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AUTHOR Carr, Maureen Sherry; Braunger, Jane
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ABSTRACT

This monograph describes the Curriculum Inquiry Cycle (CIC), a professional development process that supports educators in making curriculum and instruction decisions responsive to state standards, local needs, and student characteristics. It is designed to improve learning and teaching, with the classroom as the central focus. The CIC has four phases: Examining Current Practice, Making Decisions, Creating Optimal Learning Environments, and Researching Our Classrooms. Teams of teachers and administrators from a school or district engage in the CIC either onsite during the school year, in a 5-day summer institute, or in a combination of the two. After an overview of the subject, Section 1, Introduction, discusses changing expectations of students and teachers, reconceptualizing learning and teaching through inquiry, and curriculum as a vehicle for change and professional growth. Section 2, The Curriculum Inquiry Cycle, describes the four phases. Section 3, Ways of Thinking about Learning, discusses what learning is, theories about learning, and connections between learning and intelligence. Section 4, Ways of Thinking about Teaching, discusses what teachers need to know and be able to do to provide an optimal learning environment for students, sources of a teacher's knowledge base, reflective teaching, and the effect of teacher beliefs. Section 5, Working with the Four Phases of the Curriculum Inquiry Cycle, explains how to utilize the phases. Section 6, Seeing through New Eyes, describes how curriculum inquiry encourages conversation about possible ways for teachers to look at themselves and their students. (SM)

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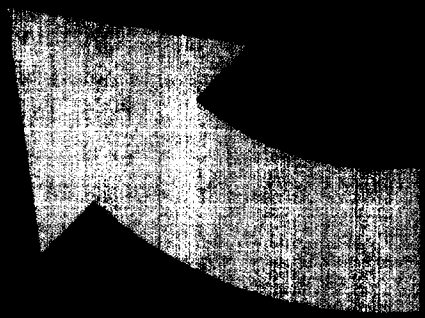
The Curriculum Inquiry Cycle:

Improving Learning and Teaching

An Overview



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Northwest Regional Educational Laboratory

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Northwest Regional Educational Laboratory
Planning and Program Development
Curriculum and Instruction Services
Rex Hagans, *Director*

Curriculum and Instruction Services
101 SW Main, Suite 500
Portland, Oregon 97204-3297
(503) 275-9545
Fax (503) 275-9584
http://www.nwrel.org/psi/ci

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The Curriculum Inquiry Cycle:

Improving Learning and Teaching

An Overview

Maureen Sherry Carr, Ph.D.
Associate

Jane Braunger, Ed.D.
Senior Associate

Northwest Regional Educational Laboratory

ERIC

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Overview of the Curriculum Inquiry Cycle

What is it?

The Curriculum Inquiry Cycle is a professional development process that supports educators in making curriculum and instruction decisions responsive to state standards, local needs, and student characteristics. Its focus is the classroom. This overview presents the rationale for the model and describes its four phases: Examining Current Practice, Making Decisions, Creating Optimal Learning Environments, and Researching Our Classrooms.

The goal of the Curriculum Inquiry Cycle is to create a self-sustaining process, applicable to all areas of the curriculum, for improving learning and teaching.

How does it work?

Teams composed of teachers and administrators from a school or district engage in the Curriculum Inquiry Cycle either onsite during the school year, in a five-day summer institute hosted by NWREL, or in a combination of summer institute and onsite follow-up. Individual needs and interests will vary: Teams who wish to experience the full cycle may find the summer institute and follow-ups most beneficial; other teams may wish to use selected phases of the model onsite, to support curriculum renewal work already under way.

What will be gained from the process?

Participants will:

- Learn a team approach to curriculum inquiry that supports curriculum planning and instructional design
- Plan strategies to involve other staff (and, as desired, students, parents, and community members) in the process
- Analyze current curriculum and instruction in light of 1) teacher beliefs about learning; 2) models of curriculum; and 3) national, state, and local standards (Examining Current Practice)
- Develop shared understandings and set priorities for effective, engaging curriculum and instruction in a content area (Making Decisions)
- Determine critical learning experiences to ensure student achievement of agreed-upon goals (Creating Optimal Learning Experiences)
- Decide teaching/learning questions to study in classroom settings and design a process for sharing findings (Researching Our Classrooms)
- Develop guidelines for local curriculum documents, decisionmaking processes and classroom practices

Where can interested parties get more information?

NWREL Curriculum and Instruction Services staff, Dr. Jane Braunger and Dr. Maureen Sherry Carr, can answer questions about the Curriculum Inquiry Cycle and help plan onsite use of the model appropriate to school and district needs. They can be reached at NWREL, 101 SW Main St., Suite 500, Portland, OR 97204, fax (503) 275-9584. Dr. Braunger can be reached by phone at (503) 275-9588 or e-mail at braungej@nwrel.org. Dr. Carr can be reached by phone at (503) 275-0441 or e-mail at carrm@nwrel.org. Information on the Curriculum Inquiry Cycle is also available on NWREL's Web site (http://www.nwrel.org/psc/ci/).

Introduction

Changing Expectations: Students

Growing concern about the achievement of American students and its perceived impact on the nation's economic future prompted the development of a national educational agenda that would prepare American students to function in an exploding information age. The agenda was a call for the systematic restructuring of American education. This redesign has taken many forms as it has been implemented across the nation: site-based management, school choice, core academic curriculum, changes in assessment, and high academic standards to be met by all students (Education Week, 1995).

The *National Education Goals Report: Building a Nation of Learners* specifically identified academic achievement in two of the national goals. These goals stated that American students would demonstrate competency in challenging subject matter and that, by the year 2000, students in the U.S. would excel in mathematics and science (Education Week, 1995). In 1994, the improvement of student achievement through high standards for all students became national policy when the Goals 2000: Educate America Act and the Improve America's Schools Act were signed into law.

The development of high standards and the application of these standards to "all students" presents a challenge to educators. There is an expectation that students will reach higher levels of literacy, develop a deeper understanding of subject matter, become technologically sophisticated, and achieve the capacity to adapt to ever-changing economic and social conditions (Brown & Campione, 1994).

Changing Expectations: Teachers

As the tide of reform swept across the nation, high academic standards became a cornerstone of reform in most states. Forty-nine states now have state level standards to guide the education of students in the schools. As plans were discussed to create a "world class" system of education, a vital element was often not considered: teacher knowledge and ability to assist students to reach higher standards.

It seems apparent that high-quality learning requires classroom teachers who are knowledgeable about subject matter and learning if students are to reach the academic achievement set forth in content and performance standards. We already have many accomplished teachers in this country who know how to make learning accessible to students and through respect and caring affirm their students' capability (Rose, 1995). How can we insure that we will continue to have a high-quality teaching force?

