

PROSPECTIVE TEACHERS' BELIEFS AND TEACHER EDUCATION PEDAGOGY: RESEARCH BASED ON A TEACHER EDUCATOR'S PRACTICAL THEORY

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It is certainly not news that prospective teachers bring with them to teacher education many beliefs about the nature of teaching and learning and that these beliefs interact with the content and pedagogy of their teacher education courses to influence what and how they learn (Anderson and Bird, 1995; Borko, Eisenhart, Brown, Underhill, Jones, and Agard, 1992; Calderhead, 1991; Calderhead and Robson, 1991; Kagan, 1992; Pajares, 1993; Richardson, in press; Wubbels, 1992).

Most explanations of the influence of prospective teachers' beliefs highlight the role of the twelve-year "apprenticeship of observation" (Lortie, 1975). Long-term experiences with conventional patterns of schooling yield beliefs that most pupils will be like the prospective teacher (i.e., able to succeed with effort), that good teaching involves a large amount of direct transmission by an enthusiastic teacher, and that learning is largely a function of motivation and perhaps native ability. Such beliefs appear contrary to many ideas encountered in teacher education (for example, that not all learners are prepared to learn easily from conventional textbooks or that teaching well involves much indirect guidance of students' thinking, not just transmission).

In this paper, we consider how teacher educators might respond to prospective teachers' beliefs in light of the particular goals of a particular course or teacher education experience. We begin by assuming that a belief has no inherent character or value out of context. Only as we look at the relationship between a particular belief and a specified action or goal can we presume to attach value to that belief and decide whether we want to foster, inform, redirect, elaborate, or alter it within a teacher education program.

An implication of our position is that teacher educators---both individually as course or field instructors and collectively as colleagues in a program---must decide how to think about and respond to prospective teachers' beliefs in particular situations. They must move beyond generalizations that beliefs will interact or interfere with what they

want to teach and, instead, focus on which beliefs will matter most and in what ways given the particular goals of a course or program. Making this move requires that teacher educators become astute observers of their students' responses and skillful elicitors of whatever underlying beliefs matter for a particular course or program goal.

How do teacher educators decide which beliefs matter most and then learn how to conduct teacher education in a manner that takes account of those beliefs while also teaching the content of teacher education? We think that one way to accomplish these goals is for teacher educators to inquire into their own practices, study their students in the particular situations in which they teach them, and develop practical theories about how prospective teachers' beliefs are likely to enter into that situation to affect what and how prospective teachers learn. In this paper, we offer a case of a teacher educator who did just that. The teacher educator (Diane Holt-Reynolds) had developed over time a practical theory about teaching about content area literacy to prospective secondary teachers, although it was not until this research study that she had the opportunity and support to articulate that practical theory (Holt-Reynolds, 1994). The content of her course was the pedagogy of helping secondary students learn from text in content area courses. Holt-Reynolds' theory about how to teach this course consisted of two components: (1) her assumptions about the beliefs her students brought to the course and how, if left intact, those beliefs might lead her students to reject the rationales underlying the pedagogical strategies she wanted to teach; and (2) what pedagogical moves were most likely to engage her students in surfacing and reframing their beliefs so that they would find the content of the course reasonable and worth learning.

Holt-Reynolds' practical theory was the basis of a study of her students' responses to her course. Through the study, she was able not only to confirm key aspects of her theory but also to generate hypotheses about student beliefs and student responses she had not earlier considered. Our intention is not to offer her story as an exemplary model of practice but rather to illustrate the power that teacher educators might find in the explication, examination, and revision of their own practical theories through research on their practice, especially when that research helps them learn more about how their students' beliefs mediate what is learned.

CONTEXT OF CASE STUDY: THE CONTENT AREA LITERACY COURSE

Content Area Literacy, as taught by Holt-Reynolds, was a "methods" course in that it emphasized teaching strategies and the rationales underlying them. In particular, she hoped that prospective secondary teachers in her course would begin to develop a usable set of strategies for helping their future students access information and ideas presented through oral and written text so that they could become more independent learners. These teaching skills included textbook analysis, design of activities in which students could transform subject-matter content in order to make personal meaning, and several specific mediational strategies such as text structural guides and reciprocal teaching (Holt-Reynolds, 1994).

