

## Individual Constructivist Teacher Education: Teachers as Empowered Learners

By **Gaile S. Cannella and Judith C. Reiff**

The recently conducted “Study of the Education of Educators” (Edmundson, 1990; Goodlad, 1990; Sirotnik, 1990) has demonstrated that the curriculum for teacher education must be reformulated. To most adequately address the needs of other learners, a teacher must first understand him/herself as a learner. How does it feel to be confused? What happens when a peer proposes an idea that contradicts my own thoughts? How am I similar and different from other individuals in my own cultural community? This very personal understanding of learning creates the openness and flexibility for comprehending the learning of others.

---

*Gaile S. Cannella is a visiting associate professor in the Department of Educational Curriculum and Instruction, College of Education, Texas A&M University, College Station; Judith C. Reiff is an associate professor in the College of Education, The University of Georgia, Athens.*

Reform in teacher education will be successful when programs are viewed as avenues for developing teachers who are **empowered learners**, individuals who understand processes of human concept construction, first for themselves and consequently for students in their classrooms (Fosnot, 1989). Although reform movements are commendable and

### *Empowered Learners*

---

may result in advances in teacher education, none of the approaches provide a wholistic view of human beings as natural, self-directed learners. Such methods as adding a fifth year of education, requiring a liberal arts degree, or enforcing content specializations will not necessarily develop this personal insight into learning (Fosnot, 1989; Smith, 1981).

An empowered learner is an individual who is **inquisitive, reflective, enthusiastic, and autonomous** (Fosnot, 1989; Kamii, 1984; Zeichner, 1983). The **inquisitive** learner is continuously learning, questioning, and investigating. The individual places him/herself in new situations, taking risks and exploring unknown circumstances and interactions. The **reflective** individual analyzes, evaluates, and tests concepts. This reflective disposition is also used to examine oneself as a learner, how contradictions in thought are generated and resolved, the shared perspectives and differences in thought between self and others, and the sociocultural impacts on one's own learning. The **enthusiastic** learner finds pleasure in learning. The individual has either retained or recaptured that intrinsic "joy in learning" experienced by all human beings as young children. The individual chooses to explore and experience and is always open to new possibilities. Finally, the empowered learner is an **autonomous** individual, self-governed, yet one who recognizes multiple perspectives and takes into account the effects of decisions on all concerned.

Contemporary developmental psychologists have demonstrated that learning is synonymous with human life. Human beings—children and adults—act upon and interact with the environment (Forman & Kushner, 1983; Ferreiro & Teberosky, 1985; Kamii, 1985; Lampert, 1987; Ferreiro, 1988; Peterson, 1989). Each individual actively creates concepts, therefore **constructing** (Von Glasersfeld, 1984; Piaget, 1974) individual understandings and even individual realities. Both learning and cognitive development are explained. Constructivist perspectives on learning provide a framework from which education in general can be viewed and describe how teachers can become empowered learners. As a teacher explores his or her own "sense-making" in the world, new constructions are generated that can be used to understand the sense-making of others. This understanding of others as individual learners results in the recognition of multiple perspectives necessary for autonomous, informed decision making. Additionally, approaches that acknowledge that human beings are constructors of their own understandings result in an atmosphere in which the individual is respected, a necessary component for empowerment. The specific purpose of this paper is to demonstrate how the development of empowered learners can be facilitated by:

1. Examining how individuals construct concepts; and
2. Presenting educational practices and guidelines within higher education programs that facilitate the development of teachers as empowered learners.

## **Constructivism and University Instruction: Invention of Concepts**

Research in the field of developmental psychology has provided a description of human beings as learners. Each individual person internally creates concepts. Through an active process of mental operations, a child or adult invents his or her own reality. These inventions will never completely **fit** the concrete reality of our physical world or the concepts constructed by another individual (Von Glasersfeld, 1984). Watzlawick (1984) provides a sea captain as the example. It is a dark, stormy night. The captain must sail the uncharted channel without navigational devices. If the captain is unsuccessful, and wrecks his ship, he has constructed a path that does not fit the safety boundaries of the channel. If he successfully clears the channel, he has constructed a reality that fits the safety boundaries of the channel, yet is unaware of how safely or close to disaster the course was steered. The captain's course through the channel fit the safety boundaries. Courses chosen by other sea captains could lead to safe navigation of the channel but would not fit each other or the course chosen by the first captain.

