A Longitudinal Study of the Development of Teachers' Pedagogical Conceptions: The Case of Ron

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Levin, B.B., & Ammon, P.R. (1996). A longitudinal study of the development of teachers' pedagogical conceptions: The case of Ron. *Teacher Education Quarterly, 23,* 1-21.

Article:

Several researchers have reported evidence that preservice teacher preparation "washes out" during the induction period (*e.g.*, Lortie, 1975; Ryan, 1990; Zeichner & Tabachnik, 1981) or can be "miseducative" (Feiman-Nemser & Buchmann, 1983). In fact, these ideas have become part of the lore of teacher education, even though very few studies of the development of teachers' thinking have followed teachers past the first one or two years of their induction into the field (see Nias, 1989, and Huberman, 1989, for exceptions). Kenneth Zeichner and Daniel P. Liston (1987) suggest several aspects of teacher education that impede the development of reflective teaching during the induction years. Among these are apprenticeship models of preservice teacher education, ideological eclecticism, and structural fragmentation.

In an earlier study, we (Levin & Ammon, 1992) sought to determine whether a similar washout effect would be observed among graduates of a preservice program that has multiple field experiences and is both structurally and ideological coherent. The Developmental Teacher Education (DTE) program at the University of California-Berkeley (UC-Berkeley) works to explicitly and systematically promote the development of constructivist thinking about pedagogy. Rather than a washout effect, our earlier study of graduates from the DTE program indicated that further development in constructivist thinking and teaching practices did occur during the initial years of teaching, in keeping with the program's proposed model of the development of pedagogical understanding in teachers (Ammon & Hutcheson, 1989; Ammon, Hutcheson & Black, 1985; Hutcheson & Ammon, 1986, 1987). In our 1992 research, we found that teachers can and do continue to develop their pedagogical thinking in the areas of behavior, development, learning, and teaching, at least through their third year of teaching. In fact, although their development was uneven across areas, there were no regressions, and we found that teachers' pedagogical understandings progressed from being quite global and undifferentiated when they had less experience toward more differentiation and then toward integration as they began to gain more experience.

Researchers associated with the DTE program at the University of California-Berkeley have proposed a model of the development of teacher's thinking in the pedagogical domain (Ammon & Hutcheson, 1989; Ammon *et al*, 1985; Hutcheson, & Ammon, 1986, 1987), which is based on data from journals and interviews of both preservice and inservice teachers enrolled in the DTE program. This model posits that more complex, multi-dimensional understandings of pedagogy evolve from simpler, uni-dimensional thinking in this domain in the kind of invariant sequence that suggests structural stages of development (Kohlberg & Armon, 1984). The model describes five qualitatively different levels of understanding of pedagogy in four areas: behavior, development, learning, and teaching. The model, which was supported by earlier studies (Ammon *et al*, 1985; Hutcheson & Ammon, 1986), serves as the theoretical basis for the present longitudinal study (see Appendix One for a brief overview of the model).

The DTE Program is a two-year, post-baccalaureate teacher preparation program that leads to an elementary teaching credential and a Master of Arts degree with an emphasis on child development. The DTE program advocates a deep understanding of how children learn and develop as a major component of the knowledge base

for teachers, especially from the perspective of Piaget's constructivist theory (Ammon, 1984; Black, 1989; Black & Ammon, 1992; Ammon & Levin, 1993). The emphasis in DTE is on helping prospective teachers coordinate an understanding of children's cognitive, moral, and social development with knowledge of subject matter and developmentally-appropriate instructional practices (Black & Ammon, 1992). With this background in understanding children, curriculum, and instruction, it was hypothesized that teachers can continue to develop their pedagogical thinking in each of these areas as they continue to teach and reflect on their teaching experiences. The question of how teachers' thinking about pedagogy develops over time is the main research question throughout this long-term study. We are interested in seeing what that development looks like, whether it continues, and how it occurs. The upper levels of the original model developed by Paul Ammon and Barbara P. Hutcheson in the 1980s were somewhat hypothetical early on, because data were available only from less experienced teachers. In this study we have been able to test, validate, and refine the model based on these data from more experienced teachers.