Holt-Reynolds had taught content area literacy several times and had solid justifications for the specific literacy-related content she emphasized. However, in this paper, we do not emphasize her theories about content so much as her theories about pedagogy --- about *how* to teach that content to prospective teachers in light of their entering beliefs about learning and teaching that could affect their learning from the course.

Theories About Prospective Teachers' Entering Beliefs About Learning and Teaching

Holt-Reynolds did not want to teach instructional strategies as if they were techniques to be acquired out of context. She recognized that any teaching method is evaluated by teachers according to their underlying beliefs about learning and how teachers help students learn. She expected that her students would evaluate the content of her course in light of those beliefs, and over time, she had learned how certain beliefs interfered with students' willingness to learn some instructional strategies.

For example, when preservice teachers believe that teaching well primarily depends on making school work interesting, they reject as irrelevant parts of the course that focus on teaching students to use metacognitive strategies for reading to learn. When they believe that student effort is the salient factor contributing to success as a learner, they reject as irrelevant learning how to foster comprehension skills or how to help students develop study techniques specific to the subject matter they teach. When they

believe all students will be like themselves---able learners a bit bored by school---they find little reason to learn how to analyze the demands inherent to subject-matter texts or how to mediate those demands with inexperienced and unskilled readers. When they believe that teacher-telling---lecturing---is a primary vehicle for communicating a teacher's enthusiasm for subject matter, they react negatively to ideas for cooperative learning. When they see teachers as the primary resource for students' learning, they reject instructional formats that foster students as independent investigators.

Thus, Holt-Reynolds concluded that prospective teachers' beliefs would interact with her course ideas and, if left intact and unexamined, would lead preservice teachers to dismiss as irrelevant large chunks of the course or to learn certain techniques at a superficial level without understanding the underlying instructional rationales that would guide their use. (For example, prospective teachers decide that they will use small group methods but as a means of building interest in the material rather than a means of helping students construct their own understanding of the content. The different rationales lead to very different ways of using small groups and different results for students' learning.)

In order to help them understand why and when to use the methods she taught about (e.g., metacognitive strategies instruction, cooperative learning, reading, and study guides), Holt-Reynolds realized that she must address underlying beliefs about learning and teaching as part of content area literacy. As a first step, Holt Reynolds predicted which entering beliefs were most likely to affect students' learning in her course:

1. *Beliefs About Learning and Learners.* From past experience with this course, Holt-Reynolds predicted that many students would enter with beliefs that secondary students' learning was primarily a function of their motivation or interest. While teachers could be more or less interesting, motivation was largely a function of the student's willingness to try and cooperate.

In contrast, Holt-Reynolds wanted her students to shift to an explanation for learning that focused on students' construction of the meaning¹: learning occurs

¹ Holt-Reynolds' students had taken courses in educational psychology and had been introduced to constructivist views of learning. However, she had learned through experience that such prerequisite courses, even when completed successfully, did not necessarily lead prospective teachers to reconsider their fundamental assumptions about how learning occurs in classrooms. For the most part, her students did not come to her class with views of learning that reflected the content of their past courses in educational psychology.

inside students' heads as a result of their active efforts to "make meaning" (rather than "getting meaning" through direct transmission). She wanted the prospective teachers to consider that students' failure to participate and learn in a secondary classroom is often due to instructional problems (especially lack of skills to learn from text) rather than personality or motivational problems, therefore calling for instructional moves by teachers rather than judgments about students' willingness to cooperate.

2. Beliefs About Teachers' Instructional Roles. Holt-Reynolds predicted that many prospective teachers would believe that if teachers are enthusiastic about subject matter and showed students that they cared, then students would be more interested and work harder and therefore learn more. Therefore, teachers' personal characteristics are more important than their instructional moves.

In contrast, Holt-Reynolds wanted prospective teachers to reframe their beliefs about teachers' roles to include purposeful, principled decisions about what students should learn and how the learning should be arranged. In particular, she wanted them to develop a mediational frame for teaching: Teachers have responsibility for assessing text demands and student abilities and then mediating the differences. Mediation involves helping students bridge gaps in their skills for understanding to help them do the thinking required to learn from a text or experience. Mediation stands in contrast to a teacher extracting the meaning from a text or experience and presenting it to the students via lecture or prepared notes as content to be assimilated. Finally, she hoped that prospective teachers in her class would realize that the instructional choices a teacher makes have a greater influence on students' learning than do teachers' personalities or the "interestingness" of teachers' presentations.