In 1986, the Carnegie Task Force on Teaching as a Profession recommended that a National Board be established to develop standards that would describe "what teachers should know and be able to do" (NBPTS, 1994). The National Board began its task in 1987 by articulating a clear

vision of accomplished teaching practice. Teachers at all levels of education worked to develop this vision as well as the professional standards in subject matter that followed. There are five guiding principles set forth in National Board Vision Statement (NBTPS, 1994):

The emphasis on bringing all students to higher levels of achievement may conflict with traditional ways of teaching.

- Teachers are committed to students and their learning
- Teachers know the subjects they teach and how to teach those subjects to students
- Teachers are responsible for managing and monitoring student learning
- Teachers think systematically about their practice and learn from experience
- Teachers are members of learning communities

Learning that engages students in challenging and meaningful tasks and meets high-quality standards is not easy to accomplish, especially when assessment is used for sorting and selecting students and the teacher's primary role is to be the transmitter of information. The emphasis on bringing all students to higher levels of achievement may conflict with traditional ways of teaching and evaluating students. A standards-based system requires substantial changes in the kinds of learning experiences that occur in classrooms and an increase in the complexity of the content for which students and teachers will be held accountable. Teachers have to accept new ways of learning and teaching that may shift the roles they have traditionally played in the classroom. A set of standards for which everyone is accountable increases the importance of collaboration among teachers, administrators, parents, students and community members. Implementing a standards-based system takes not only an adept teaching staff but the commitment and "collective responsibility" of the school and larger community (Newmann & Wehlage, 1995).

The success of educational reform in the Pacific Northwest depends on the ability of teachers to restructure and redesign curriculum and instruction congruent with emerging state and national standards. The critical need is to strengthen the substance of the curriculum through more widespread and effective implementation of new curriculum models and instructional practices which research indicates substantially increase student learning. NWREL supports teachers in this curriculum and instructional renewal process by providing increased professional development services in curriculum and instruction.

Re-Conceptualizing Learning and Teaching Through Inquiry

"It is teachers who, in the end, will change the world of the classroom by understanding it." –Lawrence Stenhouse

In order to fulfill the promise of optimal achievement for all students, we must change the "core of educational practice," that is, we must re-conceptualize our ideas of learning and intelligence and rethink the purpose and organization of schooling in a democratic society (Elmore, 1996).

Re-conceptualizing learning and teaching means teachers must examine their ideas about knowledge, about the role of students and teachers in the educational process, and about how these ideas or beliefs are translated into instructional practice (Elmore, 1996). Reflecting on classroom practice helps to develop insights into the reasons behind the actions. New understandings lead to conscious choices for both belief and teaching practice (Short & Burke, 1991). Inquiry within a professional learning community provides that opportunity.

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Inquiry is the way we come to know and understand ourselves and our world. Dewey emphasized the importance of inquiry as part of our socialization, an essential cultural norm (Dewey, 1938). Inquiry is not just thinking seriously about a problem or issue. It is a "systematic, intentional" method of finding solutions to a problem of significant personal or public concern (Cochran-Smith & Lytle, 1993).

At the heart of teacher inquiry is the idea that teaching is a complex, intellectual activity and that teachers can produce new knowledge which can inform the world of instructional practice. When teachers investigate their teaching practice, they examine beliefs about learning and teaching, think about what is or is not expert knowledge, and question common assumptions about schooling (Cochran-Smith & Lytle, 1993).

Inquiry starts with personal knowledge and experience and gradually moves to include other peoples' perspectives. Inquiry involves "participation and negotiation among equals" where alternatives and options arise from thinking through questions collaboratively (Short & Burke, 1996). Inquiry leads to new–albeit temporary–understandings of learning and teaching. The purpose of teacher inquiry is to increase understanding, "create diversity, and broaden our thinking" (Short & Burke, 1996).

This process of thinking through a question or concern with peers can have a profound effect on teachers' professional lives. As inquirers into practice, " we look at our knowledge, our assumptions, our interpretations as our practice makes them tangible, as re-searching makes them visible, and as critical consciousness opens them to questioning. What we see then are not merely faces or voices or events but meanings which re-form our practice" (Bissex, 1994).

This process of thinking through a question or concern with peers can have a profound effect on teachers' professional lives.

Curriculum As A Vehicle For Change And Professional Growth

A primary responsibility of teachers in a standards-based system is to map instructional practice onto a group of content and performance standards so that classroom experiences have a clear focus for students. The curriculum developed in this process is the means by which teachers assist students to meet high expectations (Schalock, Tell, & Smith, 1997). In this context, curriculum has a broad meaning which includes what will be taught, effective ways to make learning accessible to all students, what will be evaluated, and what assessment formats are consistent with educational goals. It is appropriate then that we make curriculum the lens through which we examine teaching practice.

Views of curriculum are rooted in beliefs and values about the purpose of education, the nature of knowledge and learning, and the roles that teachers and students play in the educational process. Short, Harste, and Burke (1996) have identified curriculum models they have experienced as students and as teachers. The first curriculum perspective is familiar to most of us. We listen to the teacher tell us about a variety of topics and then we read about these topics in a textbook. We assimilate a body of facts which is quite overwhelming, so we try to memorize the discrete pieces of data from our classroom and textbook experiences. We take a test on which we reproduce (we hope) correct responses. We take in a lot of information but often gain little conceptual understanding about essential principles or ideas. We have bits and pieces of the

puzzle but we don't see the complete picture. We have experienced the "curriculum as fact" model of learning (Short & Burke, 1996). This curriculum holds students accountable for learning a body of knowledge that the community deems essential for everyone to know.

As teachers we may have been disillusioned by the curriculum as fact model since it neither seems to translate to high achievement for all students nor does it capture student imagination. So we organize themes that connect a variety of skills and information, and we use activities to draw these together. We read about frogs. We count frogs. We paint frogs. We observe frogs and record their actions. We move like frogs as part of our exploration of physical movement. We sing about frogs. Our curriculum becomes a series of activities that sometimes connect content and process and sometimes just provide entertainment. We have opted for the "curriculum as activity" model, which may or may not lead to in-depth understanding of concepts and principles (Short, Harste, & Burke, 1996). Important considerations in the activity model are student interests, making connections across disciplines, and getting students engaged in learning that connects with their experience.

Views of curriculum are rooted in beliefs and values about the purpose of education, the nature of knowledge and learning, and the roles that teachers and students play in the educational process.

Actually, themes do have substantial potential for increasing student conceptual understanding as well as sparking student motivation to learn. The key is to select themes that connect to universal concepts through which students can integrate ideas and make connections across curricular areas (Stevens, 1993). For example, frogs may be integrated into a more comprehensive theme such as life cycles or change as an important aspect in the lives of all organisms. Activities like those mentioned above can still be used, but the learning experiences are connected to others that allow students to integrate ideas across topics and content. Themes that touch the essential concerns of all families and individuals allow students to find personal meaning in school learning and assist learners to paint a richer portrait of knowledge.