This study is the continuation of a longitudinal investigation of the development of teachers' thinking about behavior, development, learning, and teaching that began almost a decade ago. This paper reports the results of the fourth phase of this study of the pedagogical conceptions of four elementary grade teachers who were interviewed using the same set of questions at four points over an eight-year period: Time 1, at the beginning of their student teaching program; Time 2, when they graduated from their teacher preparation program two years later; Time 3, during their third year of full-time teaching; and most recently at Time 4, during their sixth year of fulltime teaching. Data are presented to help teacher educators better understand how novice teachers develop into expert teachers. Suggestions for ways to encourage continued development are also presented.

This paper presents interview data from Time 4 and a comparison of teachers' thinking at Time 3 and Time 4, which correspond to their third and sixth years of teaching. Qualitative analyses of teacher's thoughts and actions were undertaken, and case studies were written to describe each teacher. Six target questions were selected for additional analysis and a comparison of responses to these questions over the four interview times was undertaken. In this paper, we concentrate on one teacher, Ron, to show how his thinking changed and how it differs from the others in this study. In order to facilitate this discussion, we present our analysis of Ron's responses to selected target questions across the four interviews in the form of a case. We have chosen to highlight Ron's case in this paper because his thinking allows us to elaborate how Level 5 thinking is reflected in the classroom. Ron's case is especially interesting because his thinking has developed farther than the others and gives us insights into the thoughts and actions of a teacher who exemplifies an "integrated constructivist" perspective on teaching and learning.

Design and Analysis of this Study

Participants

The participants in this study graduated in 1987 as part of a cohort of teachers educated in the DTE program at UC-Berkeley. Two Caucasian males and two females, one Caucasian and one Chinese-American, were recruited for this longitudinal study on the recommendation of the DTE program director because they were representive of the range of students in their cohort.

Clinical Interviews

The same clinical interview (see Appendix Two), which was used with several cohorts of DTE students in developing the original model of pedagogical understanding, was used with the participants in this study when they began their student teaching program (Time 1), two years later at graduation (Time 2), during their third year of fulltime teaching (Time 3), and most recently during their sixth year of teaching (Time 4). Each participant in this study responded to the same set of question prompts during each interview. The purpose of the interview was to gain a clear understanding of teachers' pedagogical conceptions about behavior, development, learning, and teaching at the time of the interview. Each participant teacher also responded to individual follow-up probes initiated by the first author during the interviews for the purpose of gathering additional information about their thinking. Most interviews lasted about two hours and all were conducted at

the University. The focus of this paper is on the differences in the teachers' thinking from Time 3 to Time 4 as reflected in the clinical interviews.

The interview data for this study were analyzed according to the Ammon and Hutcheson model of teachers' thinking in the pedagogical domain (Ammon & Hutcheson, 1989), which is presented in a somewhat abbreviated form in Appendix One. In a still more abbreviated form, we have labeled Level 1 "naive empiricism" (Ammon & Levin, 1993). Teachers at this level think that learning comes from experience and that teaching is essentially showing and telling. We call Level 2 "everyday behaviorism" where learning comes from doing (*i.e.*, practicing) and teaching is essentially modeling and reinforcing. Level 3 is called "global constructivism." At Level 3 learning means exploring and teaching means providing hands-on experiences. Level 4 is labeled "differentiated constructivism." At this level teachers understand that learning occurs when children make sense of things and teaching means guiding children's thinking within specific domains of content. At Level 5, which we call "integrated constructivism," learning is problem solving and teaching is guiding thinking across domains.

Transcripts of the interviews were read by both authors and an overall, modal response level was determined that reflected a holistic score for the level of each participant with regard to their thinking in the areas of behavior, development, learning, and teaching. In some cases, scores of 3.5 or 4.5 indicate thinking that is in transition between levels but not quite consolidated at the higher level. For example, Ray's thinking about teaching and learning and Ron's understanding of development at Time 4 indicate some understanding of "integrated constructivism" but still contain elements of "differentiated constructivist" thinking. In other words, their thinking at the higher levels is not completely consolidated, which is consistent with the concepts of heterogeneity and asynchrony in models of development (Turiel & Davidson, 1986).