3. Beliefs About Student Activities. Holt-Reynolds predicted that many prospective teachers would consider academic tasks and activities as less critical for learning than the oral or written text that presented the content to be learned. Activities other than listening to lectures or reading might be seen as "frills," nice things to do if there is time but not critical for learning.

In contrast, Holt-Reynolds wanted her students to recognize that activities and academic tasks teach because they engender the mental activity that creates learning. Therefore, an important responsibility of teachers is the selection or design of activities that allow students to construct meaning for themselves. In keeping with the content area literacy course themes, Holt-Reynolds wanted her students to understand how literate activities --- reading, writing, talking, and listening --- support learning about subject-matter content.

Theories About Teacher Education Pedagogy: Eliciting and Engaging Beliefs in Order to learn New Teaching Methods

The second component of Holt-Reynolds' practical theories was pedagogy: how to teach to confront and transform beliefs about learning and teaching while also teaching about instructional methods that supported secondary students' learning from text. Her pedagogical rationale, described more fully in "learning Teaching, Teaching Teachers" (Holt-Reynolds, 1994), was based on premises that prospective teachers' beliefs must be elicited and engaged actively, and that the only way to accomplish this in a university-based course is through the use of in-class experiences that produce "data" for the students about their own learning and how teaching affected it.

Holt-Reynolds' earlier research (1992) had helped her to think about two voices of prospective teachers: self-as-student and emerging self-as-teacher. Describing this earlier work, she said:

...I was faced with amazingly similar responses when I asked, "When you listen to your teacher education professor describing something you should try as a teacher, how do you decide whether he/she is making a good suggestion?" Every preservice teacher I interviewed at that time and everyone I've spoken with since shares with me the same process. All say that they imagine themselves as teachers directing students in the activities the professor has suggested. Then, they imagine that their reaction would include some element that, as a teacher, they anticipate valuing, then they judge that the idea is a good one. For example, if they imagine that self-as-a-high-school-student would react to writing dialogue journals by feeling cared about by the teacher, preservice teachers report that they then ask themselves whether, as a teacher, they want students to feel cared about. If the answer is, "Yes," then dialogue journals are judged to be a good teaching strategy. If, however, they imagine that as a student they would feel pressured or that the journal would feel like busy work, then the journal would be "bad." Self-as-teacher does not want students to feel pressured or that they've been assigned busy work (Holt-Reynolds 1994, 6-7).

The emerging self-as-teacher voice listens most closely to the self-as-student voice, Holt-Reynolds reasoned, and she could not change that. Therefore, she evolved a

two-part pattern for activities in each conceptual section of the course. One set of activities elicited and engaged the beliefs of self-as-student. These placed self-as-student into teaching/learning contexts where he/she could experience first hand the strategies that Holt-Reynolds hoped that the emerging self-as-teacher would value. During those episodes, Holt-Reynolds consciously attempted to "sell" strategies to self-as-student. Each conceptual section of the course also included a written opportunity for self-as-teacher to practice articulating the rationales that support the strategies connected to that section.

In the course of the research study, Holt-Reynolds categorized the pedagogical moves she made to help students move from the self-as-student perspective toward the self-as-teacher perspective in each component of the course and to make this move in such a way that self-as-teacher adopted a new frame for viewing classroom situations. She drew on arguments of Schön (1983) that professional action depends on how professionals frame ambiguous dilemmas before them. Frames allow professionals access to particular portions of the professional knowledge base that each has built. So, for example, a prospective teacher may have learned a variety of methods for thinking about how to help high school students read text, but if they haven't also learned to frame classroom dilemmas (e.g., a kid who does not seem to be trying to do the work assigned) in such a way that calls up their knowledge of methods to help poor readers learn from text, they may instead resort to the frames they brought with them to teacher education, defining the problem as one of lack of interest, lack of effort, problems at home, and so forth.

She therefore defined her goals as teaching new ways of framing classroom dilemmas as well as teaching new methods for helping high school students learn from text. As she said:

[That the professional principles I want them to adopt flow from and so are connected to particular frames of classroom situations] is neither good nor bad news, it does structure for me my task as a teacher educator. If frames act as connections between practitioners and a portion of the professional knowledge base then preservice teachers' personal-history-based beliefs act as lay-frames and evoke a knowledge base as well. To the degree those beliefs or frames lead preservice teachers to devalue or dismiss as irrelevant the principles I

want them to consider, I want to modify them. I want to mediate the lack of match.

