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Learning to Teach, Teaching to Learn: The Center for Constructivist Teaching/Teacher Preparation Project

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Constructivism is a theory about both "knowing" and "coming to know." Based on work in cognitive development, philosophy, and anthropology the theory describes knowledge as temporary and non-objective, internally constructed, and socially and culturally mediated. Learning, from this perspective, is a self-regulatory process of struggling with the conflict between existing personal models of the world and discrepant new insights, constructing new representations and models of reality as a human meaning-making venture, and further negotiating such meaning through socially cooperative activity, discourse, and debate.

Although not a theory of teaching, constructivism suggests that a radically different approach to instruction be taken than that used in most schools to date. Teachers who base their practice on constructivism reject notions that meaning can be passed on to learners who incorporate exact copies of the teacher's understanding for their own use, that wholes can be broken into parts, that concepts can be taught out of context. In contrast, a constructivist view of learning suggests an approach to teaching that gives learners the opportunity for concrete, personally, meaningful experiences through which they can search for patterns and build concepts. The classroom in this model is seen as a mini-society, a community of learners engaged in activity, discourse, and reflection. The traditional power hierarchy of teacher as the "ruling knower" and learner as the unknowing, controlled subject studying to learn what the teacher knows begins to dissipate as teachers assume more of a facilitator's role and learners take on more ownership of knowledge. Indeed, autonomy and empowerment of learners become the goals.
Constructivist theory has even begun to influence teacher education programs (Duckworth, 1987; Fosnot, 1989; O'Loughlin, 1990) in most cases through the work of individual teacher educators in their individual courses. Yet understanding the teaching/learning process from a constructivist view requires a paradigmatic, structural shift in thinking—a shift that rarely can be accomplished in one or two courses (Schifter & Fosnot, 1993). Teachers and teacher educators alike still hold beliefs such as “teaching is telling” and “covering the curriculum is more important than conceptual understanding” (Peterman, 1991; Schifter & Fosnot, 1993). Further, most educators still tend to teach as they were taught rather than as they were taught to teach (Jones, 1975; Taylor, 1990). A truly constructivist approach to teacher education needs to begin with these beliefs and systematically challenge them through activity, reflection, and discourse in both course work and field work throughout the teacher preparation program.

A New Framework for Preparing Teachers

In the fall of 1989, with the assistance of federal funds from the Department of Education, faculty and administrators from Southern Connecticut State University established the Center of Constructivist Teaching/Teacher Preparation Project—a theoretically consistent teacher education program grounded in constructivism. The center’s two year (45 credit) graduate certification/M.S. program reflects the following principles: 1.) Field experiences designed to allow for investigation and experimentation in child development, learning, and teaching should form the program core; 2.) Learners need experiences which confront traditional views of teaching and learning in order to enable them to construct a pedagogy which stands in contrast to older, more traditionally held views; 3.) Practicum site schools should exhibit integrated, learner-centered curricula which emphasize learner investigation, reflection, and discourse and employ up-to-date technology such as “on-line” search capability, LOGO, word processing; 4.) An induction year mentor program (connecting the university and the school) should support teachers and administrators and; 5.) Formative and summative evaluation should be conducted throughout the life of the new program. This article presents a brief description of the center’s teacher education program.

Levels of Learning

In place of traditional methods courses the program is tiered in four stages (see Figure 1) and unfolds in the following ways.

**Figure 1**
Program Description

- **Level 1** Constructing Pedagogy from an Analysis of One’s Own Learning
- **Level 2** Constructing Pedagogy from an Analysis of Children’s Thinking
- **Level 3** Cooperative Field Work in the sites
- **Level 4** Integrative Field Experience

**Level One: Constructing Pedagogy from an Analysis of One’s Own Learning.** In August, 1990, 15 cooperating teachers from five partner school sites enrolled with 30 teacher candidates (graduate students) in a three-week intensive summer institute, “Teaching and Learning I,” which was taught by Education and Liberal Arts faculty. Constructivist-based learning experiences provided them with shared opportunities to analyze their own learning and thinking.

Week one focused on mathematical problem solving experiences with manipulatives and included computer classes in LOGO. For example, investigating how many handshakes would be possible among group members if they only shook hands with everyone once, participants constructed permutations; working as geographers in a simulation exploring the area of rectangular plots of land, they investigated quadratics; using Dienes base-5 blocks and working collaboratively, they constructed their own number systems.

Week two involved participants in language arts activities such as writing workshops, cooperative reading and discussion groups, the writing of double entry journals, and investigative spelling activities regarding phonetic patterns and language roots. Word processing, bookmarking, and newspaper layout software were used in the computer class.