Classroom Observations

In addition, at Time 3 and Time 4 all participants were observed on two occasions by the first author while they taught mathematics and reading or language arts lessons. Hour-long lessons were scripted and these running records were analyzed with a classroom observation instrument, the Developmental Teacher Observation Instrument (Kroll & Black, 1993). This instrument was used to assess the extent to which each teacher's classroom activities reflected appropriate pedagogy from a developmental-constructivist viewpoint. Descriptions taken from Ron's observations are presented to provide examples of how what he thinks and talks about in the interviews are enacted in his classroom practices. From the perspective of qualitative data analysis, the classroom observations were used to triangulate the data from the clinical interviews (Miles & Huberman, 1984; Stake, 1995)

Results and Discussion

Appendix Three shows that the level of pedagogical understanding of all four teachers in this study continued to develop from Time 3 to Time 4. The only exceptions are Sally's thinking about the area of development, which remained static, and Ron's level of thinking about behavior and teaching, which was already at Level 5 at Time 3 and remained at that level, although in a more consolidated form. It is also noteworthy that there were no regressions between any of the interviews.

Appendix Three also indicates that Ron began with a higher level of pedagogical understanding than the other teachers in this study. This may be due to his prior teaching experiences in preschool and special education before entering the pre-service teacher education program, or perhaps to some other predisposition toward constructivist thinking. Nevertheless, the thinking of Ron and the other teachers in this study about behavior, development, teaching, and learning continued to develop with more experience in the classroom, rather than wash out or regress.

Despite changes in the teaching situations of three of the four teachers in this study between Time 3 and Time 4, the thinking of each of these teachers continued to progress: Julie was not teaching during the sixth year of this study, having taken a year off to edit mathematics curriculum for a textbook company; Ray changed from

teaching third grade in a public school to teaching Kindergarten in a private school; and Sally had a new baby and was j ob-sharing and teaching half-days in first grade at Time 4, whereas at Time 3 she taught second grade fulltime. Ron's teaching situation at Time 4 was the same as Time 3 in that he was still teaching fifth grade in an ethnically-mixed, low income school.

Ron's Case

In contrast to the other teachers in this study we find Ron in the same classroom after six years, still teaching fifth grade, and loving it. He says at the beginning of the Time 4 interview:

I really love teaching them United States History. I like the cultural aspects that brings up. I like the way it integrates. I love the literature of fifth grade. I like their emerging ability to think.

Even though Ron's thinking began at a higher level than other teachers in this study, his understandings about behavior, development, learning, and teaching continued to develop at least through his sixth year of fulltime teaching. As can be seen from the examples presented below, Ron developed a more consolidated understanding of pedagogy and his teaching practices showed continued integration of his thoughts with his actions from Time 3 to Time 4. Furthermore, the classroom observation portion of this study indicated that Ron planned curriculum and executed his teaching ideas in a manner consistent with his espoused ideas in the interview data.

On a personal level, what changed most in Ron's life since the Time 3 interview was the birth of a second daughter and the need to balance responsibilities and finances at home while his wife, also a teacher, stayed home with the new baby. On a professional level, the biggest change at school was adjusting to a year-round schedule. Ron does not like the year-round concept because he feels that he and the students are "really rolling" when it is time to take a break. He says each new cycle means taking time to get the students adjusted again, so its like starting school four times a year instead of just once. The other significant event in Ron's professional life revolved around a contract dispute between the teacher's union and the district administration, in which Ron took an active role. In spite of these changes in Ron's personal life and some turmoil in his professional life, there is clear evidence in Ron's responses to the interview questions and from observing his classroom practices that he has continued to grow and develop with regard to his pedagogical reasoning.

Ron's Thinking about Behavior

With respect to the area of behavior, Ron's thinking, as expressed in the interview, was at Level 5 at Time 3 and remained a solid Level 5 at Time 4. Teachers whose thinking is at Level 3, for example, see children's developmental stages as the major determining (and limiting) factors of their behavior while teachers with Level 4 reasoning expect behaviors to depend on children's abilities to understand a particular situation. At Level 5, Ron isn't at all constrained by his students' current capacity to reason about either their schoolwork, their own behavior, or their motivation. He proactively sets up his classroom, designs curriculum, and conducts his teaching to help his students develop their capacities to reason, to think, and to solve problems in both cognitive and affective situations. These are hallmarks of Level 5 thinking. For example, Ron continues to organize his classroom management system to correspond with social studies concepts about the structure and function of the state and federal government that he wants to teach and which are a part of his fifth-grade curriculum (Levin & Ammon, 1992). That is, each group of four-to-five students organizes itself into a state government and elects a governor, secretary of the treasury, secretary of technology, supply clerk, and sanitation engineer. Each student has a role in the group and a job to do. Ron encourages each group to self-monitor and to solve minor problems that come up in the group. When Ron needs order or quiet he tells the governors to do their jobs. When he wants to collect lunch money or process book orders, he asks the treasurers to do their jobs and report to him. In turn, the secretaries of technology, supply clerks, and sanitation engineers take care of the classroom computers, pass out and collect materials, and oversee clean-up in the classroom.