Repeated iterations of one course have allowed me to watch closely the effects of the beliefs/frames preservice teachers bring from their histories. I find that my mediation strategies fall into three groups of teacher moves: the "it's not that, it's this" move, the dramatic failure move, and the novel event move (Holt-Reynolds, 1994).

"It's not that, it's this" moves are made to prevent miscategorization of course concepts by prospective teachers as something they already know about and have rejected as "bad teaching." Holt-Reynolds created experiences that preempted rapid judgments before she introduced a new concept or method. For example, before moving into a discussion of study guides that support students' independent learning from text, she engaged her students in a "fishbowl" discussion in which class members role-played student and teacher perspectives about study guides, leading to distinctions between "bad" study guides and possibly useful study guides. At the conclusion of the activity, Holt-Reynolds was able to say that they were about to consider "not that" (i.e., the *bad* guides) but "this" (i.e., guides that led to better experiences described by some students and teachers in the role play). Simply telling students to set aside their prior notions was not sufficient to convince them to reserve judgment until after the content had been presented; the experience of participating in the "fishbowl" was necessary to engage students in open-minded consideration of study guides.

Dramatic failure moves typically came later in the sequence of instruction and created experiences for prospective teachers in which action based upon their prior beliefs about learning or teaching simply did not work. For example, she wanted to persuade them that teaching about various text structures is important because many high school students will attempt to read text in some subject-matter areas (e.g., explanations of cause-effect relationships in a science text) with strategies more appropriate to text structures frequently found in other subject-matter areas (e.g., narrative structures in a literature class). She began by having them publicly fail in a matching task in which the rules for defining patterns were unusual and difficult to infer from the task. She then led them to consider how their inability to figure out the pattern was similar to the experience

of high school students who every hour move into a new setting in which the rules for making sense out of text have changed from the preceding hour.

The final move, the *novel event*, invited prospective teachers to be students by experiencing a new teaching method that was modeled by Holt-Reynolds. For example, when she taught about writing-to-learn strategies or small group discussion strategies, she engaged the class in learning about some content through the use of those methods. The sequencing of this move was critical and responded to the dialogue between self-as-student and self-as-teacher that Holt-Reynolds wanted to foster:

Typically, I follow a "not this, this" event or a dramatic failure with a novel event experience. "Not that, this" exercises and dramatic failures make cognitive space for new learning; they create a need to know something new. They do little to help preservice teachers value the new concept, skill, or strategy. Novel events, because they are experiences, because they happen literally to the [self-as-student] provide optimal contexts for learning. They cooperate with the internal dialogue preservice teachers tell me they use for evaluating course ideas. Self-as-teacher may discover a need to learn something in "this" category, but self-as-student usually decides whether the novel event is capable of filling the newly-felt need to know (Holt-Reynolds, 1994).

STUDYING THE PRACTICAL THEORY:

WHAT AND HOW DID STUDENTS LEARN?

Holt-Reynolds had been teaching her content area literacy course with this practical theory in mind but had not had opportunities to lay out her theory for examination or to test it beyond the data she was able to gather when teaching the course alone. When approached by the National Center for Research on Teacher Learning (NCRTL) with the possibility of participating in a study of her pedagogy and her students' beliefs and learning, she readily agreed. The remainder of this paper is a description of the study and conclusions reached about three students who were followed across the term. In analyzing their data, we asked whether and how Holt-Reynolds' practical theory accurately predicted what and how her students would learn about content area literacy strategies. The close examination of a few students, with the aid of

outside researchers, allowed Holt-Reynolds access to data about her students' responses and learning that are not available to an individual instructor who is not participating in systematic study of practice. For the most part, Holt-Reynolds' ideas were verified; we include in this paper the stories of two students who responded to the course as expected and who appeared to benefit a great deal from it. We also include the story of one student whose learning was not what Holt-Reynolds had predicted. Following the student data, Holt-Reynolds describes how she reflected on her practical theory and practice in light of what she learned about her students' learning from the course.