Another curriculum option is to organize learning around a process of inquiry in which individuals explore ideas of personal and social significance. Short, Harste, and Burke (1996) offer a process for classroom inquiry that begins with "personal and social knowing." In this "curriculum as inquiry" model learners explore what they know about a topic from their own experiences of the world and what they have learned in school and from their families and culture. Immersion in a topic is crucial to develop worthwhile questions for inquiry. Time to explore information extensively leads to the emergence of more significant questions for inquiry.

Learners investigate "knowledge systems" that human beings use to make sense of language, mathematics, science, history, etc. We ask different questions and gain multiple views about learning by looking at questions through a variety of lenses–historical, socio-cultural, biological (Short, Harste, & Burke, 1996). In a study of the life cycle, for example, students may investigate the explanations about cycles of life that have emerged over time. Or learners may examine the narratives of various societies about the origins of life. Or students may explore the evolution of biological theories about the life cycle. By looking at questions from many perspectives we develop broader and deeper understandings of our subject and an appreciation for different ways of investigating our questions.

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The emphasis in the process is life-long learning. The progression is from the reflection on personal knowledge, to the consideration and understanding of formal knowledge, to communication of reconstructed knowledge and experience through multiple symbol systems or intelligences. Learners come to understand that answers quite often lead to more questions, and each time through this process we re-interpret and re-construct our experience (Short, Harste, & Burke, 1996).

The emphasis in the process is life-long learning.

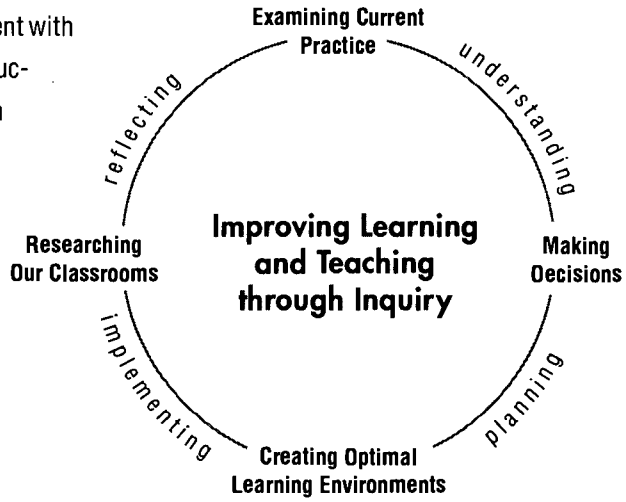
These perspectives are based on a set of deeply held understandings about what is worth knowing, who is at the center of learning, and what the most effective way is to create meaningful learning for learners. There are many other curricular options that represent different answers to these questions–curriculum as a scope and sequence, curriculum as student empowerment, curriculum as a system of knowledge, etc. (Beane, 1995). If teachers are to assume their rightful responsibility to develop as well as implement curriculum, it is crucial that they confront these questions to design a curricular framework that meets the needs of the school and classroom context. Through the curriculum inquiry cycle teachers can look deeply into their ideas about knowledge, the roles that students and teachers play in the development of knowledge, and the relationship between their conceptions of learning and teaching and the kind of learning that occurs in classrooms.

The Curriculum Inquiry Cycle

The Curriculum Inquiry Cycle is a process designed to improve learning and teaching, with the classroom as the area of emphasis. A major goal of this NWREL project is to assist teachers and schools to create self-sustaining processes for improving curriculum and instruction. Curriculum inquiry involves teachers in determining the critical experiences necessary to engage students in meeting challenging standards. Educators participating in this ongoing cycle of curriculum renewal develop and articulate local standards which guide their teaching in the context of broad state and national reform priorities; examine current curriculum practice in the school or district; clarify local needs, content, and performance standards to determine how to balance competing demands; plan critical classroom experiences to achieve desired student goals; and conduct classroom research on selected practices and educational issues, assessing progress and making needed changes. It is prompted by key questions central to instructional improvement:

- What knowledge is crucial? What do we understand about this knowledge?
- What do we know about how people learn?
- What strategies are most powerful for fostering student learning?
- What critical experiences must occur to achieve standards?
- How do members of the learning community collaborate to provide a coherent and meaningful learning experience?

The Curriculum Inquiry Cycle is consistent with the idea of individuals as active constructors of their own learning. It is based on the belief that teachers are capable of identifying significant classroom issues, gathering pertinent data, and analyzing and interpreting the results to inform future practice. The following are the underlying assumptions of the Curriculum Inquiry Cycle:



- Teachers are knowledgeable professionals
- Planning curriculum is the professional responsibility of teachers
- Curriculum inquiry is a vehicle for professional growth
- Curriculum inquiry leads to improved learning and teaching
- Teachers learn by building on current practice
- Teachers need to share professional expertise

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- Curriculum planning is a team effort
- Curriculum inquiry strengthens close connections among curriculum, instruction, and assessment
- Curriculum planning is a recursive process
- The classroom is the fundamental unit of school change
- Administrative support is essential for effective curricular and instructional change

Critical questions that are addressed within the four elements of the model include:

Examining Current Practice

Key Questions: What does my teaching look like? Why do I work this way? What do I believe about how learning occurs? Is my current practice making a difference in student learning? How do I know (assessment)? Is my teaching consistent with what is known about how people learn? How might some classroom experiences produce different outcomes from those I intend.

Outcomes:

- Extensive analysis of current practice in a chosen content area
- Rich depiction of the teaching and assessment in a specific content area in the school
- Articulation of current goals for student learning
- Identification of teachers' beliefs about learning that drive teaching practice
- Knowledge of current views of learning (constructivist, social interaction, brain compatible learning, etc.)

Making Decisions

Key Questions: What is my understanding of curriculum? Are content, performance, and opportunity to learn standards reflected in my teaching practice? How do I set priorities among my goals? Am I aware of alternative models of teaching? Am I aware of alternative assessments?

Outcomes:

- Articulation of teachers' beliefs about curriculum (curriculum as fact, activity, inquiry, etc.)
- Knowledge of other views of curriculum (curriculum theorists, teachers, researchers, community members, textbook publishers)
- Understanding of content and performance standards in the state
- Indepth analysis of the fit between current teaching goals and content standards
- Comparison of current expectations for students and performance standards
- Translation of standards into classroom practice
- Agreement on priorities for student learning and non-negotiables to ensure student attainment of standards
- Identification of need areas (teacher knowledge, materials, planning) to achieve priority goals

Creating an Optimal Learning Environment

Key Questions: What are the dynamics of an optimal learning environment? What learning experiences are essential? What assessments are appropriate?