During the third week participants worked on a project in science, social studies, or multicultural education. The week began with a simulation in which participants became architects in a company proposing bridge designs for a Brazilian rain forest. Along with the physics involved in their designs, social science issues emerged and grew critical when the “disgruntled environmentalists” as well as the men (a minority) were fired as the company administration became progressively more autocratic. Science and social science questions arising from the simulation formed the basis of project work which participants engaged in during the remainder of the week. Computer classes covered “on-line searching” for participants to gain skills in accessing information for their projects.
Each Friday participants would reflect on the ways their university instructors facilitated learning and which specific aspects of the experiences they found conducive to thinking. The group came together Friday afternoons as a “community of discourse” to propose and discuss pedagogical principles resulting from reflection on participants’ own learning. During these discussions we all attempted to process contradictions to old traditional schemes, such as “teaching is telling.”

Participants also kept journals during the institute and wrote a final synthesis paper describing the processes of learning and teaching. An excerpt from Leah’s paper illustrates the type of reflection most participants experienced:

I had always believed that the purpose of mathematics, for the student, was to get the correct answer and the purpose for the teacher was to provide the directions on how to arrive there. I now see what an incorrect and narrow definition of mathematics learning I had!...

During our problem solving sessions I found the most positive and beneficial learning experience was when I could understand the discovery (mine or someone else’s) in my own terms.... I’ve come to realize that it is very important that the learner feel a part of the process not just a processor of facts and rules....

Another important idea I learned this week is the power of group learning. The group work facilitated learning because the interaction of ideas provided an opportunity for reflection...and the experience of sharing ideas allows the learner to see that there are many different ways of looking at a problem.

This institute has left me feeling excited and empowered as a learner (exhausted, too!) I feel that I am developing some very new ideas about my learning, how others learn and the important role of the teacher in this process. I know I will never forget these experiences... I will be synthesizing all of this for a very long time!

Level Two: Constructing Pedagogy from an Analysis of Children’s Thinking. During the fall semester of 1990, the 30 teacher candidates investigated the learning and thinking of elementary children using clinical interviews, video, case studies, and samples of children’s work. They explored topics in mathematics, literacy, science, social studies, and artistic development, making every attempt to attach meaning to children’s ideas and actions and understand both typical and exceptional development. Excerpts from Ellie’s synthesis paper, written at the end of level two, exemplify the impact of this work:

My understanding of the process of learning has changed over the last few months. As I studied the way children come to know, I also became clearer about how I come to know... Not only is learning a natural process, a self-regulating process, it is a process which occurs by virtue of our existence. I am, therefore I learn.

This understanding of my own learning process has allowed me to better understand and respect the knowledge of young children. Their process of learning... is as complex and complicated as any adult endeavor. Through my study of the way children come to know I have come to see a few patterns, patterns that seem to repeat throughout our lives. When the child first experiences something... she experiences the whole picture. Through her interaction with herself and the world she begins to see that this whole thing actually consists of separate things. As she explores these parts, she integrates them back into the whole and better understands.

Having begun to formulate a constructivist pedagogy Ellie is able to critically evaluate the teaching process and design activities to promote learner construction:

I visited a classroom where a teacher was doing a lesson about air and water balloons. I was not satisfied with the presentation and thought about how I might change it. First of all, why do this activity? What science are the children learning?... I became curious about the explanation children might have for the balloon increasing in size. I would start the activity with a simple invitation. “I was at a birthday party last weekend. The decorations were red and blue and everyone got to bring a few balloons home. I began to wonder why balloons get bigger when we blow into them. Does anyone have any ideas about this?” This might lead to a question like, “I wonder what else we could do to make the balloon bigger”? Then we could actually start to do things with the balloons. As the teacher, my job would be to... help direct and clarify thinking by asking good probing questions and helping children paraphrase their thoughts and ideas. I would also be looking for strategies children were employing and planning... group presentation... to present findings... I [would] help children see how each group attacked the problem and give them [scientific] vocabulary for their ideas.

Level Three: Cooperative and Reflective Field Experiences. In the spring semester the 30 teacher candidates rejoined the 15 teachers who participated in Teaching and Learning I, two to a classroom, for 12 weeks of cooperative field work consisting of a full time team teaching situation. Although ostensibly similar to traditional student teaching this experience is distinctly different in that it is cooperative rather than imitative in nature. Here, participants brainstorm, plan, and implement together; again, the focus is on creative and critical thinking in relation to pedagogical decision making.
An excerpt from Kate's journal, written halfway through her cooperative field experience, is illustrative:

Phrases like "teacher-as-researcher" and "teacher-as-learner," though understood in an abstract sense, became very concrete for me this weekend. Teaching math has been a struggle for me and Jim [her fellow student teacher].