Two external researchers, Linda Anderson and Steve Swidler, attended each meeting of the course and conducted interviews between class sessions with eight students whose identity was unknown to Holt-Reynolds until after grades had been assigned. The two researchers and the instructor met regularly to discuss what should be asked in the interviews to determine how various students were interpreting the course and how their entering beliefs about learning and teaching were figuring in those interpretations. Methodology is described more fully and detailed student cases are presented in "Prospective Teachers' Responses to Opportunities to Rethink Beliefs About Learning and Teaching" (Anderson, Holt-Reynolds, and Swidler, 1994).

The three students described here were all undergraduates expecting to do their student teaching within the next two terms in local high schools. Jenna and Perry were prospective history teachers, while Kayla was a prospective mathematics teacher.

During the course, *Jenna* and *Kayla* transformed some of their fundamental beliefs about learning and teaching in the directions intended by Holt-Reynolds and consequently learned about content area literacy instruction in ways that seemed genuine and rich. Post-student-teaching interviews revealed that what they had learned in this course had affected both their teaching and their self-appraisals as teachers. *Perry*, in contrast, did not appear to change certain beliefs during the course nor did his post-student-teaching interview suggest that he had been greatly influenced by the course. By considering how and why these students experienced the course differently, Holt-Reynolds was able to both test her practical theory (and found it mostly valid) and fine-tune it (because she had not accounted for the full range of entering beliefs brought to the course and, therefore, had missed some important features of *Perry's* responses to the

course). Below, we present our interpretations of each students' experience in the course, based on the interview data.

Cases of Students' Learning From the Content Area Literacy Course

In order to test the two components of Holt-Reynolds' practical theories, we consider whether Jenna and Kayla, who had learned as intended, could be portrayed as matching her assumptions about their entering beliefs and about their responses to her pedagogy, while Perry did not.

Jenna. In Jenna's case, the instructor's predictions about entering beliefs and about the student's response to her pedagogy were accurate. In many respects, Jenna was the prototypical student that Holt-Reynolds had come to expect in Content Area Literacy. Jenna's entering beliefs were much like what Holt-Reynolds predicted in that they were organized around the theme of "interestingness" and she attributed teachers' success largely to personality and enthusiasm. She expected that textbooks would be boring, as would most lectures, and that boredom would be the most critical problem with which she would have to cope as a teacher. Therefore, the class activities that targeted these beliefs found an easy match. Jenna brought some subject-matter beliefs that may have supported her learning from the course. Far from seeing history as inherently dull and straightforward, she already thought of it as potentially fascinating and as learning process as much as content. This view of her subject matter, as well as her own experiences in classes where students were active meaning-makers, may have prepared Jenna to be receptive to the new ideas offered by Holt-Reynolds, but *only when* the central notion of "interestingness" was shown to be insufficient as a basis for teaching. Thus, the first assumption made by Holt-Reynolds about the nature of students' entering beliefs that must be confronted was accurate for Jenna.

Holt-Reynolds' assumptions for what it would take to engage Jenna's beliefs and challenge them were accurate as well. Jenna engaged enthusiastically with the in-class activities and spoke frequently in the interviews about what sense she was making of them. Generally, her interpretations were in line with Holt-Reynolds' intentions. For

example, Jenna said this about the "Tiglier" activity² in which students concluded that one could do schoolwork well and receive high grades without ever comprehending the ideas (i.e., engaging in "procedural display" as described by Bloome [1986]): "If you just give it to them and ask them to memorize and give it back, then they haven't learned it, they don't understand it. They're just giving it back to you."

About this and other activities of the first two weeks, she said that what she had learned was "stuff that was in you but it just needed to be pulled out," such as not having to tell a student everything and instead doing something to help them learn for themselves. This statement suggests that Jenna was responding to the course activities with self-reflection, one of the intended outcomes of the activity.

As further evidence of her genuine engagement with the in-class activities that Holt-Reynolds had intended would stimulate belief change, when she was asked in each interview what stood out most for her about the preceding two weeks, Jenna often answered in terms of the activities and assignments that had been accomplished. For example, she said during the third interview that what stood out for her was the discussion of "What is learning?" She admitted to feeling "confused" because there were "so many answers," but when pressed, she then acknowledged that an important new idea was that "the whole idea of being able to use it in a different situation and apply it to something else" was a new view of learning that she was thinking about.