Outcomes:

- Analysis of learning/teaching experiences in relationship to stated goals
- Determination of critical learning experiences for agreed-upon learning outcomes
- Understanding the learning environment from the learner's perspective
- Examination of typical student learning experiences in light of 1) conditions of learning, 2) prior knowledge and experience, 3) connections to other learning, and 4) relationship to standards
- Design of learning experiences to maximize student learning; teaching for understanding
- Criteria for selecting instructional resources
- Knowledge of specific teaching/learning strategies for identified goal areas

Researching Our Classrooms

Key Questions: What questions or concerns about teaching and learning in my classroom do I want to explore? How can I work with colleagues to set a productive classroom research agenda? How will we share our findings?

Outcomes:

- A view of teaching as problematic, leading to questions and problem-posing about teaching and about student learning
- Strong commitment to collaboration with colleagues in studying classrooms, sharing insights, and acting on the findings to make changes
- Identification of specific area to investigate
- Decisions about the scope of the study and procedures for data gathering
- Plan for assessing progress toward curriculum and instruction goals, e.g., impact on student learning
- Understanding of curriculum change as professional growth

Collaborative inquiry into questions of particular educational concern is an appropriate way for teachers to achieve congruence between their personal theories and effective practice and to have some measure of control over what passes for educational knowledge. Shulman (1987) has pointed out that teachers must have broader connections within the school, district, and general community. Many people have perceived teaching as an independent activity, but in today's school teachers must be collaborative members, planning curriculum and coordinating the various instructional services available to students. They must help to build relationships with parents that foster the school's mission to promote learning, and they must be cognizant of the cultural, racial, and ethnic diversity in their communities that may have an impact on student lives in school. (NBPTS, 1994). Inquiry as part of professional growth forms the basis for the emergence of a true learning community.

Ways of Thinking About Learning

What is learning?

Learning is what human beings do to survive. Learning begins at birth (some argue that it happens earlier) and continues throughout life. Some of what we learn is hardwired into our human genes, such as talking and walking. Some of what we learn is planned, like learning to play the guitar or how to solve a quadratic equation. Sometimes we learn without meaning to, like the toothpaste jingle that won't stop singing in our heads. Whether intentional or not, learning is a permanent change in what we know or what we do. What makes learning different from growing size-10 feet is that it results from our experiences with people, objects, and events.

What are some theories about learning?

Theories of learning vary according to whether the emphasis is on changes in how we think or changes in what we do (Woolfolk, 1995). During most of this century, behaviorism has been the dominant psychological paradigm in education. Behaviorists focus on observable, measurable behaviors to identify universal laws of learning applicable across ages, species, and contents. Learning takes place through the formation of stimulus-response bonds fostered by external consequences or rewards. These bonds or associations are strengthened through repetition and reinforcement. In this model, learning is hierarchical, reactive, and extrinsically motivated (Crain, 1985). The behaviorist tradition is a major influence in many classrooms, as evidenced by drill-and-practice worksheets, the delineation of reading and math into lists of skills, and the emphasis on objective, standardized tests as the primary assessment of student learning.

During the past 20 years cognitive psychology, sociocultural psychology, and brain research have challenged the behavioral learning assumptions. Cognitive psychology concerns itself with changes in what we know. Cognitive psychologists are interested in how humans acquire knowledge and how knowledge is represented and stored in memory. One theoretical position within this realm supports the idea that individuals construct schemes or categories of knowledge based on direct and indirect experience. Various categories of information are stored and connected in schema networks. For example, a young child with a pet cat or dog has developed lots of ideas (schemata) about these animals based on everyday experience. The child has a schema for pets, albeit a limited one. As the child encounters other animals as pets–guinea pigs, ferrets, parrots, etc.–the concept of pet (schema) is enlarged. When new information is integrated into a schema, learning takes place (Rumelhart, 1977). Presentation of a new idea can evoke several schema networks, and effective assimilation and organization of schema depend on the individual connecting what is known to the new information. Schema theory suggests a learner who actively constructs knowledge by comparing prior knowledge and experience with incoming information and then reorganizing this data to form new and enlarged schemata.

The idea of an individual as creator of his or her own knowledge is referred to as a constructivist theory of learning. Constructivism has also become an influence in education in recent years. Mathematics programs that assist students to formulate concepts through interaction with

objects and solving problems with peers; reading programs that connect student prior knowledge with real, meaningful text; and science programs that engage students with important scientific questions are examples of ways educators have incorporated constructivist concepts into their teaching.

Other research has examined human awareness and control over learning processes. Metacognitive knowledge is defined as "knowledge and beliefs accumulated through experience and stored in long term memory that relate to the human mind and its activities" (Flavell, 1985). The ability to plan, monitor understanding and effectiveness of learning strategies correlates with overall cognitive development (Flavell, 1985). This suggests that learning becomes conscious and self-regulated as individuals grow in experience.

Research growing out of the sociocultural theory of Lev Vygotsky also has had a significant impact on how we organize learning situations and the roles of the teacher and the student in the learning environment. Vygotsky maintained that "every function of the child's cultural development appears twice: on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)...all the higher functions originate as actual relations between human beings" (Vygotsky, 1978). This indicates that meaning is constructed with and through others. The dialogue or "instructional conversation" facilitates meaningful learning (Tharp & Gallimore, 1989). Learning takes place as the novice (student) moves from assistance from an expert (teacher or peer) to independent action or understanding. The distance between the need for assistance and independent functioning is the zone of proximal development (Vygotsky, 1978). This means that learners need to operate in collaborative environments with assistance from teachers or more knowledgeable students.

...our brain prefers cooperation and conversation, conceptualization and storytelling as ways to learn.

While research into cognition has produced viable theories, only recently have we been able to see what happens in the human brain when learning is going on. Fast magnetic resonance imaging (MRI) allows us to observe the brain during cognitive activity, and positron emission tomography (PET) indicates how and where the brain processes a series of events (Sylwester, 1995).

The brain processes information in a parallel fashion, looking for emerging patterns. Through the emotional components of the brain our attention is focused on novel or dramatic changes in our environment. Our attention system is quick and effective as a survival mechanism, but it is less helpful in a stable environment where change is gradual. Physical changes occur in the brain as we grow in experience. This means that, while we all start out with a generic brain, individual life experiences change the physical structure of the brain, making each person's brain unique. We can, and do, learn to engage in things that require an individual' s sustained attention and precision, but our brain prefers cooperation and conversation, conceptualization and storytelling as ways to learn (Sylwester, 1995).

What does this new information on the brain mean for educators? Caine, Caine, and Crowell (1994) have delineated 12 principles that can frame our thinking about the brain:

- The brain is a parallel processor
- Learning engages the entire physiology
- The search for meaning is innate
- The search for meaning occurs through patterning
- Emotions are critical to patterning
- Every brain simultaneously creates parts and wholes
- Learning involves both focused attention and peripheral perception
- Learning always involves conscious and unconscious processes
- We have at least two ways of organizing memory
- We remember and understand information better if it is embedded in spatial memory
- Complex learning is enhanced by challenge and inhibited by threat
- Every brain is uniquely organized

Brain compatible teaching emphasizes immersion of learners in complex learning experiences that allow students to internalize information and skills and to create a coherent and personally relevant knowledge system.

