquiry learning as a key tool to promote student success by assisting teachers to design instruction around the principles of constructivist learning. For teachers to use the precepts of constructivist learning effectively, they must develop a deep understanding about the act of teaching, integrate new learnings into existing understandings, form new understandings, and develop new conceptual frameworks. This program moves the teachers through these steps by having them become teacher researchers. As they study the origin and evolution of student science ideas on a specified topic, the participants collect data and analyze data, draw conclusions from their data, discuss their learnings in group sessions, and use journals for a reflective tool.

Sparks, D., & Hirsh, S. (1997). *A new vision for staff development.* Alexandria, VA: Association for Supervision and Curriculum Development.

Sparks and Hirsh describe the paradigm shift in staff development. Three powerful ideas are altering the shape of schools and the staff development that occurs within them. These ideas are results-driven education, systems-thinking, and constructivism. The authors describe major shifts in staff development that are coming about as these three ideas take hold: from individual development to individual and organizational development; from fragmented, piecemeal improvement efforts to staff development driven by a clear, coherent plan; from district-focused to school-focused approaches to staff development; from a focus on adult needs and satisfaction to a focus on student needs and learning outcomes; from training conducted away from the job to multiple forms of job-embedded learning; from an orientation toward the transmission of knowledge and skills to the study by teachers of the teaching and learning process; from a focus on generic instrumental skills to a combination of generic and content-specific skills; from staff developers who function primarily as trainers to those who provide consultation, planning, and facilitation services as well; from staff development provided by one or two departments to staff development as a function of all administrators and teacher leaders; from staff development directed toward teachers to continuous improvement in the performance of all who affect student learning; and from staff development as a "frill" to staff development as indispensable. Sparks and Hirsh elaborate on each of these in this book, providing examples from around the country.

Tonack, D., & Dean, C. (Eds.). (1997). *Change in action: Navigating and investigating the classroom using action research.* Aurora, CO: Midcontinental Regional Educational Laboratory.

This book is a report of 35 action research projects by Nebraska teachers following five Saturday seminars as part of a graduate course. Short summaries of the studies include the research question, data analysis, and results. A section on researchers' journeys includes comments from participants' journals. Finally, sample contents from three researchers' portfolios provide an in-depth look into their research. A course evaluation rubric is included.

Wyshynski, R., & Paulsen, D. (1995). Maybe I will do something: Lessons from coyote. *Language Arts, 72,* 258-264.

The authors relate a story of Coyote that describes the disastrous results of Coyote's attempt to imitate the tricks of another. They suggest that this is a valuable lesson for teachers, who often try to imitate the seemingly easy

teaching practices of others. They describe each of their attempts to imitate a practice that was appealing. For Wyshynski, it was using the readers' workshop model. Everything seemed easy and seemed to be going okay, but she questioned the results. The students were reading from a narrow collection and were not very reflective. She realized that her students did not have the literate companions to sustain a meaningful dialogue. She decided to reclaim her role as teacher to help her students become more literate companions for each other. She was able to value children's voices and contributions while retaining her authority as a teacher who helps students learn. She became purposeful in her decision making. Paulsen's story is similar. The authors discuss the deeper understanding of reader workshop and interpretive communities that resulted from their questioning of practice. They conclude that teachers often imitate "grand ideas" without a clear focus on purpose. With a more focused vision, they feel that they now know why they do what they do with their students each day.

Zeichner, K. M., & Tabachnick, B. R. (1991). Reflections on reflective teaching. In B. R. Tabachnick & K. M. Zeichner (Eds.), *Issues and practices in inquiry-oriented teacher education* (pp. 1-18). New York: Falmer Press.

Ziechner and Tabachnick discuss the rise of reflection as a strategy in teacher education programs as a tool to improve educational practice. Though they do not disagree with the possible improvements that can come from a more thorough understanding of teaching practice, they take exception to uninformed reflective investigation. If there is no focus or priority in the reflection, then it is an ineffective tool. They identify four traditions in reflective teaching: academic tradition, emphasizes the role of the teacher as a scholar and content specialist; social efficiency tradition, stresses the scientific study of teaching in order to build a strong teacher education curriculum; developmentalist tradition, stresses the teacher as a researcher who determines what should be taught and how it should be taught based on interaction with the learner; and social reconstructionist tradition, stresses the importance of education in creating a more just and humane society. They provide anecdotal evidence of the presence of each of the traditions in teaching practice. Many times a teacher will label his/her activities as one approach, but, in reality, is teaching using another. However, these teachers did begin to move their practice to a more reflective one as their reflective conversation continued. They conclude that this shared meaning making experience engages the participants in a process that allows students and instructors to learn the value of reflective practice.