The notion that individual human beings construct concepts for themselves generates a major question. What is being constructed? Do individual constructions represent increasingly more accurate approximations of reality or perceptually bound creations that fit environmental experiences. Traditional epistemologists have taken for granted the notion that constructed knowledge is a reflection of reality. The perspective focuses on the need to determine how close to reality constructions may be. Von Glasersfeld (1984) and others (Lincoln & Guba, 1985) question this correspondence with an "objective reality". Constructions are seen as limited or expanded by previous constructions. "Truth" and "facts" are viewed as created.

Even across conflicting constructivist perspectives, the view of human beings as concept creators can lead to principles for human learning. (1) Knowledge is created by each individual through processes of self-regulation and adaptation. This knowledge cannot be separated from the individual and is in a continual process of change and revision. (2) Concepts are constructed through assimilation, fitting new experiences to existing concepts or, accommodation, revising concepts or creating more sophisticated ways to explain experiences. (3) Concepts are invented by each individual. Accumulated facts or association do not result in cognitive growth. (4) Cognitive conflict, experimentation, and reflection result in the construction of new concepts (Fosnot, 1989).

The brain is a natural learner, as is evidenced by the acquisition of speech, mobility, and early childhood questioning behaviors. Just as the lungs function to breathe, the brain continuously learns. Conflict in perspective or experience creates

### *Empowered Learners*

---

an internal disequilibrium during which the individual questions, explores, tests ideas and creates new concepts and/or perspectives.

Knowledge is subjective and determined by the individual to best fit past experiences and the current situation (Fosnot, 1989). Each individual creates his or her own unique understanding of concepts based on individual brain functioning, previously constructed concepts and past experiences. Knowledge is, and must be, different for each human being (Von Glasersfeld, 1984). Empowered learners have analyzed this process of concept construction, recognize that no two individuals could ever construct the same exact understanding of any concept, and acknowledge that concepts change—are reconstructed—as the individual matures and interacts with the environment.

Learning is a natural, active process. Under conditions that correspond with the individual's understanding of the world, natural learning occurs without external motivation. Adults, as well as children, naturally construct concepts when placed in inquiry environments or other situations that stimulate cognitive conflict and allow for exploration and individual control over learning.

### **Constructivism and Teachers**

The opportunity to understand oneself as a learner is missing from most classrooms. Our educational system has basically functioned using didactic, memory oriented, transmission models (Short & Burke, 1989; Joyce, 1985). Observers in elementary, secondary and college classrooms describe large doses of memory learning. The recitation method, either verbal or written, dominates most school learning activity.

Preservice and inservice teachers may not have had experiences within their own education that would foster learner empowerment. These individuals would have difficulty understanding teaching models that do not fit their own constructions of learning. Howey (1983) has pointed out that teacher education programs as a collective group have not used learner oriented methods. Education courses expose students to concepts such as individualization, discovery, and open ended questioning usually by using lectures, readings, or step-by-step directions. We should not be surprised that teachers have not constructed understandings of such concepts as equilibration, learner self-regulation, exploration, sociocognitive learning, cognitive conflict, concept construction, and so on (Fosnot, 1989). In most cases, teachers have constructed concepts of learning that are memory oriented and factually based. They do not understand themselves as active, creative learners.

Glickman (1985) has further stressed that teachers must be viewed as changing adults. These adults vary in their constructions of teaching and learning. Understandings may change over time, dependent on the flexibility of the constructions themselves and the experiences provided to the individual. Teaching is very complex, combining conflicting goals with uncertain methods for achieving

outcomes (Wagner, 1984). The preservice or inservice student is asked to understand a variety of psychological, sociological and educational points of view. Yet, experiences provided for these individuals may or may not foster the construction of concepts that are conducive to meeting individual needs of their own students.

For example, Ms. Carpenter checks the workbook page of seven-year-old Joey finding that he has correctly completed all the related addition and subtraction statements ( $3+5=8$ ,  $5+ \_ =8$ ,  $8-5= \_$ ,  $8- \_ =5$ ). Assuming that Joey and most of the class have constructed the concept, the children are asked to generate other related addition and subtraction facts. She hopes the children will suggest related formulas such as,  $2+4=6$ ,  $6-2=4$ ,  $4+2=6$ ,  $6-4=2$ . Everyone is confused. The thought reversal necessary for construction of mathematical properties has not developed. The children have not constructed the mathematical relationship using the workbook. Instead some have attained the “correct” answers by using whatever number is missing from the pattern. The teacher does not understand this confusion. Her constructions of learning are based on observations of correct responses. She does not recognize that correct answers can be obtained without understanding the concept.