What is the connection between learning and intelligence?

The behavioral focus on observable and measurable behavior has also influenced views of intelligence. For most of this century in the United States, intelligence has been thought of as a singular trait that individuals possess in varying degrees. This trait is characterized by logical, scientific thinking and verbal skill. Tests were devised to identify individuals exhibiting high verbal and intellectual behaviors, and students' learning potential was determined by the IQ score.

This perspective on intelligence emphasizes ability as the primary factor in learning both in school and in life. It negates the role of effort, instruction, and technological assistance (Fink, 1995). The focus on test scores trivializes knowledge and supports correctness rather than understanding. Learning becomes the accumulation of factual knowledge, and learners are categorized according to their "ability" to be successful in this process. Schooling becomes a matter of sorting and selecting students to follow paths that reflect this narrow view of human potential.

Several theorists have postulated alternatives to the singular trait theory of intelligence. Howard Gardner connects intelligence to problem-solving in particular cultural settings. He emphasizes the biological origins of problem-solving as a means for survival but contextualizes problem-solving in activities that have high cultural value (Gardner, 1993). Gardner has identified seven "intelligences" that meet a set of criteria, including a neurally based operational system and the ability to be encoded into a symbol system. For example, musical intelligence is connected to pitch relationships (neural base) and variations in pitch can be encoded into notes (symbol system)

(Gardner, 1993). Gardner's theory of seven intelligences (linguistic, mathematical-logical, musical, bodily-kinesthetic, spatial, interpersonal, and intrapersonal) expands our view of intelligence by offering a set of abilities that we all possess to some degree.

Schools have tended to focus primarily on linguistic and mathematical abilities, although recently the importance of interpersonal capabilities is being emphasized through collaborative projects and cooperative learning groups. Video games, computers, and other visual media have stimulated interest in the development of spatial abilities and the value of image as way of encoding information.

Connecting the metacognitive aspect of learning to intelligence, Robert Sternberg has developed a theory of mental self-management called the Triarchic Theory of Intelligence. Sternberg describes three kinds of mental processes that allow an individual to manage the environment. Executive components or mental processes are metacognitive and facilitate planning, monitoring, evaluating, and problem-solving. Performance components are lower order processes used to implement instructions from the executive. Knowledge-acquisition components are used to learn how to solve problems (Sternberg, 1988). These elements are interdependent and interactive. For example, an individual buying a new car must set some criteria for purchase (metacomponents), so he or she must get some information about what to look for in a car (knowledge components). Cars must then be examined and driven to see if they meet the criteria for purchase (performance components) (Sternberg, 1988). This theory presents the picture of an active learner, solving problems and making adjustments to situations based on new information and experience.

The image of a learner that emerges from current thinking in psychology and intelligence stands in opposition to behavioral views of learning and psychometric views of intelligence. Behavioral and psychometric influence in education created a vision of learning that is unidirectional, linear, and focused on rote memory. Other theories paint a portrait of an individual actively engaged with other learners, capable of regulating learning processes, and motivated by an intrinsic need to communicate, to collaborate, and to understand.

Ways of Thinking About Teaching

What do teachers need to know and be able to do to provide an optimal learning environment for students?

Lee Shulman (1987) has outlined seven categories of knowledge that teachers need to meet the challenges of today's classrooms:

- Content knowledge: not just facts and concepts but also an understanding of the structure of the discipline as defined by scholars in the field
- General pedagogical knowledge: principles and strategies of management and organization
- Curriculum knowledge: ways of organizing learning, materials, and programs
- Pedagogical content knowledge: ways of representing information that facilitates understanding and an awareness of those aspects of content that might inhibit learning
- Knowledge of learners and their characteristics: individual differences and human learning and development
- Knowledge of educational contexts: awareness of the relationships among schools, the district, and the larger community
- Knowledge of the aims and purposes of education: perspective on the historical and philosophical origins of education

"Those who can, do. Those who understand, teach."
–Shulman, 1986.

Teachers must engage students in learning that helps them to construct content knowledge, explore the relationships among ideas, and make connections to the world beyond the classroom door. Newmann and Wehlage (1995) call teachers' knowledge of practices and assessments that will facilitate learning authentic pedagogy. They have identified standards for both the instructional and assessment components of authentic pedagogy. A learning situation is authentic if students are engaged in high order thinking, are developing a deep understanding of subject matter, participate in classroom discourse to build shared understanding, and can relate their knowledge to public issues or personal experience (Newmann & Wehlage, 1995). Authentic performance assessment includes tasks that require students to organize data and consider a variety of possibilities, to understand subject matter concepts and principles, and to communicate understanding beyond the classroom or school (Newmann & Wehlage, 1995).

Teachers use "personal knowledge" to make decisions about practice and to negotiate the path between the personal context of the classroom and the institutional aspects of teaching. Personal knowledge is an awareness and understanding of self as well as knowledge about students' lives, understandings, and concerns (Feiman-Nemser & Floden, 1986).

In a standards-based system, teachers must understand the targets identified in performance standards and be able to map these standards to what needs to be accomplished in the classroom. Teachers must be able to plan with students the ways to meet standards and assist them to evaluate their progress toward quality intellectual achievement. Teachers also must reflect on their effectiveness in facilitating student learning (Schalock, Tell, & Smith, 1997).

What are the sources of a teacher's knowledge base?

To build content knowledge teachers generally study the literature of their discipline(s), not only to learn the information that will be taught to students but also to be informed about the way knowledge is viewed and structured within the content area. In addition to academic preparation, teachers also have access to a myriad of curriculum materials, programs, assessments, and texts that may be useful in helping students learn. Another avenue teachers can explore is research on the processes of schooling, teaching, and learning, which offer ideas on the nature of effective schools, behaviors attributed to effective teachers, and current thinking on human learning and development. And finally, teachers can learn about the principles of excellent teaching by examining both their own classrooms and those of other teachers. For example, a teacher might observe and record the reading behavior of a group of students in the classroom to develop a better understanding of the kind of strategies these children use to construct their understandings of text. Teachers learn from the "wisdom of practice" (Shulman, 1987).

Does reflective teaching have an effect on what happens in classrooms?

Several studies of teacher thinking indicate that teachers who think conceptually provide greater feedback to students and are more positive in classroom interactions. "Thoughtful teachers" have a more varied repertoire of instructional strategies and receive more high order thinking responses from students (Glickman, 1986).

Professional development offerings should support teacher autonomy and choice, consider the complexities of teaching and encourage teachers' inquiry into learning and teaching.