Instructional Practice: Curriculum, Instruction, and Assessment

This section of the bibliography contains references on instructional practice. References were chosen that provide information on curriculum, instruction, and assessment. This section provides a snapshot of work in this area since the number of articles and books available is overwhelming. While not included on this list, the national standards documents in the various subject areas provide a beginning into a consideration of curriculum and instruction and were widely used by project staff.

The following references relate to curriculum: Applebee (1997), Dempster (1993), Egan (1986), Kosunen (1994), Levy (1996), McCutcheon (1997), and Wiggins and McTighe (1998).

The following relate to instruction: Farrell (1991), Gardner (1995), Hillocks (1995), Pirie (1997), Rosenblatt (1991), Shor and Freire (1987), and Stock (1995).

References that discuss assessment are Guskey (1996), Hatch and Seidel (1997), Kohn (1994), MacIver and Reuman (1993/94), Shafer (1995), Watts (1996), and Wiggins (1996).

Instructional Practice: Curriculum, Instruction, and Assessment

Applebee, A. N. (1997). Rethinking curriculum in the English language arts. ***English Journal, 86*** **(5), 25-31.**

Applebee reveals some of the concerns and potential effects of school reform and curriculum standards on classroom practice that have arisen from his case study research involving expert teachers. He begins by acknowledging that teachers must recognize the impact of tradition on classroom practice since tradition is the lens that defines a teacher's perception. It is by reconciling opposing views of curriculum, of traditions, that educators are able to bring about positive change. He views curriculum development to be "a matter of constructing domains for conversations," domains that can be explored through reading, writing and discussion. These domains apply to teachers as well as students. As teachers begin their investigations, they focus on such problems as the canon—what literary selections should be part of the curriculum. He provides the following general principles for designing classroom curriculum: an effective curriculum must be built around language episodes of high quality (quality); an effective curriculum requires an appropriate breadth of materials to sustain conversation (quantity); the parts of an effective curriculum are interrelated (relatedness); and for a curriculum to be effective instruction must be geared to helping students enter into the curricular conversation (manner). He concludes his article with possible next steps: moving the conversation across grade levels, defining the canon, relating the curriculum to the larger world, and demonstrating an effect on student learning.

Dempster, F. N. (1993). Exposing our students to less should help them learn more. ***Phi Delta Kappan, 74,*** **433-437.**

Dempster constructs a rational for the battle cry of the '90s curriculum revisionist—*Less is More.* Before this concept came into acceptance, the predominate curriculum decision-making guideline for teachers was that anything that will "enrich the meaning" should be utilized, the more the better. Dempster says that truly effective learning requires frequent distributed practice, and this can only be achieved by reducing the size of the existing curriculum. As a means of deciding what should and should not be taught, he advocates that educators consider taking a close look at the composition of each instructional unit, with an eye to removing elaborations that do not serve a curriculum purpose, and that the non-essential material be removed from the curriculum.

Egan, K. (1986). *Teaching as storytelling: An alternative approach to teaching and curriculum in the elementary school.* Chicago: University of Chicago Press.

In this book, Egan provides an alternative to the dominant procedure for planning lessons, which he describes as the objectives—content—methods—evaluation model. This model can lead to a mechanistic way of thinking about planning teaching. His alternative model encourages teachers to see lessons or units as stories to be told. It draws on newer views of learning and meaning, and stimulates children's imagination. The story, he says, reflects a basic and powerful form in which we make sense of the world and experience. He calls into question the notion that children only learn through hands-on experience with materials. He suggests that children learn a great deal from stories and fantasy, and further, that this learning is fairly abstract. While the child may not be able to articulate abstractions, he or she uses them in making sense of stories. Egan explores how a teacher can use childrens' conceptual abilities to present school content in the form of stories. Stories bring a natural coherence to lessons and set up criteria for what should be included. Therefore, teachers should approach a topic (e.g., communities) as a story to be told, rather than a set of objectives to be attained. Egan proposes the story form model of lesson development which revolves around five key question areas: (1) What is most important about this topic and why should it matter to children? (2) What powerful binary opposites best catch the importance of this topic? (3) What content best articulates the topic into a story form? (4) What is the best way of resolving the dramatic conflict? (5) How can one know whether the topic has been understood by the students? He presents examples of answers to these questions, and describes story lessons or units from several subjects.