Research on teacher thinking provides further examples of the thought required within educational settings (Clark, 1988). Effective teachers tend to make adjustments to plans as new information is obtained in the learning environment (Leinhardt & Greeno, 1984). When constructions of learning are limited, teachers appear unable to make adjustments when teaching plans are not working (Griffin, 1983; Koehler, 1983). These individuals differ widely in the ability to construct alternatives (Howey, 1985). Additionally, preservice teachers become very concerned with “what works” (Zeichner & Teitelbaum, 1982). They tend to think that what is observed is the limit to what is possible. They have not constructed concepts of learning that allow for individual perspectives, long term effects, or analysis of belief systems dealing with other human beings.

For example, a teacher who is unable to comprehend another’s point of view may become over-concerned with being a disciplinarian. “Teach me management techniques that will help me **control** the class.” Further, if students are not learning, they are at fault. “Johnny just isn’t interested in learning math.” “Mary’s family is just not well educated. I can’t expect her to do well in reading.” Individual students have constructed different perspectives of the world. Teachers who have constructed a limited view of learning (e.g. writing mechanics, high test scores, speed methods) will have problems understanding that students have different expectations and different needs.

## Recommendations

For teachers to become empowered learners, they must be viewed as active constructors of concepts who enter teacher education programs with constructions

### *Empowered Learners*

---

already formed about teaching and learning. Because of years of didactic methods, these learners may need facilitation in recognizing their own learning processes. Assistance can be found in such methods as exploration, experimentation, and discovery.

#### *Teacher Education Guidelines*

Recognition that teachers are learners themselves who construct concepts for themselves leads to the establishment of certain expectations for the philosophical base of teacher education programs and the methods used to implement these programs. Eclectically exposing teachers to a variety of teaching methods may be doing more harm than good. When constructions of learning do not include the understanding of one's own learning, the "choose whatever works" message is very compelling. These individuals are not able to recognize that some methods are not philosophically compatible or that methods may produce different long term effects than the present interpretation of "what works."

Empowering teachers as learners can be accomplished by using constructivist principles. The philosophical base and pedagogical methods chosen would include the following assumptions:

- (1) Each human being constructs or invents his/her own knowledge.
- (2) Learning differs for individuals based on unique biological components.
- (3) The potential for learning is present when the individual experiences a cognitive conflict or a challenge to existing understandings or beliefs.
- (4) The individual learner is in control of learning through the process of self-regulation.
- (5) Learning is a natural internal process of invention.
- (6) When new concepts are constructed, changes in thought are qualitative, not simply an addition of facts or experiences.
- (7) Teaching environments can facilitate knowledge construction by using experimentation, exploration, inquiry, and social interaction to stimulate cognitive conflict.
- (8) An empowered learner thinks for her/himself, challenging curriculum, methods, and administration.

Two reform movements in teacher education have been influenced to varying degrees by views that can be considered consistent within a constructivist philosophical orientation. First is the developmental tradition (Zeichner & Liston, 1990). The learning of pre-inservice teachers has been considered developmental, requiring the same supportive, facilitative environment that is expected for children. In these organismic models (Pintrich, 1990), teachers have been viewed as a combination of artist, naturalist and researcher (Perrone, 1989). The second tradition, social reconstructionist, has placed an emphasis on providing teacher education students with experiences in experimentalism and reflective inquiry, consistent with notions of learners as constructors of knowledge.

Related to the developmental and social constructionist reform movements is

conceptual change research (Posner, *et al*, 1982; West & Pines, 1985). This literature suggests that pre/in-service students should be placed in learning experiences that challenge existing educational beliefs and facilitate resolution of the contradictions (Basseches, 1986; Feiman-Nemser & Buchmann, 1989; Kitchener, 1986).

As Zeichner (1983) and Wechlage (1981) have shown, teacher education in the U.S. has a history of efforts to promote inquiry and exploration. These methods are to be applauded in any classroom. However, most often these techniques have simply been demonstrated to groups of teachers as part of the wealth of teaching methods that can be chosen. Teachers have not been placed in inquiry, discovery oriented environments that facilitate understanding of themselves as learners. For success, the philosophical base and implementation of teacher education programs, undergraduate and graduate courses within those programs, and, if possible, general university education must be grounded in the understanding of teachers as learners. The following are examples of higher education programs that follow a learner empowerment paradigm.