Such comments suggested to us that Jenna was rethinking her initial ways of seeing teaching and learning. Jenna's interviews frequently included self-reflective statements about what she was learning and how she was changing, and she related these changes to features of the course and Holt-Reynolds' instruction. She was able to take an observer's perspective on her learning from the course, saying in essence that Holt-Reynolds' ideas about the importance of speaking first to self-as-student in order to access self-as-teacher were accurate.

Kayla. Kayla's entering beliefs were also within the range predicted and

² In the Tiglier activity, students read a text with many nonsense words, and they were able to excel on a recall test even though they did not understand the passage.

targeted by Holt-Reynolds. Kayla portrayed teachers as the central figures in classrooms, who promoted learning by presenting information to mostly passive students; better teachers revealed better organization in their presentations, and they did not bore students. Holt-Reynolds expected this pattern of beliefs, and she targeted it directly in the course activities.

Kayla differed from Jenna in the ways that her own history as a mathematics student informed her future visions of teaching and learning. Kayla was discouraged with her experiences as a learner of mathematics and came with vague notions of what she did *not* want to do as a teacher (i.e., recreate her unpleasant experiences of studying math). However, she did not have a well-developed image of what might be possible instead.

That Jenna and Kayla brought very different ideas about the nature of their subject matter and their own capacities as learners did not matter much for their learning in this particular course. Holt-Reynolds did not make assumptions about students' views of subject matter so much as she premised her instruction on their entering general beliefs about teachers' roles and learning processes, regardless of subject matter. In the cases of Jenna and Kayla, their entering beliefs about their subject matter were congruent (in different ways) with the new ideas about teachers' and learners' roles that Holt-Reynolds offered in the course. In Jenna's case, the new ideas fit with and strengthened her subject-matter beliefs. In Kayla's case, the new ideas helped her to reframe her past experiences and to see that her poor performance in mathematics classes in college were the result of poor instruction rather than her own inadequacy as a student. Thus, the course had tremendous personal value for Kayla because it allowed her to see herself in a more positive light—as a capable student whose current difficulties in mathematics were due to poor instruction that didn't reflect the principles she was learning in Content Area Literacy.

The gradual development of Kayla's new view of herself was apparent in her responses to the activities of the course, from which we concluded that she, like Jenna, responded to the instructional activities in the ways that Holt-Reynolds predicted. For example, she responded enthusiastically to the Tiglier activity, restating the point that she

thought Holt-Reynolds was trying to teach and making the connections to her own past history: "It made me what kind of teaching I got. It made me see that it didn't work even though the teachers were satisfied with my grade." Over the term, she returned to this point and eventually said that she was doing poorly now in large part because past teachers did little to avoid "procedural display" by students.

Throughout the term, when Holt-Reynolds used "novel event" activities to teach about, for example, using writing to support learning (rather than only to assess learning) or using prereading activities to prepare students for instruction, Kayla's recounting of these course activities and its implications were always in line with Holt-Reynolds' intentions. As a result of course activities early in the term, she had adopted a view of learners as active meaning-makers and teachers as mediators, and she interpreted and evaluated all new "teaching methods" that she encountered later in the term within her new framework. Thus, Kayla, like Jenna, responded to the course and the sequencing of mediational moves exactly as Holt-Reynolds had intended.

Perry. Kayla and Jenna had each found it worthwhile to question whether and how teachers influenced students' learning, and it made sense to them that this would be a pivotal question in a teacher education course. In contrast, Perry did not seem disposed to consider issues of learning as important, and he did not engage in the class as intended, perhaps because some of his entering beliefs were outside the range of beliefs that Holt-Reynolds was targeting. Like Jenna, Kayla and many others in the class, his first interview revealed a very teacher-centered view, implying that students learned as a result of what teachers did. Also, like Jenna and Kayla, Perry emphasized the importance of interesting students rather than boring them.

Perry differed, however, in that his reasons for interesting students were not the same as most other students whom Holt-Reynolds was prepared to teach. Many other students held the initial theory that interest and motivation (as internal states) were the primary cause of learning. If you get students interested, then they will learn what you have to teach. Therefore, the challenge is to get students interested, and the way to do that is to be an interesting person whose enthusiasm is contagious. While such a theory does

not lead to many productive teaching strategies (especially for the majority of us who are not charismatic individuals), its advantage for novice teachers is that it focuses them on learners' internal states. Holt-Reynolds intended to help her students rename and reframe their prior constructs about students' internal mental states from "interest" to "engagement with ideas through meaning-making" and to see the ways that teachers can influence them through instructional moves rather than relying on charisma and enthusiasm.