Farrell, E. (1991). Instructional models for English language arts, K-12. In J. Flood, J. M. Jensen, D. Lapp, & J. R. Squire (Eds.), *Handbook of research on teaching the English language arts* (pp. 63-84). New York: MacMillan.

Farrell describes the three curriculum models for designing instruction in English/language arts classrooms. The Mastery Model requires that instructional objectives be clearly stated and broken into small discrete units for learning. Research suggests that mastery learning measures paper and pencil achievement well, but does not measure style and expression in writing. The Heritage Model promotes the use of content that advances the culture and heritage of the nation. In practicality, a standard canon that is used by all teachers has never been developed. Selection of content is determined by each individual teacher. The Process Model is a more student-centered approach that requires the teacher to create an environment that encourages students to come to their own understandings and learnings. This model is used more actively at the secondary level and develops strong

analytical skills in students. While it is true that teachers may use all of these models within an instructional unit, research has shown that teachers do tend to use a specific model predominately.

Gardner, H. (1995). Reflections on multiple intelligences myths and messages. *Phi Delta Kappan, 77,* 200-203, 206-209.

Garner wrote this article to address misconceptions that had arisen as a result of educators integrating the theory from *Frames of Mind* (1983) into classroom practice. He begins by debunking six myths about multiple intelligences. (1) Using standardized tests to determine which intelligence applies to a particular person is inconsistent with the tenets of multiple intelligence theory. These concepts rely on accumulated knowledge about the human brain and human cultures; therefore, a linguistic or logical intelligence test does not provide an appropriate lens for viewing multiple intelligences. (2) Since an intelligence is a new type of construct, it can not be forced into preconceived domains or disciplines. Multiple intelligences are determined by ever changing biological and psychological factors. (3) Though often compared to learning styles or other categories of learning strategies, a multiple intelligence is a capacity not a style. (4) Contrary to some theorists, multiple intelligence theory is empirical and is continually refined as new findings emerge. (5) Multiple Intelligence theory is not in conflict with research about the impact of heredity and environment on intelligence. (6) Multiple intelligences do not narrow the definition of intelligence to focus on scholastic performance, but instead focus on a set of talents. He concludes by emphasizing that there is not a single educational approach to using multiple intelligences in the classroom because all children are not the same.

Guskey, T. (1996). Reporting on student learning. Lessons from the past--prescriptions for the future. In T. Guskey. (Ed.), *Communicating student learning: The 1996 ASCD yearbook* (pp. 13-24). Alexandria, VA: Association of Supervision and Curriculum Development.

Guskey provides a historical perspective of educational grading and reporting. He considers that there are effective and ineffective strategies in this process; that grading and reporting are not essential to instruction; that there is always a degree of subjectivity in grading and reporting; that grades may have a value as a reward but have no value as punishment; and that grading on the curve is ineffective in promoting student learning. He advocates that by relating grading and reporting to learning criteria, teachers are able to communicate a clear set of learning objectives and appropriate response to that learning objective. He provides three guidelines for grading: begin with a clear statement of purpose, provide an accurate statement of what is to be learned, and use grading and reporting to enhance learning.

Hatch, T., & Seidel, S. (1997). Putting student work on the table. *National Forum: The Phi Kappa Phi Journal*, 77 (1), 18-21.

Hatch and Seidel begin this article with three images: the child handing a report card to a parent and neither of them understanding what an "A" or a "C" signifies; the reporting of standardized test scores in the local paper and the lack of clarity about what they mean; and teachers sitting around a conference table discussing what their graduating students should know and be able to do. Grades, standardized tests, and standards do not improve student learning, the authors contend, but there is promise in another image. In this case, we see teachers putting actual pieces of student work on the table and having serious conversations about that work. The conversations can extend to parents, students, and the community and provide clear understandings of standards for excellence and the means of achieving them. Hatch and Seidel describe these kinds of conversations: a parent-child-teacher conference about the child's work; monthly teacher meetings to discuss student work; and school community events revolving around student work.