A Piagetian-based instructional model was developed by faculty of the ADAPT program (Accent on Developing Abstract Process of Thought) at the University of Nebraska. This model is a modification of the Learning Cycle developed by Robert Karplus (1974) as part of the Science Curriculum Improvement Study, and involves three components that emphasize the development of logical thought: exploration, invention and application. During the exploration phase, students participate in concrete activities such as collection of data, group interactions, observations, interviews or environmental analyses. Invention involves the use of concrete experiences to form generalizations or relationships, or to invent hypotheses. Application is the process of testing generalizations or hypotheses in a variety of settings. The ADAPT model has been used as the basis for a variety of courses including anthropology, English, and science. Research using this method has been conducted primarily with science programs and in a small number of special university programs for freshmen. Results have shown increased concept understanding and improvement of critical thinking (Ivins, 1983; Schlenker & Perry, 1983; Schermerhorn, 1982; Fuller *et al.*, 1980).

Earliest attempts in teacher education that were concerned with teachers as learners or discoverers were inquiry-oriented teacher education models (Zeichner, 1983). Teachers have been viewed as “researchers,” “scholars,” “innovators,” and “inquirers.” The concept of reflective action, as proposed by Dewey (1900), is implicit within inquiry-oriented teacher education programs. The prospective teacher is viewed as active in the learning process. Emphasis is placed on the development of inquiry related to teaching. Knowledge and skills cannot be pre-specified because teachers are viewed as observers and critical evaluators in learning environments. Although inquiry models tend to emphasize analysis within school settings rather than analysis of one’s own learning processes, the major



### *Empowered Learners*

---

purpose of the programs is to foster “a disposition toward critical inquiry” (Zeichner, 1983, p. 6).

Language and literacy acquisition experts have begun to incorporate perspectives into teacher education classrooms and programs that support concepts of learning that are inquiry based and recognize learner construction (Short & Burke, 1989). Preservice (and inservice) teachers are given a voice within the college classroom through journals, small-group discussions, and self-evaluation. By becoming immersed in experiences such as “authorship” (p. 201), teachers are reflecting on themselves as learners (readers and writers).

Duckworth (1987a; 1987b) has taken the “teacher as researcher” concept and proposed two avenues of research: (1) teacher as a constructor of content knowledge, and (2) field research into construction of concepts by students. Fosnot (1989) proposed a model of teacher education that combines the concept of “teacher as learner” with “teacher as researcher.” Education and arts and sciences faculty at Southern Connecticut State University have established an interdisciplinary thought major in which students choose an arts and humanities, social sciences, or natural sciences strand. Future teachers begin by taking an “Introduction to Interdisciplinary Thought” course. The thinking strategies used in each of the strands are examined by using a common theme such as revolution, investigation or creativity. For each of the three strands, students are expected to compare views of the world, forms of inquiry, and cultural biases/expectations related to the theme concept. After completion of the chosen strand, a senior seminar is conducted in which students pose problems, solutions, resources and conduct interdisciplinary research projects.

In the education courses of the Southern Connecticut program, teachers are viewed as learners who must first construct understandings of such processes as equilibration and self-regulation for themselves. Adult level mathematics problems, language analyses and video segments of children are examples of learning experiences provided. In small groups, and then with the entire class, students discuss, and even argue over, how to solve the problems. Following, or during, the inquiry type discussion, the professor asks questions leading toward analysis of the learning taking place during problem solving. For example, teachers are given the following problem and placed in small groups for discussion: “If you bicycled up a hill at 20 mph, then turned around and bicycled down at 60 mph, what was the average speed traveled from start to finish?” (Fosnot, 1989, p.30). After a class discussion illustrating several possible solutions, and disagreement over differences between average speed and rate, the learning process is analyzed in relation to the problem activity. Cognitive conflict, assimilation, accommodation, and so on are explained and examined by the students themselves.

Simon and Schifter (1988) have used a similar approach to mathematics for teachers. During a special summer program, teachers are confronted with new mathematics concepts and allowed to experience the depth of understanding that is



possible using concrete exploration. For example, in small groups, teachers are given base-5 blocks and asked to invent a system of counting that uses the blocks and is symbolically represented by the letters of the alphabet, a,b,c,d, and on through z. First, teachers manipulate, invent, and discuss. They test the invented system by attempting addition and subtraction problems. Finally, assumptions concerning mathematical learning and teaching are reflected upon and discussed.