In practice, Ron structures his classroom, his management, and his curriculum to provide opportunities for students to make choices, and he fosters accountability by holding students responsible for these choices, their

thinking, their learning, and their actions. For example, Ron takes his students camping to a special camp that focuses on teaching self-reliance, group problem-solving, risk-taking, and responsibility. Throughout the year, Ron prepares his students to get the most from this unique camping experience by encouraging them to stretch mentally, physically, and emotionally. Ron's goal is to learn to use the camp techniques in class well enough himself so that he won't have to rely on an outside expert (Dave) to provide his students with these kinds of experiences:

I made a decision at the beginning of the year, or toward in the middle of last year, that I was going to try to teach more in terms of this idea, this trust or this cooperation kind of thing that I learned from Dave. And he uses it in terms of physical and emotional risk taking, and problem solving and things like that. And I wanted to incorporate it into everything. I want it to be in every subject area. I thought that it could be done that way. I really wanted to try to integrate it.... So I sort of made a commitment to myself that I was going to try, which required me to completely reorganize everything that I thought.... I'm trying to make every day that camping trip.

Ron's understanding of the value of integrating things such as trust, cooperation, risk-taking, critical thinking, and problem solving across all areas of the curriculum is characteristic of Level 5 thinking. Furthermore, Ron not only understands these principles intellectually but actually operationalizes them in his classroom through his curriculum choices, his teaching practices, and individually with his students.

However, Ron also understands that cultural, linguistic, developmental, and motivational characteristics all interact to affect children's behavior in different situations. He is very cognizant of the different family values his students bring to school and of how his own values may not always coincide with parental expectations. However, parental involvement is encouraged and valued in Ron's class, and differences in family and cultural values are openly discussed:

...because of cultural differences, I think it's smug to assume the responsibility of teaching responsibility and certain kinds of values... certain cultures raise their children different. And even linguistically, certain kinds of commands or requests are viewed completely different depending on the culture.... And I think it's dangerous for me to go in there with my cultural style. It's not that I don't teach values, of course I do, and I try to teach them in a variety of ways. I try to encompass as many kinds of realms as possible. I don't think it should be done independently of the parents. They have to be a part of that.

Ron's Thinking about Development

With regard to the area of development, Ron was at Level 4 at Time 3, but is now at Level 4.5 at Time 4 because he sees development as connecting life experiences both inside and outside of the classroom. At Time 3 Ron was not as cognizant of the interaction between a child's life at home and at school, but at Time 4 he is quite aware of how all these influences come together. Furthermore, he understands and appreciates the limitations of the particular age and developmental level of fifth graders, but he is not constrained by them. This is different from Level 3 thinking where development is seen as achieving certain stages of maturation that children draw upon as they interact with their environment. Level 4 thinking sees development as a consolidation of one's structural developmental capacity through such interactions, but Level 5 thinking focuses on transforming and constructing the capacity to think at higher levels by exercising one's current structures in relation to particular internal and external conditions. Classroom observations of Ron's teaching show that he actively promotes this kind of thinking in his lessons by making connections across different curriculum areas and to his students' social and emotional lives as well.

For Ron, this more advanced way of thinking about children's development is indicated by the fact that he consciously structures his curriculum to provide guided experiences to help students understand the symbolic and emotional significance of projects in science, characters in a book, events in history, and even their conflicts on the playground. He does this by giving his students specific experiences, continually asking them questions,

probing their thinking, charting data, relating known information and prior experiences, encouraging students to make comparisons, and to get beyond themselves to see other perspectives.

It also happens because we do a lot of that, give them a lot of experience at continually asking them kinds of questions about, charting those kinds of things, you know, tell me about this character at the beginning of the story. How does it evolve throughout the story? What was the changing factor? What was it that changed, that made this character different? How are they different now emotionally? How are they different physically? How are they different in terms of their relationships with all the other characters in the book? Why did the author do this? Given all the choices the author had to make about this character, why did the author have this character changing in this way? Why was it important to this story? There's just a barrage of those kinds of questions continually throughout the year.