Hillocks, G., Jr. (1995). *Teaching writing as reflective practice.* New York: Teacher College Press.

Hillocks promotes the concept that writing is the heart of reflective educational practice. As he details the elements involved in the effective teaching of writing, he provides the reader with a conceptual framework for designing reflective writing practice. He illustrates the integration of multiple educational theories as well as the importance of practical knowledge of the tools and strategies of teaching. By bridging the educational theories that apply to reflective teaching and writing and day-to-day process of the classroom, he provides a coherent basis for deliberating and planning instructional design. It is the teacher's responsibility to create an environment that fosters the engagement of students in the learning process. The teacher builds on prior knowledge and an understanding of the student's abilities in the design of classroom practice. Learning should be in the hands of the child, and writing is the best tool the child has for extending, shaping and rethinking—for reflective thinking.

Kohn, A. (1994). Grading: The issue is not how but why. *Educational Leadership*, 52 (2), 38-41.

The author presents a challenge to educators as they read this article. Why do teachers grade? He argues that grading to sort not only harms students but leads to non-productive outcomes and that grading to motivate is ineffective

and usually decreases motivation. He states that the only legitimate reason for grading is to provide feedback to the student about his/her work. He also advocates that as the teacher uses grading for sorting and motivation, the teacher is able to place the blame for lack of achievement on the students, causing her/him to abdicate the responsibility for the learning that takes place in the classroom. He concludes this article by providing advice on the deeper implications of grading and techniques to reduce the negative aspects of grading.

Kosunen, T. (1994). Making sense of the curriculum: Experienced teachers as curriculum makers and implementers. In I. Carlgren, G. Handal, & S. Vaage (Eds.), *Teachers' minds and actions: Research on teachers' thinking and practice* (pp. 247-259). London: Falmer Press.

The purpose of this study was to understand the interpretations of more and less experienced primary-school teachers in Finland concerning the written curriculum and to ascertain how the intended curriculum is related to instructional planning and teaching practices. Some of the experienced teachers had been members of the curriculum planning team that developed the written curriculum. The author used questionnaires, planning simulations, think-aloud techniques, journal writing, and interviews. This book chapter focuses on the curriculum makers, those who were part of the development team. These teachers had internalized the core idea of the curriculum innovation, and used the curriculum as intended by the designers of the national curriculum and by themselves as developers of the local curriculum. They stressed the importance of using the written curriculum as the basis for their instructional planning. They used student-centered teaching methods, long-term planning, and theme-based teaching more often than other teachers in the study. The curriculum makers' role as an alternative to isolated teachers is discussed. They fostered collegiality on their campuses and between schools. Kosunen suggests that by listening to the stories and examining the theories, assumptions, and beliefs of teachers who are curriculum makers, we can learn more about how teachers think and act in terms of curriculum planning and use.

Levy, S. (1996). *Starting from scratch: One classroom builds its own curriculum*. Portsmouth, NH: Heinemann.

This book tells the story of several original projects undertaken by Levy and his elementary students. He begins with a discussion of the obstructions to a dynamic curriculum: the fragmentation of subject matter; the abstraction of knowledge; our reliance on prepared textbooks and learning kits; and the expectation that we will cover vast areas of content. He describes his teaching approach to curriculum in terms of "finding the genius" in the topic to be

taught. He outlines the process and provides examples. The process of developing curriculum can be approached from an alternative perspective that involves the following elements: (1) topic; (2) the genius of the topic (what is essential, unique, special about the topic?); (3) illustrations (what are the best examples to express the genius of the topic?); (4) experiences (what are the children's experiences of the topic?); (5) questions (what questions will help them connect their experiences with the essence of the topic?); (6) story (how can the content be put into a story?); (7) activities (what new experiences should the students have?); (8) skills and habits (what do I want to teach?); (9) evaluation (how will I know what they understand?). Levy provides extended examples of projects that embody this process. Examples include an exploration of the impact of a local bike path on their community, an imaginative look at the qualities of numbers, and others.