Some teacher education programs have obviously introduced notions that are consistent with constructivist philosophy. However, as Zeichner and Liston (1990) have argued, these programs are not common in the United States. Further, although conceptual change research and constructivist implications are posited, the traditional craft and outcome oriented behavioral models (Zeichner, 1983) that dominate colleges of education do not provide evidence of reconceptualization or paradigm shift.

## Reflections

There is no magic formula for establishing a teacher education program that will result in teachers who think and make decisions at high levels, are compassionate, are creative, and always recognize the emotional, social, and intellectual needs of their students. Just as the sea captain constructs a course that fits the safety boundaries of the channel, teacher educators, in conjunction with other university and public school educators, construct and reconstruct patterns of teacher education. We have not and will probably never construct a pattern that is ideally all that teacher education could be. Yet, based on constructivist approaches to education, programs are possible that would empower teachers as learners, resulting in individuals who could understand and address the needs of their own students and treat these students as respected, worthwhile human learners.

Our constructions of appropriate higher education programs will always be in the **process** of change; however, just as we expect teachers to understand learning, we in higher education must understand the learners in our programs. Our constructions will vary, but our safety boundary could always be: **Teachers (and future teachers) are active, constructive learners and should be empowered as such.**

## References

- Basseches, M. (1986). Dialectical thinking and young adult cognitive development. In R.A. Mines & K.S. Kitchener (Eds.), *Adult cognitive development: Methods and models*. New York: Praeger.
- Clark, C. M. (1988). Asking the right questions about teacher preparation: Contributions of research on teacher thinking. *Educational Researcher*, 17(2), 5-12.
- Dewey, J. (1900). *The school and society*. Chicago: University of Chicago Press.
- Duckworth, E. (1987a). "The having of wonderful ideas" and other essays on teaching and learning. New York: Teacher's College Press.
- Duckworth, E. (1987b, October). Opening the world. Keynote address, annual conference

### *Empowered Learners*

---

- of the Association for Constructivist Teaching, West Point, NY.
- Edmundson, P. J. (1990). A normative look at the curriculum in teacher education. *Phi Delta Kappan*, 71(9), 717-722.
- Feiman-Nemser, S., & Buchmann, M. (1989). Describing teacher education: A framework and illustrative findings from a longitudinal study of six students. *Elementary School Journal*, 89, 365-377.
- Ferreiro, E. (1988, April). *Real problems and pseudoproblems in the emergence of literacy*. Paper presented at the meeting of the American Educational Research Association, New Orleans, LA.
- Ferreiro, E., & Teberosky, A. (1985). *Literacy before schooling*. Portsmouth, NH: Heinemann.
- Forman, G. E., & Kushner, D. S. (1983). *The child's construction of knowledge*. Washington, DC: National Association for the Education of Young Children.
- Fosnot, C. T. (1989). *Enquiring teachers, enquiring learners: A constructivist approach for teaching*. New York: Teachers College Press.
- Fuller, R. G., Bergstrom, R. F., Carpenter, E. T., Corzine, H. J., McShane, J. A., Miller, D. W., Moshman, D. S., Narveson, R. D., Thornton, J. L., & Williams, V. G. (Eds.). (1980). *Piagetian programs in higher education*. Lincoln, NE: University of Nebraska.
- Glickman, C. (1985). *Supervision of instruction: A developmental approach*. Newton, MA: Allyn & Bacon.
- Goodlad, J. I. (1990). Studying the education of educators: From conception to findings. *Phi Delta Kappan*, 71(9), 698-701.
- Griffin, G. A. (1983). The dilemma of determining essential planning and decision-making skills for beginning educators. In D. C. Smith (Ed.), *Essential knowledge for beginning educators* (pp. 16-22). Washington, DC: American Association of Colleges for Teacher Education ERIC Clearinghouse on Teacher Education.
- Howey, K. R. (1983). Teacher education: An overview. In K. R. Howey & W. E. Gardner (Eds.), *The education of teachers: A look ahead*. New York: Longman.
- Howey, K. R. (1985). Six major functions of staff development: An expanded imperative. *Journal of Teacher Education*, 36(1), 58-64.
- Ivins, J. E. (1983). What are your labs really teaching? *Science Teacher*, 50(5), 56-59.
- Joyce, B. (1985). Models for teaching thinking. *Educational Leadership*, 42(8), 4-7.
- Kamii, C. (1984). Autonomy: The aim of education envisioned by Piaget. *Phi Delta Kappan*, 65(6), 410-415.
- Kamii, C. (1985). *Young children reinvent arithmetic*. New York: Teacher's College Press.
- Karplus, R. (1974). *Science curriculum improvement study: Teacher's handbook*. Berkeley, CA: Lawrence Hall of Science.
- Kitchener, K.S. (1986). The reflective judgment model: Characteristics, evidence, and measurement. In R.A. Mines & K.S. Kitchener (Eds.), *Adult cognitive development: Methods and models*. New York: Praeger.
- Koehler, V. K. (1983). Introduction: A research base for the content of teacher education. In D. C. Smith (Ed.), *Essential knowledge for beginning educators* (pp. 1-4). Washington, DC: American Association of Colleges for Teacher Education ERIC Clearinghouse on Teacher Education.
- Lampert, M. (1987). *Reinterpreting mathematics: An experiment in teacher education* (Report of the National Center for Research on Teacher Education) East Lansing, MI, Michigan State University.
- Leinhardt, G., & Greeno, J. (1984, April). *The cognitive skill of teaching*. Paper presented
-