Perry's theories of how students learned from school instruction were different in some key ways. He saw the solution for boring lessons not in terms of teacher personality or enthusiasm but rather in terms of the activities that teachers created to engage students with the material. It was activities that needed to be interesting, not teachers, and the way that activities could be made interesting was to adjust them to the students rather than expecting students to change as a result of instruction. Once students became interested enough to carry out an assignment or activity, then they would learn. The critical factor was in doing the activity, not in being interested in it, although interest was an intermediate step.

At first glance, this theory seems to be close to one view that Holt-Reynolds hoped her students would espouse by the end of the term because it already contained a slot for activities and related them to learning. However, Perry left out of his talk any references to students' internal states as important in learning. He sounded as if he believed that simply doing the activities led to learning, regardless of student's mental responses. He portrayed learning of history as primarily a function of information transfer. As a teacher, then, he would design activities that would be interesting and relevant enough to get students to do them, and through doing them, they would receive the information necessary for them to learn. The "interest" component was like a magnet that first attracted the students to the work, but then the real learning occurred when the student encountered the information.

In some respects, Perry's entering beliefs and theories were more complex than other students because they already incorporated activities as the medium through which learning would occur. However, they did not include the one component that was critical

to Holt-Reynolds' assumptions about her students' beliefs: a belief in the importance of internal mental states for learning. Although Perry talked about "interest" as important, he portrayed it more as a feature of an activity, or sometimes as a trait that students brought, but not as a mental state of learners while they were learning. Because he saw it as linked to activities and stable traits, he thought of teaching as a matter of adjusting activities to learners, in essence tracking history instruction to fit the propensities students brought to engage with different kinds of activities.

When we examined Perry's responses to the activities in the course that were designed to elicit, engage, and eventually transform his beliefs, we found a pattern of superficial engagement without much real reflection on what he was learning and how he was changing. Instead, Perry interpreted each event in ways that were congruent with the theories he brought to the course. Two particular examples stand out in their contrast to Jenna's and Kayla's comments about the same events.

All students were asked about the "Tiglier" activity, which was designed to help students see that one could do schoolwork well and receive high grades without ever comprehending key ideas. After a long pause, Perry said, "(the point of this activity was) that you can understand things, it shows that even if you don't know what they're talking about, you have certain skills, and you can understand some things that are going on. But I don't remember this much." In contrast to Jenna and Kayla for whom this had been a salient experience about the limitations of schoolwork's effects on learning, Perry interpreted the activity in a more positive light, as if to say that people can learn just about anything from exposure, even if it seems senseless. Nothing about his experience with this activity seemed to trouble his implicit definitions of worthwhile learning or his ideas that school assignments promoted learning in unproblematic ways.

In the third interview, after the class session that had impressed Jenna about the many ways of defining learning, Perry said that

I...think that a lot of the stuff that we spent all sorts of time on in class... the stuff is a lot of semantics about what learning means. We all have an idea of it but we spend a lot of time in writing that we should define exactly what we mean by everything... When you say something about students' learning, I seem to think that you sort of understand what they're going to learn... I don't

know if it matters all that much."

In contrast to Jenna, Perry seems perplexed not about the nature of learning but about why one would ever worry about defining it. Perhaps this is because his initial beliefs did not emphasize the importance of learning as a process, and, instead, he took it for granted that if a teacher just got the activities right, then learning would take care of itself. In any event, Perry never engaged deeply with activities that pushed him to make explicit what he believed learning to be and to require.

Instead, Perry experienced the course as a series of activities and assignments that served as models of teaching techniques that he might someday use but not as an occasion for talking about why these techniques might help students learn. Perry did not respond to Holt-Reynolds' instructional moves by first questioning his initial ideas. Instead, he assimilated new ideas without ever revising his initial beliefs about teaching and learning. It was as if the first two kinds of instructional moves (i.e., "not this, that," and "dramatic failure") had no effect on Perry, who instead tuned in only for the "novel event" moves, where he identified an opportunity to learn something worthwhile---new techniques that he might use later. Even then, there were suggestions in his last interview that term and in his post-student-teaching interview that he saw the new techniques as most appropriate for special occasions when he might go "beyond the basics."