Here Kate refers to the fact that she and Jim had been attempting to teach a unit on angles. After assessing each child's knowledge of the correct use of protractors they planned to engage the children in measuring the interior angles of several polygons and to hold a whole class "math congress" to share their discoveries. They quickly learned, however, that most of the fourth and fifth graders did not understand how to measure with the tool despite much explanation from all three teachers.

During seminar that week (held on-site), Jim and Kate shared what they had learned about the children's conceptions and their own struggles about what to do next. The eight student teachers at that partnership school and I brainstormed several activities they might try, such as having the children use LOGO (which they were already familiar with) to draw shapes and then having them invent a measurement tool to measure the amount of each turn in the drawing. Kate and Jim tried these activities over the next few weeks with much success before re-teaching about the protractor. Although they felt they had finally succeeded in teaching the concept of measurement of angles, they remained dissatisfied with the progression of the unit and believed they had resorted to too much "telling." Kate's journal entry continues:

We met with Deanna [the cooperating teacher]. She suggested we look through a series of books from England dealing with math conceptions. Reading these further enhanced my framework of a "whole-to-parts" pedagogy I've been constructing for myself. I think I ran into trouble before because I fell back on my own original ideas of teaching that I had seen my teachers use, a "parts-to-whole" theory: explanations of theorems and proofs first, then application.

As Kate struggles to clarify for herself this new "whole-to-parts" pedagogy, she is constructing, she focuses her reflection on trying to ascertain what the "whole" is that she wants to focus investigation on. She continues:

Bring the kids back to reality. I thought, back to the concrete. For me... this was "shapes." Forms are seen everywhere and they can be investigated by exploring their angles, vertices, and so forth. Now so the task became to think of what the "big ideas" were that I wanted them to grapple with — no small task. I kept thinking about "ontogeny recapitulates phylogeny." As with the angle-measuring devices, the need to mea-
sure arose from the problem posed — experimentation, followed by questions, followed by hypothesis testing, followed by experimentation. But what is the need for investigating shapes, angles, and volumes?

In this excerpt Kate can be observed grappling herself with some big ideas. What is the connection between teaching and learning? What form should investigations take so that learners will be engaged, raise questions, and construct concepts? She attempted to answer her questions by putting herself once again in the learner's role.

Her journal continues:

One activity I had seen in the English series dealt with conservation of volume. It asked the student to construct houses of blocks using 36 blocks each time upon three different base floor plans.... Thinking about those houses set me on a line of questioning though. Only three examples for floor plans were given: were there any more? I began to draw out on graph paper all the combinations of 36 I could think of. I found my level of excitement increasing. My investigation led me to find that area of a face of a house is related to the depth. Hmm, I thought, what other combos are there and what combo gives you the most perfect cubed house? I continued with my investigation and found a systematic way of coming up with a total of 10 designs for 36 blocks. I found that area is related to depth and both are related to volume. I found a relationship between designs.

Kate concludes:

How intriguing. As a learner trying to satisfy my need for discovering some possible big ideas, I've learned that I need an open-ended kick-off investigation for my students to engage in where they can raise their own questions.

After completion of the cooperative field work, teacher candidates remained in the field site for four more weeks to engage in reflective field work. A focused observation and/or research study on a pedagogical issue of interest to them. Students presented their work at a professional conference, held as a culminating experience and attended by cooperating teachers and administrators.

Observational work, common to teacher education programs, usually occurs early on when teacher candidates have little notion of what to look for and thus often gain little from their observation. During the cooperative fieldwork level of our program, however, many important personal questions arise. Our reflective field research not only gives prospective teachers the opportunity to study in-depth a question related to knowledge or learning but further develops their ability to evaluate the teaching/learning situation by having them observe other teachers involved with students.
Level Four: Integrative Field Experience (clinical fellowship year). After completion of the reflective experience participants receive their initial teaching license from the state and secure their first teaching position. Twelve of our initial 30 students are now completing their novice year of teaching. To ensure the implementation of innovations and to provide support within the school climate a faculty mentor from the project visits the novice teacher weekly and serves as a resource person and support ally. A seminar is also held one night a week back at the university.

This level of our program proved especially important for Sara, who began her first year with an immediate goal of putting a writing workshop and a literature-based reading program in place in her second grade. Within weeks a few vocal and influential parents began to complain that skill pages from workbooks were not coming home. They called the principal — who immediately scheduled an observation and conference with Sara, subsequently requiring that she use the basal readers and the spelling texts, and that she demonstrate use of praise and reinforcement. By November Sara was in tears most of the time, panicked that she would lose her job. I scheduled a meeting with her principal at which we discussed the practices she was trying to put in place. He shared his needs resulting from pressure he was receiving in the district. Together we worked out a compromise: Sara would not need to use basalts everyday (though she would be responsible for their content), but they needed to be incorporated into her reading instruction in some fashion. Sara and I then created record keeping and management systems to satisfy her principal's requests. We also planned a parent open house to explain her writing program and several "author teas" where the children could read their published pieces to an audience of parents.