Teacher thinking influences choice of content, selection of strategies, and the sequence of learning. There is support for the idea that thoughtful practice has a positive effect both on student achievement and teacher-student relationships. How intensely teachers think about practice relates to the degree of input teachers have in decision-making, flexibility in teaching practice, their perception of the demands of their work, and the time and support they receive to engage in thinking about practice (Clark & Peterson, 1986). Professional development offerings should support teacher autonomy and choice, consider the complexities of teaching, and encourage teachers' inquiry into learning and teaching.

Do teachers' beliefs influence their classroom behavior?

We know that teachers, like everyone else, have beliefs about life in general and schooling in particular, but do teacher beliefs have an impact on what happens in classrooms? Richardson (1994) studied the connection between elementary teachers' beliefs about reading and their practice of teaching reading. Open-ended questions were asked in an interview setting and the results were analyzed to develop a profile of the teacher beliefs about reading. A strong relationship was found between the researchers' predictions of practice from teacher belief profiles and the actual teaching practice.

The Deford Theoretical Orientation to Reading Profile (TORP) is a multiple-choice instrument used to examine teachers' theories about reading. The assessment was validated by observing

teaching episodes and comparing actual practice with the theoretical orientations derived from TORP. There was a significant relationship found between the TORP scores and predictions of practice (Deford, 1985).

Teachers who believe in autonomy allow more student choice and encourage student responsibility for learning. Research on motivation indicates that students in classrooms where teachers have an autonomy orientation are more intrinsically motivated and are more likely to self-regulate behavior and learning (McCombs, 1996).

Are beliefs amenable to change?

Because of their strong emotional connections beliefs can be difficult to change. The earlier a belief becomes part of long-term memory the harder it is to modify. Substantial changes in the belief systems of adults are unlikely, and beliefs may persist even when the adult is presented with contrary evidence (Pajares, 1992).

While changing beliefs in adults may be very difficult, it is not impossible. In the Richardson study, observations of one of the participants indicates that changes in thinking about how students learn to read can occur before the ideas are translated into practice (Richardson, 1994). Guskey (1986), on the other hand, maintains that it is changes in practice that change beliefs, not the reverse. Teachers measure their effectiveness based on how well their students perform, and their practice on what works for a particular group of students. If teachers try new practices and students are successful, then the teachers are more likely to believe that doing or thinking in a new way is appropriate. Other researchers suggest that the process of change is complex and may include an interaction of belief, reflection, and behavior (Richardson, 1994).

Why is it important to re-examine beliefs about learning and teaching as we move to a standards-based system?

All teaching and learning is based on a set of assumptions that guide curriculum planning, instruction, and evaluation. The standards-based system assumes that every student can learn a body of knowledge and skills if everyone involved–teachers and learners–clearly understands what the expectations are. The standards-based philosophy further maintains not only that changes must occur in the complexity of learning experiences provided, but also that the way students are taught must be substantially modified.

Professional development should assist teachers to get in touch with their implicit theories or beliefs about teaching and learning to form coherent, rational theories based on evidence.

Most teachers have always had standards for student performance, but these may or may not have been the same standards held by other teachers in their buildings or districts. Many teachers accept the idea that all students can learn, but they may not believe that everyone can learn the same body of knowledge in the same way no matter how much time is allowed. Most teachers want students to do well on assessments, but they may give more credence to in-class performance or their professional knowledge of a student's capabilities when evaluating the success of the classroom program. If we are to implement a standards-based curriculum in every classroom, then it is essential that teachers examine their beliefs in light of the assumptions of the standards-based system. When teachers make decisions about curriculum and instruction,

they must be able to justify these decisions and provide evidence from research and an examination of their own experience of what works. Professional development should assist teachers to get in touch with their implicit theories or beliefs about teaching and learning to form coherent, rational theories based on evidence (Richardson, 1994).

Working with the Four Phases of the Curriculum Inquiry Cycle

Examining Current Practice

Inquiry into educational practice within a supportive, collaborative relationship is an effective way to enhance teacher reflection on and for practice. The purpose of this phase of the Curriculum Inquiry Cycle is to invite teachers into conversation with colleagues about the ways that they support student learning in their classrooms. Teachers involved in this process learn about themselves and their students. Teachers look closely at what they do and why so that they can make decisions about classroom practice that help create the kind of learning places that are stimulating for both students and teachers.

Teachers' work is inextricably connected to their personal lives, and any study of practice will necessarily include life experiences and background. Classroom practice is based on personally held values and beliefs, whether or not there is conscious awareness of these ideas. Discussing practice may, therefore, make teachers quite vulnerable and anxious (Goodson, 1993). For this reason, it is recommended that initial discussion of teaching practices and their attendant beliefs or theories be based on video or written vignettes of classroom practice.

Focus questions are used to guide teacher observations and small group analysis and interpretation of the vignettes. As teachers discuss the observations, they look for assumptions that the vignette teacher might have about learning, about the student's role and the teacher's role in the learning context, and goals the teacher might have for learning.

After teachers have an opportunity to identify theories implicit in the vignette, they develop a belief statement for the vignette teacher. This process also provides an operational structure for activities that will involve analysis of the participants' teaching practice later on.

Teachers are now ready to write a depiction of classroom practice that can be used as source information for examination. One way to develop this description is through autobiography, in which teachers not only describe current practice but also include information about their reasons for choosing teaching as a career, their expectations for the future, and their concerns about their lives as teachers (Bullough & Gitlin, 1995).

Other ways to develop descriptions and to generate collaborative dialogue are reflective questioning (Lee & Barnett, 1994) and practical argument (Fenstermacher, 1994). Reflective questioning involves observation and interview procedures. A teacher is observed by a partner and then interviewed by this partner about the classroom experiences noted. Questions might include: What were you expecting to happen when...? How did you decide to...? What were your goals for...? etc. The idea is to probe, to clarify, and to help the teacher think about the experiences. Reflective questioning may be done with one or more individuals who are interested in exploring educational concerns and issues as well as eliciting beliefs and values that

may be at the core of these issues. The purpose is to assist a teacher to investigate his or her ideas, not to lead the teacher to predetermined conclusions or to evaluate the effectiveness of classroom practice (Lee & Barnett, 1994).

The practical argument is a process to facilitate practical reasoning that involves the teacher (T) and one other person (O). Like reflective questioning, the process begins with observation of the teacher followed by questions related to why a course of action was taken, etc. The focus is on having the teacher develop the "argument" or justification for what was observed. During this "elicitation" phase the observer does not make judgments about classroom actions. A valuable tool for moving this part forward is the use of videotape, since the teacher can now view the teaching event as an observer. Questions develop as issues of significance to the teacher surface. As T and O move into the next phase of "reconstruction" the process involves critique, which is often initiated by the teacher. The goal of this phase is to have the teacher question the original rationale and "reconstruct" his or her position to reflect internal rather than external motives for actions (Fenstermacher, 1994).