It's all the same thing, it's that ability to think critically. And math's the same way. You know, if they can take a group of different kinds of games or of lessons or something and make a connection, "oh this, this game, the, the strategies that I'm using to solve this problem are very much like the strategy I used there." And even more than that, say, "the way I went about solving this problem is the same way that I went about um, you know, getting along with my friend out on the playground," which is what I'm after more than just within a subject area. I would really like all those kinds of things to be related to something even, you know, further away from math or reading, so that all the subject areas end up relating to each other.

Ron's Thinking about Learning

Ron's thinking about learning has advanced from Level 4 at Time 3 toward Level 5 at Time 4 as can be seen in the quotes from his interviews as well as from classroom observations. At Time 4 Ron understands that learning is interconnected with everything and across everything in his students' academic and social life, as well as with their development. However, he does not yet express an understanding of the difference between promoting vertical and horizontal development in learners. The cycle of "learning promoting development" and "development promoting learning" is not yet completely consolidated or explicit in Ron's thinking. Learning to think and reason about one's own thinking is important to Ron (both for himself and for his students), although he doesn't consistently use the term metacognition in the interview to label this understanding. However, Ron does talk explicitly about the importance of disequilibrium and discrepant events in learning, the value of a multitude of experiences, and of relating and connecting these. In contrast, Level 3 thinking about learning is limited to thinking that there is **a** correct understanding of the content to be learned, and Level 4 thinkers understand that there will be **some** understanding on the part of the learner, although maybe not the same understanding the teacher has in mind. Level 5 thinking about learning integrates an understanding that both internal factors, such as learning styles and developmental structures, and external factors, such as a safe, trusting environment, all interact in the learning process.

A comparison of Ron's responses to some selected questions at Time 3 and Time 4 is useful here to illustrate changes in Ron's thinking about learning. When asked what kinds of experiences most bring about learning, Ron responded this way at Time 3:

The ones that make them uncomfortable. The ones that they aren't sure of. The kinds of literature discussions where they are sure one answer is correct and somebody else says "Yeah, but what about this?" and then they're completely lost and they're not sure. They have this deeply held conviction, suddenly somebody tells them some evidence that completely refutes everything they thought and they're left in limbo with no idea of what's right, and that's the perfect place.... I really believe in the Piagetian idea of disequilibrium and that's the most wonderful place to get a kid. If you can really get a kid in that point where they are just not sure where to be next, that's like the right ground for planting.

However, at Time 4 Ron puts it this way:

Experiences that cause disequilibrium. Any kind of discrepant event that creates— it has to be a genuine discrepant event that causes true curiosity.

Although there are similarities at Times 3 and 4 in Ron's responses to this question, he expresses his ideas much more succinctly at Time 4 without the need to elaborate, as if they are logical necessities in his thinking. From a developmental perspective, this is evidence of consolidation of his thinking at the next level. Furthermore, we note that the resolution of disequilibrium caused by discrepant events comes from the learner and not from the teacher, which is further evidence that Ron's thinking about learning at Time 4 is at Level 5.

Ron's Thinking about Teaching

Evidence indicating that Ron's thinking about teaching is solidly at Level 5 at Time 4 can also be seen by comparing his responses to the following question at Time 3 and Time 4. In response to the question of what the teacher's role is in the learning process, Ron said:

Time 3: Facilitator. The teacher's role to me is very clear: to provide curriculum that is extremely flexible, that can be attacked at a low level or a high level equally successfully, at a level of success that is comfortable for the learner, and then to be the person that's there to ask the right question at the right time; and to create an environment that is supportive of risk-taking so that can work. None of that works unless the kids feel that they can do it and not get an F if they get it wrong.... The kinds of questions that I'm thinking of are the kind that promote disequilibrium, those kinds of questions that challenge their thinking.

Time 4: That'd be the questioner. Um, encouraging the independence, that meta-cognition, the risk taking. It's all risk taking, I guess. Learning is, taking a risk, I think. It's just so much easier to know what you know. Every time you learn something new it makes you reorganize everything, you know, to fit it all in. I would love that, that a combination of, that Piaget stuff is just, like right up my alley.