MacIver, D. J., & Reuman, D. A. (1993/94). Giving their best--grading and recognition practices that motivate students to work hard. ***American Educator, 17,*** **24-31.**

These authors discuss problems associated with traditional grading systems and give details for a pilot project in Maryland to develop a better grading system. The authors propose that traditional assessment, grading, and student recognition practices are partly responsible for lack of student interest and motivation in academic success. Traditional grading programs do not identify accessible or challenging goals for students. When students are given challenging, quantifiable goals that force them to use their full potential, they experience more success.

McCutcheon, G. (1997). Curriculum and the work of teachers. In D. J. Flinders & S. J. Thornton (Eds.), ***The curriculum studies reader*** **(pp. 188-197). New York: Routledge.**

This book chapter examines the relationship between curriculum and teachers' work. Rather than thinking of these as separate from one another, McCutcheon looks for the relationships between them. She discusses the hidden curriculum, that which students have an opportunity to learn through everyday goings-on at school. The hidden curriculum is not the intended student learning. She provides examples, such as the stereotyped messages about minority and ethnic groups due to messages implicit in teachers' actions or textbooks. The hidden curriculum may consist of the development or lack of development of a work ethic. The null curriculum constitutes what students do not have an opportunity to learn at school, either because courses are not offered, or because students are restricted from enrolling in certain courses, or because materials and other resources are limited. The overt curriculum is the formal course of study developed at a

policy level. McCutcheon compares the interaction between teachers and the overt curriculum from the traditionalist view and from the deliberationist view. The traditional view is that teachers are to teach the overt curriculum as mandated from above. Their ability to do this is limited by their understanding of the intentions of the curriculum and their skills and knowledge to do what is intended. According to the deliberationist view, teachers develop the curriculum based on intentional decision-making informed by an understanding of how students learn in their classrooms. Their role is that of active creators of classroom curriculum rather than passive interpreters.

Pirie, B. (1997). *Reshaping high school English.* Urbana, IL: National Council of Teachers of English.

Pirie describes an English program that blends philosophical depth with classroom practicality, utilizing reader-response theory and cultural studies as a framework for his ideas. He states that teachers must first develop their own understandings of the central goals of teaching English—understanding about what should be the structure of the English classroom of the future. He defines some of the key issues that teachers will discuss as they begin to develop this vision: How much and what content should be taught? How do teachers develop their own theories of teaching? When choosing classroom strategies what do teachers need to consider? How do teachers address the individual needs of students? How do teachers make the learning personal? He describes situations in which students make their own learnings with the assistance of the teacher; the students are not learners they are "makers" of knowledge.

Rosenblatt, L. M. (1991). Literary theory. In J. Flood, J. M. Jensen, D. Lapp, & J. R. Squire (Eds.), *Handbook of research on teaching the English language arts* (pp. 57-62). New York: MacMillan.

Rosenblatt describes the origins of reader response theory, a theory that emphasizes the personal, social and individual needs and interests of the reader in the process of reading, rather than a preordained classical interpretation of the text. This theory is the integration of multiple reader response critical positions: reader-oriented, the reader's personality determines the reader interaction with a passive text; text-oriented, the text can be deconstructed to enhance meaning; reader-plus-text-oriented, the text sets a context for the reader while the reader also sets a context allowing for the reader to "concretize" the text personally. This approach to reading literature engages the reader into the text by drawing on his/her previous experiences and interests. It develops a collaborative relationship between the teacher and the student and the student and the text.

Shafer, L. (1995). Learning from Rosa, Ahmed and Zhou. *Reading Journal of Virginia, 19,* 16-23.

Schafer describes a means of keeping anecdotal records about students in order to create a verifiable means of assessing student progress for students representing a wide span of cultures. She felt that traditional methods of documentation did not meet the needs of these multicultural students. She used her records to evaluate students' learning, to make instructional decisions for individual students, to make instructional decisions for the entire class, to determine when students needed remediation, to look for patterns in student behavior, to provide documentation for parents and staff and to evaluate her own teaching. She followed a simple procedure in her anecdotal strategy—she observed the students, reflected on what she had seen, and planned a means to take advantage of what she had seen. She also invited participants in her teacher-research group to share in her findings and assist her in analyzing anecdotal evidence. This sharing helped her to solidify her own ideas and share an effective assessment tool with other teachers.