- at the meeting of the American Educational Research Association, Montreal, Canada.
- Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Perrone, V. (1989). Teacher education and progressivism: A historical perspective. In V. Perrone (Ed.), *Working papers: Reflections on teachers, schools, and communities*. New York: Teachers College Press.
- Peterson, P. L. (1989). Alternatives to student retention: New images of the learner, the teacher and classroom learning. In L. A. Shepard & M. L. Smith (Eds.), *Flunking grades: Research and policies on retention*, (pp. 174-201). New York: Falmer Press.
- Piaget, J. (1974). *To understand is to invent*. New York: Viking Press.
- Pintrich, P.R. (1990). Implications of psychological research on student learning and college teaching for teacher education. In W.R. Houston (Ed.), *Handbook of research on teacher education: A project of the association of teacher educators*. New York: Macmillan.
- 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.
- Schermerhorn, L.L. (1982). *Project COMPAS: A design for change*. Washington, DC: Fund for the Improvement of Postsecondary Education. (ERIC Document Reproduction Service No. ED 219 100).
- Schlenker, R. M., & Perry, C. M. (1983). The molar concept: A Piagetian-oriented learning cycle. *Journal of College Science Teaching*, 12(6), 431-434.
- Short, K.G., & Burke, C.L. (1989). New potentials for teacher education: Teaching and learning as inquiry. *The Elementary School Journal*, 90(2), 193-206.
- Simon, M. A., & Schifter, D. (1988). *Teacher education from a constructivist perspective: The educational leaders in mathematics project* (National Science Foundation Grant Report no. TEI-8552391). South Hadly, MA: Mt. Holyoke College.
- Sirotnik, K. A. (1990). On the eroding foundations of teacher education. *Phi Delta Kappan*, 71(9), 710-716.
- Smith, F. (1981). Demonstrations, engagement, and sensitivity. *Language Arts*, 58, 103-112.
- Von Glasersfeld, E. (1984). An introduction to radical constructivism. In P. Watzlawick (Ed.), *The invented reality* (pp. 17-40). New York: W. W. Norton.
- Wagner, A. (1984). Conflicts in consciousness: Imperative cognitions can lead to knots in thinking. In R. Halkes & J. Olson (Eds.), *Teacher thinking: A new perspective on persisting problems in education* (pp. 163-175). Lisse, The Netherlands: Swets & Zeitlinger.
- Watzlawick, P. (1984). Introduction. In P. Watzlawick (Ed.), *The invented reality* (pp. 13-15). New York: W. W. Norton.
- Wehlage, G. (1981). Can teachers be more reflective about their work? A commentary on some research about teachers. In B. R. Tabachnick, T Popewitz, & B. Szekely (Eds.), *Studying teaching and learning: Trends in Soviet and American Research*. New York: Praeger.
- West, L.H.T., & Pines, A.L. (1985). *Cognitive structure and conceptual change*. New York: Academic Press.
- Zeichner, K. (1983). Alternative paradigms of teacher education. *Journal of Teacher Education*, 34(3), 3-9.
- Zeichner, K., & K. Teitelbaum. (1982). Personalized and inquiry-oriented teacher education:

### *Empowered Learners*

---

An analysis of two approaches to the development of curriculum for field-based experiences. *Journal of Education for Teaching*, 8(2), 95-117.

Zeichner, K.M., & Liston, D.P. (1990). Traditions of reform in U.S. teacher education. *Journal of Teacher Education*. 41(2), 3-20.