Although the distinction is subtle, at Level 4 teaching is helping students attain some level of understanding of the curriculum content rather than a particular "correct" understanding, which is a Level 3 conception. At Level 5 the teacher's role is to provide a structured learning environment, to facilitate, and to question, as Ron says, but it is also to allow the learner to become independent and autonomous. Promoting metacognitve thinking in students by providing opportunities for them to think about their own thinking and their own learning takes precedence over the teacher having to be there to ask the right question at the right time. Instead, as Ron indicates in the interview at Time 4, and clearly displays in his teaching at Time 4, the teacher's role in the learning process is to structure the curriculum and create a classroom environment that is conducive to promoting cognitive, social, and emotional growth in children through their own actions and interactions. Ron's curriculum clearly does this, and it is not by accident. He proactively engages in facilitating learning by constantly questioning and by providing opportunities for metacognitive thinking, independence, choice, and risk taking. For example, in math Ron requires his students to write in their math journals about how they solved a particular problem and why they chose that method, while in reading he helps students to think about the characters in a novel by having them compare and contrast their relationships by completing a chart with several questions to consider about each character.

For Ron what is taught includes academics such as social studies, literature, process writing, math, and science as well as affective and social goals including responsibility, respect for others and for oneself, and ways to talk through and settle differences without the teacher having to mediate. Ron also strives to teach students to be flexible problem-solvers in both cognitive and social situations, which fit his goals of teaching students how to think critically, to relate things, to make comparisons, and to be willing to tackle and keep working on any kind of problem. It is also important to Ron to teach students to "metacognate," as he calls it, that is to ask themselves the same kinds of challenging questions that he asks and to begin to think about their own thinking and learning process. He does this by giving them lots of choices and creating many experiences before suggesting conventional rules and structures or algorithms, and by helping students to pick things apart and

relate them to other things. He also asks lots of questions, and provides opportunities for students to write about their thinking in journals, both before and after an experience or a discussion.

Summary

In summary, Ron's teaching at Time 4 leaves nothing to chance. His goal is to build a classroom community where students will feel safe and have enough trust that they can take a risk, make a mistake, and learn from disequilibrating experiences. As the teacher, Ron wants to be a questioner and encourage independence, responsibility, metacognition, and risk taking. He works to provide a curriculum that is interesting to his students, challenging, full of choice, and comprised of opportunities for discrepant events that encourage disequilibrium.

This analysis of the Time 4 interview with Ron and of the classroom observations of Ron's teaching shows that his pedagogical understandings have advanced and that he has both elaborated and consolidated his thinking since Time 3. Furthermore, his thoughts and actions are very consistent at Time 4, both in the interview and in his teaching practices, which were observed shortly after the interview. Ron's ideas are very clearly articulated in the interview and are backed up with details and examples. He also shows throughout the interview that he is thoughtful about his teaching, that he has specific goals in mind each year, that is he is still very passionate about what he does, and that he works conscientiously to keep improving his teaching. For example, Ron believes that his students should learn to be responsible and accountable for their behavior, should learn to take risks, choose wisely, resolve conflicts, ask good questions, and try different strategies. However, Ron also believes in providing a safe environment where it is okay to take a risk and fail, to see mistakes as valuable learning experiences, and to ask questions that might require looking beyond preconceived ideas. These are all examples of Level 5 thinking, an "integrated constructivist" understanding about pedagogy.

Implications for Teacher Education

How and why Ron continues to develop and integrate his thinking at Time 4 are questions that speak to the relevance of this study for teacher education. Some possible reasons for Ron's continued development can be found in this excerpt from the Time 4 interview in which he discusses two influences on his thinking: (1) books he reads and (2) his interactions with a student teacher from the DTE program, Janet, with whom he worked the previous semester:

I also read this book, *The Quality School*. Um, I can't remember the guy's name [sic Glasser].... He's got those five basic needs that people, all people have constantly, whatever they do, their behavior's done to meet those needs. And that made me kind of rethink the psychology of how to deal with kids, and I sort of thought about that. And then the other thing that happened last year was having Janet, who was much more advanced than any other student teacher I ever had. And she really forced me to explain better. The usual explanations weren't good enough, so that made me really rethink. And in finding where she was and pushing her past where she was, I had to be a lot more organized and really had to think through more meticulously how I would teach her to teach better, which made me think about how I needed to teach better.