Direct observation of practice is extremely valuable, and in the case of practical argument seems required, but in some staff development settings this may not be possible. In this case, using journal entries of a series of teaching episodes or the teacher autobiographies as indirect observations provides source material for participants to carry out the interview process.

After teachers have had opportunities to examine their practice and think through the practice with colleagues, it is important that a written statement of beliefs be generated and made public (within the collaborative group). If teachers are members of a school staff who are expecting to develop a set of experiences common to all students, they will need to identify, discuss and challenge their differences. It is also crucial that the teachers compare their beliefs and theories with current thinking and research on learning and effective teaching.

At this point teachers read selected texts and articles that describe research and explain theories of learning and intelligence. Jigsaw and carousel reading activities are useful for two reasons. Teachers are able to gather information individually and construct meaning for this information in dialogue with peers, thus engaging teachers in activities that can be used effectively in their own classrooms. Topics may include brain research, conditions for learning (e.g., Cambourne [1995], constructivist theory, multiple intelligences, motivational principles, etc.) Follow-up readings which provide more detailed information become preparation for the second phase of the cycle.

Making Decisions

Exploration and examination continue in this aspect of the model. Making decisions refers not just to decisions about what goals to set for students but also the professional or personal goals that relate to what teachers are discovering about themselves and their thinking.

Participants have read and thought together and they have continued to expand their knowledge between the end of phase one of the cycle and Making Decisions. Teachers reconnect with ideas and each other by making comparisons between their thinking and the ideas that they have read. They discuss in small groups where there are points of difference and similarities, and debate

the viability of both their own positions and those espoused in the reading. The important thing is that teachers make choices consistent with their internal values. If these educational values are not congruent with accepted public knowledge, they must justify and provide evidence to support their practice.

Ideas about curriculum generally surface in the exploration of beliefs about learning. However, it is useful to investigate ways of thinking about curriculum. In the Human Graph (Schurr, 1992), individuals are asked to agree or disagree with statements describing various ways of viewing curriculum and then asked to write a justification for their choices. Volunteers from both positions share their ideas in front of the group and members of the larger group may respond. A positive outcome of this activity is that participants tend to speak to each other rather than directing their comments to the group leader. During the discussion, a recorder keeps track of the ideas expressed to create a group summary statement about curriculum. Additional readings and presentations specifically address ways of conceptualizing and creating curriculum with teachers and students.

As teachers try to develop the summary of their ideas about curriculum, it is likely that there will be areas of disagreement about content, materials, and learning experiences. When teachers are planning together, these disagreements can be a thorny issue. One consequence of a bureaucratic school organization is the widespread idea that curriculum is something designed by someone other than teachers and is ensconced on a shelf in the back of the supply closet. Sources that show teachers how other professionals handle creating curriculum are helpful.

Improving the Literacy Program: A Journey Toward Integrated Curriculum by Carol Santa (1995) is a positive example of how one school district worked through the process of curricular change: from philosophy to student learning goals to critical classroom experiences. Another example of teachers in discussion about areas of curricular difference can be seen in the video *Graduation by Portfolio* (CPESS, 1997). One section of the video shows teachers discussing concerns with the standards for senior exhibition of work for graduation. In another segment, teachers discuss their program with outside evaluators both taking advice and providing justification (CPESS, 1997).

Since most states are involved with standards-based reform to some degree, teachers are naturally concerned with how they will assist students to meet these content and performance standards. Another concern of many teachers is just what a standard is asking for in terms of actual instruction.

To help translate standards into a meaningful guide for teachers, small groups take responsibility for one section of standards for a particular subject. A speaking standard, for example, might be that students will be able to communicate effectively in different settings. Teachers then identify practices that either they already use or that could be used to move their students to meeting the benchmark for this standard. They might include cooperative projects, peer-tutoring, giving directions, acting as parent guides, debate, role-playing, and formal speeches. This type of activity not only helps teachers create a list of possible practices that would help meet the standard; it also lets teachers know that they already have students engaged in practices that will help o achieve high standards.

As teachers reflect on their practice with respect to what they know about learning and curriculum, and look at how standards are incorporated into their teaching, they are in a position to make some decisions about goals for themselves and goals for their students. Teacher goals might be that more information is needed about subject matter or aspects of learning theory or using inquiry with students. Student goals might be that students will take more responsibility for learning. It is important to provide time for teachers to talk about their goals with other team members so that the team may discuss and identify priorities.

Creating Optimal Learning Environments

Teachers have reviewed research and re-interpreted their experiences in light of current views of learning and intelligence. This is a time for teachers to identify and discuss aspects of learning situations that truly support students as learners. We examine two basic ideas: Learning Community and Inquiry.

Brown and Campione's (1996) Fostering a Community of Learners (FCL) is a system that produces a "self-consciously active and reflective learning environment." Briefly, FCL involves individual and group inquiry, sharing of expertise through jigsaw activities, cross-age teaching, and consultation and participation in a "consequential task" that requires that all students have learned all the information on the inquiry topic. The primary aim is to help students to construct deep understandings of subject matter. The inquiry process in the FCL model is based on guided discovery in which teachers use open-ended, probing questions and exploration to guide students to an understanding of important concepts. In FCL, the responsibility for facilitating learning is distributed throughout the community of learners rather than resting solely with the teacher (Brown & Campione, 1994).

Short, Harste, and Burke (1988) discuss a model for classroom inquiry that encourages students to explore what they know about a topic from their own experiences of the world, what they have learned in school and from their families and culture. Students have an opportunity to immerse themselves in a topic before deciding which areas to investigate. Often students are asked to share what they know at the beginning of class and then expected to decide a topic for investigation before the next class. Time to explore information more extensively can lead to the emergence of more significant questions for inquiry.

Students then investigate the many methods that human beings use to make sense of language, mathematics, science, history, etc. Bruner maintains that to truly understand language or history we must learn the premises and the structure of knowledge domains (Bruner, 1977). By looking at questions from various perspectives students develop broader and deeper understandings of disciplinary content and an appreciation for the inquiry processes used in the different disciplines. Students will ask different questions and gain multiple views about sports, for instance, by looking at them through several lenses–historical, physiological, and sociocultural.

In addition to multiple perspectives, students need to consider a variety of ways to communicate their understanding. Schools generally have relied on language and mathematics for understanding and expression. Operating successfully in these "sign systems" is very important, but

students should be comfortable using art, music, and movement as ways to share information (Short, Harste, & Burke, 1988).

If students are to use the power of learning, they must be able to learn and develop knowledge in a variety of ways. In most American schools the dominant pattern is a teacher telling students information and then testing the students to see if they know the material. If it is on the test, then students know it is important.