Shor, I., & Freire, P. (1987). What is the "dialogical method" of teaching? *Journal of Education, 169* (3), 11-31.

This article is actually an interview illustrating the liberatory aspects of the dialogical method between Ira Shore and Paulo Freire. Both authors advocate that dialogue is not a technique for instructional practice, but is instead a means of transforming the social relations in the classroom into new understandings of content and society. The authors call this collaborative process "relearning." Both the teacher and the student bring knowledge into the classroom, but it is the interactive dialogic process that brings new meaning to that knowledge, giving the student a critical view on reality. This learning occurs as students and teachers seek to alleviate the tension that develops when: familiar and unfamiliar knowledge or ideas conflict with one another, when the traditional view clouds the truth, and when the student experiences conflicting emotions about traditional and liberatory class activities.

Stock, P. (1995). *The dialogic curriculum: Teaching and learning in a multicultural society.* Portsmouth, NH: Boynton/Cook.

Through a series of anecdotes and sample student writings, Patricia Stock reveals an inquiry into practice that a group of teachers began in an attempt to make the classroom more meaningful for multicultural students, as well as to advance the principles of good writing. The author has titled this type of study "dialogic curriculum" since it involves the teacher and student in an interactive spoken and written dialogue. The process stresses the

development of the student's personal story as a vehicle to teach written communication skills. Though traditional grammar study was not a focal point of the strategy, the grammatical structure of the student writings improved when quality communication was stressed. She found that even those students who had extremely poor writing skills at the beginning of the process were able to make significant gains during the process.

Watts, K. H. (1996). Bridges freeze before roads. In T. Guskey. (Ed.), *Communicating student learning: The 1996 ASCD yearbook* (pp. 6-12). Alexandria, VA: Association of Supervision and Curriculum Development.

Watts states that educators need more than grades and standardized tests to communicate student achievement. Alternate means of communicating student learning can be divided into four categories: visible evidence through portfolios, exhibitions, displays or work, presentation, and video; ranking or rating of student achievement against predetermined standards through sampling, rubric grades and checklists; evidence of learning through self-assessment or peer evaluation; and two-way communication in conferences. She states that promoting new kinds of assessment is dependent upon the school culture and changing the patterns of norms in a community. When the alternative assessment becomes part of the instructional process, student learning increases.

Wiggins, G. (1996). Honesty and fairness: Toward better grading and reporting. In T. Guskey. (Ed.), *Communicating student learning: The 1996 ASCD yearbook* (pp.141-177). Alexandria, VA: Association of Supervision and Curriculum Development.

Wiggins describes the criteria for improving grade reporting systems. Before educators can develop improved reporting systems, they must determine the audience for the reports and what information that audience needs. Assessment systems are currently based on information that is more expedient to the teacher, than informative to the intended audience. He advocates the use of context in reporting: using narrative, student self comparison, multiple score reports and varied data types. To develop an effective reporting document, educators need to insure that grades, scores, comments and other communication methods are comprehensive and valuable to parents. He does not advocate changing the symbols of grading but he advocates that all reports should be standards referenced. However, the most important issue in grade reporting is honest and fairness in assessment and reporting, for it matters little what is said if it does not fulfill these two qualities.

Wiggins, G., & McTighe, J. (1998). *Understanding by design.* Alexandria, VA: Association for Supervision and Curriculum Development.

This book is about understanding and about designing an education for understanding. The authors explore several ideas. They explore common practices in curriculum, instruction, and assessment that interfere with student understanding. They introduce the notion of a backward design process that begins the purpose of the task or the desired results and works backward from there. They present a theory of the six facets of understanding and the priorities for establishing what is worth understanding. The knowledge that is worth understanding is that which is enduring, at the heart of the discipline, needs uncoverage because it is not obvious, and is potentially engaging. They describe the kinds of questions that can organize material for understanding. The six facets of understanding are described as what we can do when we understands. We can explain, interpret, apply, have perspective, empathize, and have self-knowledge. These are elaborated upon in this book. The authors explore the practical implications of a focus on understanding for curriculum, assessment, and teaching, and they propose an approach to designing curriculums and assessments that focus on student understanding. Templates and extensive examples are provided as guidance for teachers.

Promoting Instructional Coherence Annotated Bibliography

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