During the clinical fellowship year, four in-service days focused on constructivism, literacy, mathematics, and project work were held for the administrators who hired novice teachers from the program. We hoped that as a result of these sessions novices would be more likely to receive support and that their efforts at change would be more permeating and lasting. Overall, these offerings worked well with administrators requesting that other teachers from their school attend with them. Sara's administrator attended these sessions and began to get quite excited by the new ideas. By February, Sara's situation had changed: parents and administrators began to support her practice; colleagues began to seek her out for new ideas; and the local public television station even filmed her class during a writing workshop and an author's tea. Her principal eventually acknowledged Sara as one of the leaders in the school.

In June, 1992, participants enrolled in the final part of the program — an institute entitled "Institutions, Schools, and the Change Process." Grounded in the foundations of education, participants explored how institutions are inherently connected to society and discussed various methods of creating change in schools. In this institute, Sara studied some of the dynamics within her school setting which were working towards facilitating change as well as those which were hindering it. She met with several of her colleagues to discuss change in the language arts program and then planned with them an in-service program on the writing process approach. She took the lead role in preparing readings and facilitating discussions, then she and her colleagues went to the district requesting and subsequently receiving funding for the program. During the course of the following year they met every other week and arranged to observe each other as they taught.

Upon successful completion of this course and the first year of teaching, participants in the program received a masters degree in elementary education.

Conclusion
The title for this article, "Learning to Teach, Teaching to Learn," suggests our hope for constructivist teacher education programs. Sara, writing in January during her clinical fellowship year, illustrated the sort of change we envision:

I've learned that there are two needs I must fulfill. There's the school's curriculum, and most importantly, there's each child's needs. I've concluded, more soundly, how much better time is spent teaching what the child needs when he/she needs it. Though at times I've felt pressured, even forced, to "teach" what I know is meaningless to a child, I've learned that this is not meaningful teaching, and it definitely does not result in meaningful learning.

Students learn to write by writing to fulfill their own needs and desires to communicate. They learn to read by reading interesting books and print. They learn about "neighborhoods and communities" by investigating their own neighborhoods and communities. This doesn't happen by reading all about them on social studies book pages or by being told; it happens through individual meaning making.

Just as young learners construct, so too, do teachers. Teacher education programs based on a constructivist view of learning need to do more than offer a constructivist perspective in a course or two. Teachers' beliefs need to be illuminated, discussed, and challenged. Prospective teachers need to confront traditional beliefs, study children's meaning making, and experiment collaboratively within a classroom context. Only through such extensive questioning, reflecting, and constructing will the constructivist paradigm shift in education ever take root in teacher preparation efforts.
Restructuring Cultural Foundations to Meet the Needs of a Homogeneous Region

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As a new professor fresh out of UCLA, I had plans to bring ideas from the rich diversity of Los Angeles into my multicultural education courses. I hoped to help provide an understanding of such sociological factors as differential power relations, ethnic revitalization, the marginalization of ethnic groups, and the poverty cycle, and to use the rapidly changing political and ethnic/racial strife as a common base for any discussions. As a philosopher of education, I intended to discuss what Ellsworth (1989) calls the “historical context and philosophical position” (p. 300), which I believe serves as the foundation for any discussion of multicultural diversity issues. In this foundational approach multicultural discussion and education focuses on the “voices” of different peoples so that “all voices and their differences become unified both in their efforts to identify and recall moments of human suffering and in their attempts to overcome conditions that perpetuate such suffering” (Giroux, 1988, p. 61).

My practical experience for this approach comes from teaching a Cultural Foundations of Education course at UCLA where multicultural education and discussions of diversity are expected and, indeed, are seen as part of the daily existence of future teachers. Thus with this teaching background and personal philosophy toward multicultural education, I began teaching multicultural education at Montana State University.

This paper describes the activities, content, and basic conceptions used in a multicultural education course designed for pre-service teachers in a homogeneous region. While I teach in Montana, the experiences I draw from and the problems I face are similar to homogeneous regions across the country. The paper discusses the needs specific to a homogeneous region, mainly the need to develop basic awareness and positive attitudes about diversity. I have provided personal examples of the necessary re-examination of my assumptions regarding multicultural education in my attempts to