As teachers re-conceptualize their classrooms they may find that increasing their repertoire of instructional strategies becomes an important professional goal. During this phase of the model, teachers have an opportunity to read about various models of learning, to participate in demonstrations of different strategies, and, through video vignettes, to see how some of these strategies actually work with students in the classroom. Instructional models that support students in learning include inquiry training, concept attainment, Taba's process approach, guided discovery, expository teaching, and direct instruction (Eggen & Kauchak, 1988). As teachers use a variety of strategies, students not only learn about subject matter, they also learn how to learn because teachers model effective ways to make sense of experience and knowledge (Joyce & Weil, 1986).

While teachers must be concerned with achievement issues, they may not consider issues of equity that have substantial impact on student learning and student self-esteem. A 1994 study of four California schools (Poplin & Weeres, 1994) identified seven concerns shared by parents, teachers, students, staff, and administrators. The concerns are listed in order of significance:

- **Relationships:** The most crucial relationships were those between teachers and students; other community relationships were also important.
- **Race, Culture, and Class:** Diverse linguistic and cultural groups are often taught by a predominantly mono-lingual and mono-cultural group of teachers.
- **Values:** Parents and teachers should talk about basic values and give voice to these values across race, culture, and class so students can have adults with whom they can discuss important ideas and problems.
- **Teaching and Learning:** Teachers must take responsibility for curriculum design and have access to a professional learning community. Students should be actively involved in meaningful learning.
- **Safety:** Everyone participating in the school needs to feel physically and psychologically safe.
- **Physical Environment:** The school and classrooms should be aesthetically pleasing and orderly, and there should be substantial media and materials to support meaningful learning.
- **Despair, Hope, and the Process of Change:** Conversation about change should be encouraged, and people affected by change should be included in the change process. Change should speak to the concerns of all participants.

Studies indicate that students' feelings about their classrooms not only can significantly influence learning but can also have an impact on their relationships with teachers and peers. The learning environment can foster or inhibit the kinds of behaviors that lead to positive student achievement (Caruthers, 1996).

Research on the brain indicates that our "mind" and body are not separate entities that compartmentalize their functions. We do not think or feel; we think and feel. Since thinking and feeling grow together, students and teachers need to interact in a community of care and respect in which individual members of the community are supported in the quest for knowledge and understanding.

Researching Our Classrooms

Teachers by this time have explored a number of concerns and issues relating to learning, curriculum, standards, and values. It is at this point that teachers will begin to make a change in practice or perhaps a change in thinking about students.

To give teachers some awareness of what can constitute research in the context of the Curriculum Inquiry Cycle, several scenarios are presented that show how a particular teacher made choices about what to study and the format that seemed most amenable to the object of study. After discussions of what is possible teachers are ready for explanations about particular methodologies, data collection techniques, and ways of interpreting and sharing results.

If teachers are interested in formal action research, then a brief history and an outline of the steps to be followed is useful. Briefly, the steps include identification of the problem or issue, definition of the problem, review of books to provide background information, determination of questions to be answered by the research, plans for gathering and analyzing data, and recommendations based on the outcomes of the project. Examples of projects that illustrate each step assist teachers to concretize the process (McKay, 1992).

Cochran-Smith and Lytle (1993) suggest that defining our concept of teacher research only through this empirical model limits our use of the rich information that teachers gather in several different ways. They outline a framework that includes four types of research that provide useful information and also provide positive ways for teachers to gather and share information. The framework includes:

- **Teacher journals:** records of classroom activity, reflections, and analysis and interpretations of experience.
- **Oral inquiries:** collaborative studies of classroom issues and experiences.
- **Classroom studies:** examination of practice using interviews, surveys, and other data collection methods. This type of inquiry is most like the action research model described earlier.
- **Conceptual essays:** representations of the teacher's position on issues related to learning or teaching. The focus is on analysis and interpretation of philosophical and psychological concepts rather than specific practice.

Teachers' dialogue with students through journal writing is a way for teachers to gather information about student thinking and the effect of classroom practice on individuals. Asking students to respond to questions about what makes learning difficult or what facilitates their learning can be an important source of questions for teacher inquiry (Bissex, 1994).

The Philadelphia Teachers' Learning Cooperative uses a structured form of oral inquiry called Documentary Processes as a way to structure teacher reflection and conversation in their Thursday afternoon meetings (Buchanan, 1994). One of these processes is the Descriptive Review, which is a detailed account of a child and the child's work that is presented to colleagues. After the presentation, aspects of the information are clarified in discussion and the group makes recommendations for continued work with the child.

Hypothesis-Test (HT) is another way to explore learning and teaching within a professional learning community (Omalza, Aihara, & Stephens, 1997). This model is grounded in the belief that teachers are only able to create meaningful learning experiences if they come to know and understand their students' thought processes. HT consist of four steps:

- **Observation:** carefully attending to student thinking in a variety of learning situations
- **Interpretation:** listing at least five possible explanations for the observations noted
- **Hypotheses:** formulating questions based on the interpretations that will be tested in other learning situations
- **Curricular Decisions:** selecting learning experiences that will provide information relative to the hypotheses

This is a recursive process in which teachers reflect on student thinking as well as their own to understand the learner in enough depth to provide appropriate assistance (Olmaza, Aihara, & Stephens, 1997).

Participating in teacher research not only has positive effects on what happens in classrooms; it has positive effects on teachers' self-efficacy. Teachers gain a sense of accomplishment by contributing to professional knowledge and their sense of autonomy is strengthened (Stenhouse, 1988).

Seeing Through New Eyes

A view of the individual as meaning maker offers different invitations to learners: opportunities to explore, to doubt, and to resolve doubt through inquiry (Omalza, Aihara, & Stephens, 1997). The idea that individuals construct their own knowledge within a community of learners is reflected in the curriculum inquiry cycle.

The curriculum inquiry cycle encourages conversation about possible ways to look at ourselves and our students.

The curriculum inquiry cycle encourages conversation about possible ways to look at ourselves and our students. This means asking questions about our assumptions and beliefs about learning, and respecting each other enough to challenge and to demand evidence. Curriculum inquiry is deciding together which learning experiences are negotiable and which are non-negotiable (Santa, 1995). It is a willingness to risk being wrong and to persevere when the light at the end of the tunnel is still pretty dim.

Teachers who have worked with the curriculum inquiry cycle have been most positive about the dialogue that it encourages with colleagues. Teachers have indicated that there is often little time in the week, let alone in a day, for them to engage in substantive discussion of learning and teaching issues. Participation in Curriculum Inquiry workshops facilitates this discussion and motivates teachers to take their issues and ideas back to other colleagues not engaged in the inquiry process.

Diane Stephens (1997) describes teaching as inquiry. Teachers involved in this process learn about themselves, but they also learn about their students. They observe and reflect on the learning process so that all the action they plan for the students supports learning. The important thing for teachers in this process is that they be able to "see schools and students through new eyes" (Buchanan, 1994).

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