In considering how to support teacher development in the pedagogical domain, Ron's case suggests that having student teachers to work with can be helpful in promoting better understandings on the part of the cooperating teachers. This special mentoring relationship often requires the more experienced teacher to have to think, rethink, and articulate how and why they teach as they do. Although working with student teachers may not always be a catalyst for the development of a more experienced teachers' thinking, it does offer that possibility (Sprinthall & Thies-Sprinthall, 1980). In fact, the DTE program at UC-Berkeley purposely assigns student teachers to work with graduates of the program, including very recent graduates with only a few years of experience. For example, Ron, and the other teachers in this longitudinal study, served as cooperating teachers on a regular basis as early as their second year teaching, and both pre service student teachers and novice inservice teachers report that this experience is quite valuable for them for all the reasons Ron expressed above. While they are still working out many of their ideas about teaching and learning, these less experienced teachers have much to offer and much to gain by serving as mentors to student teachers. Perhaps their thoughts and

actions are not so automatic, as is the case with expert teachers, that they are better able to communicate the thinking and problem solving process behind their decisions about curriculum, students, and teaching.

Teachers who read and reflect on ideas in books also have opportunities to reconsider their own thinking and compare their ideas with those of the author. They might even apply new ideas gleaned from a book to their teaching and become "thoughtful and alert students of education" as Dewey suggested (as cited in LaBoskey, 1994). Ron reflects on ideas from both education-related books and fiction and continually relates what he reads to his profession. Perhaps the DTE program had a part in setting the stage for its graduates to consider themselves lifelong learners and critical reflectors of themselves as teachers, their curriculum and teaching choices, and understanding their students' development. Perhaps the experience of self-analysis of one's teaching in required weekly dialogue journals during two years in the DTE program provided a foundation for teachers educated at UC-Berkeley to consider reflection a critical factor in learning to teach. Providing opportunities for communities of teachers to discuss a variety of literature might also be a valuable aid to promoting development in experienced teachers, although this is an untested idea with a lot of assumptions. Certainly this occurs when inservice teachers take additional coursework in their districts or at colleges and universities for renewal credit, but perhaps reading and discussion groups should be encouraged at the building level as well.

Another catalyst for development of experienced teachers' thinking in the pedagogical domain might also come from opportunities to share their knowledge and ideas with other teachers (and perhaps in Ron's case with his wife, who is also a teacher). This can be done formally or informally through study groups or discussion groups (Moir & Stubbe, 1995; Veenman, 1984), perhaps focused on writing or discussing cases about teaching and learning (LaBoskey, 1994; Levin, 1994), support groups for new teachers (Hollingsworth, 1994; Bartell, 1995) or by conducting action research (Oja, 1990/1991; Levine, 1992). Although Ron explains in the following statement that he doesn't like sharing ideas, he does do this, encouraged by a very supportive principal who he sees as one of his greatest resources in his own development as a teacher:

I have probably the greatest principal in the world to work for. And if that wasn't true, half of what I do would be useless. She creates an environment at this school where, where we feel like we can take risks with our teaching. She creates an environment where kids feel safe, by and large. She creates an environment where teachers are listened to, where ideas are valued. She creates situations where we share with each other what we're doing, even though I can't stand that. But it's good for me. It's like taking my medicine, I know that. And she refuses to let this school sit on it's laurels. It's a good school, but it's not good enough.

Interestingly, Ron's principal appears to create for her staff the same kind of environment that Ron feels is important for his students: a safe environment where people are listened to, encouraged to take risks, and where people share. If all teacher education programs provided these same elements of caring and sharing, we would perhaps provide the kind of thoughtful, reflective environment for educating beginning teachers that Ron and the other teachers in this longitudinal study experienced.

Conclusions

It is not often that we are able to follow the development of teachers' thoughts and actions over a long period of time and have in-depth analyses of their pedagogical understandings. Several researchers have focused on preservice teachers, or followed beginning teachers into the field for one or two years (for example, Bullough, 1989; Kane, 1991; Levine, 1992; Ryan, 1990). This study goes beyond those works and follows four teachers much further into their careers. Although this paper describes only one case in depth, Ron's thoughts and actions give us insight into how teachers who are educated in a teacher education program with a strong emphasis on constructivist theory can think and act as they become more experienced, how their thoughts and actions can develop, and how other factors may interact to influence their thinking and their development.

Perhaps teacher educators reading this article should consider examining their own practices and programs for evidence of ideological eclecticism and structural fragmentation (Zeichner & Liston, 1987), and consider ways

to help preservice and inservice teachers continue to develop their pedagogical understandings after graduation. Opportunities for on-going reflection on one's practice and theoretical or philosophical understanding and interaction with other professionals in both collegial and mentoring roles, for example, seem to be factors from our experience that help teachers continue to develop well after their initial teacher education experiences. Furthermore, descriptions of the development of teachers' pedagogical understandings about teaching, learning, behavior, and devlopment, as posited by the Ammon and Hutcheson model (Ammon & Hutcheson, 1989; Ammon, Hutcheson & Black, 1985; Ammon & Levin, 1993; Hutcheson & Ammon, 1986, 1987; Levin & Ammon, 1992), seem valid ones to use for direction in this endeavor.

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Appendix One

Levels of Teachers' Pedagogical Conceptions

Appendix Two

Standard Questions for the Clinical Interview with Teachers

I. A. If you had complete freedom to work as a teacher with any age group, which would it be?
B. Why would it be that age group?
C. Are there particular things you like about kids that age? Examples.
D. Are kids this age different from kids who are a couple of years older or younger? Explain.
E. Are there any special problems or challenges that come up with teaching the kinds of things you most want to teach? Why?/Why not?

II. A. As you start out the year with a new class, would there be any information you would want about your students? Why?/Why not? What kinds?
B. From a teacher's point of view, what are some good ways to find out what sort of individual one is working with? (Specifics)
C. How will you know what to expect of students, what they are capable of learning?

III. A. 1. Now we'll talk about some specific classroom activities. An activity commonly found in the elementary school classrooms is "sharing" time, when individual children are given the opportunities to share experiences, objects, etc., with their classmates. Many teachers believe sharing is an important learning activity. Exactly what kinds of things might be learned from sharing in a second grade classroom?

2. Why would you expect those outcomes in particular?

3. How about for sixth graders?

4. Why are there (no) particular differences between sixth and second graders with respect to the kinds of learning you'd expect to result from sharing?

5. Are there particular ways in which a teacher can handle sharing time so as to enhance the learning outcomes identified? Why might these details make a difference?

6. Do you think that particular kinds of experiences are most likely to bring about learning? What kinds of experiences?

7. In general, how would you describe the teacher's role in the learning process?

B. 1. In teaching history, some teachers make use of "timelines" in their efforts to help children understand when various events occurred in relation to each other. Every inch on the timeline might correspond, say, to a certain number of years, and events are placed along the line according to their dates. At what ages do you think such time lines would be especially useful?

2. Do you think that timeline would be less useful before and after the grade level(s) you suggested? Why?

3. Aside from grade level, are there other learning characteristics that might affect the usefulness of the timeline as a teaching tool?

C. 1. How would you go about teaching children the concept of a sentence, so that they would be able, for example to use periods and capital letters correctly when writing? Suppose the children in the class you were working with were third graders. What would you do and why would you do that?

2. Would you do things differently if you were working with sixth graders? Why or why not?

3. In general, do you think that it is important that a certain sequence or order of experiences be followed?

4. How important is sheer repetition in school learning...practice, memorization?

5. Do you think that the same thing can be learned in different ways? Explain.

6. Why do you think that some things take a long time to learn, while other things can be learned quickly? (i.e., what makes something either hard or easy to learn?)

7. (Have you ever considered) grouping students within a class on the basis of their ability?

8. Do you see such groups as pretty much fixed or changing?

IV. A. What goals do you have as a teacher? What do you most want to accomplish?

B. Do you see the students as being any different after being with you? How?

C. How are these things learned or how do people become that way?

D. What kinds of feedback do you look for? How do you get it? Why choose these ways (or this way)?

V. A. Some people believe that part of the school's role is to train kids to be responsible, self-disciplined, and/or respectful of authority. Do you see any or all of these as part of the school's role? Explain.

B. How are these things learned, or how do people become this way?

VI. Do you foresee any obstacles to accomplishing what you want to as a teacher? Explain—specify relationship to teaching.

VII. A. We have talked a lot about teaching, learning, students, etc. What do you see as your greatest resources or sources of information in your own development as a teacher?

B. What did you find yourself drawing upon as you thought about and answered these questions?

Appendix Three

Julie's Pedagogical Profile

Sally's Pedagogical Profile

Ron's Pedagogical Profile

Ray's Pedagogical Profile