Summary of Conclusions From the Student Cases.

The data about these three students does lend support to Holt-Reynolds' practical theory in that the students for whom her assumptions were accurate did learn from the course in the ways that her theory predicted. When her assumptions were not tenable, the student did not change as she intended.

Jenna and Kayla entered the course with beliefs that were targeted by Holt-Reynolds, and they responded to her instructional moves as predicted. Their beliefs were elicited, then reframed or discredited through the course experiences, and then new beliefs were constructed as a result of experiences that impacted them as students first, then as prospective teachers. They left the course with new ideas and new language, and they returned from student teaching with those ideas and language not only intact but

strengthened. They credited Content Area Literacy with dramatic changes in their thinking and with their success as student teachers.

Perry entered the course with beliefs about teaching that, while superficially similar, differed from Holt-Reynolds' expectations in significant ways. Perhaps most important, he did not come to the course with an obvious curiosity about the nature of school learning or a disposition to consider seriously issues of learning and instruction. His core beliefs about teaching and learning were never really subjected to examination, and instead he responded only to the new ideas about teaching methods, assimilating them into his preexisting ideas about teaching and learning. Following student teaching, he did not talk as if Content Area Literacy had a great effect on him.

WHAT HOLT-REYNOLDS CONCLUDED FROM THE STUDY:

FINE-TUNING THEORY AND PRACTICE TOGETHER

Up to this point in the paper, the text was coauthored. In this italicized section, Holt-Reynolds is the sole author.

Now that I have access to the data coming from our collaborative research, now that I have contributed to the direction that analysis has taken, what shall I do? The part of me who is a teacher and the part of me who is a researcher are ready to collaborate, to shape the next round of teaching. What did Linda, Steve, and I find out from our conversations with these students? What should these data tell myself-as-teacher? How do our hypotheses for explaining these data connect to practitioner thinking and to the pedagogy I am evolving for my work with preservice teachers?

Target Errors Preservice Teachers Hold Beliefs I Have Yet to Discover

If preservice teachers are bringing beliefs with them to class that interact with course concepts and make it harder for preservice teachers to learn that content but that, as their instructor, I have not yet discovered, I find that rather exciting. It would mean

that students of teaching have a larger assortment of significant beliefs with which they work already than I have imagined or located. It would suggest that, as their instructor, I would do well to ask myself how it is that I've failed to notice the range and nuance of preservice teachers' beliefs. Perhaps my elicitation strategies can be expanded---I may need to throw a wider net! Perhaps my listening skills require sharpening---I may need to slow down.

Our hypotheses about Perry suggest a set of elicitation moves that are less generic. If students bring with them lay-theories that sound very much like course conclusions, I should attend to these just as closely as I attend to lay-theories that I expect will interact with course ideas in troublesome ways. Perry's case can certainly be explained as the result of my failure to notice that his preference for activities as important classroom elements meant something very different to him than I imagine I confess, this hypothesis sobers me. Like most teacher educators, I interact with 25-35 students in a class. It is hard work eliciting and engaging lay-theories that blatantly fly in the face of the frames preservice teachers will need if they are to access the professional knowledge base. If I must also listen carefully to the apparently complementary lay-theories they bring, then I will have to work a bit harder, notice a larger range of reactions. I will need to learn to remember to ask myself, "Does this preservice teacher mean what I mean when he or she says what I say?"

The good news here is that I'm really only redefining what constitutes a teaching target for myself; I'm only reminding myself of something that, as a teacher, I really do already know---learners construct meaning, and their constructions are personal. What preservice teachers say matters less than what they mean when they say it. Myself-as-teacher-educator does know this; she can use Perry as a salient reminder to probe, ask, assume little, and listen carefully. Perry reminds me to watch the target rather than allow myself to admire my shot!

I certainly also need to think about the contexts from which preservice teachers have come much more carefully. The beliefs and explanations constructed by students like Perry who have experienced schooling in small conservative, rural communities may vary considerably either in content or in focus from those developed by students with

experiences of schooling in large, pluralistic, suburban or urban communities. The instructional components of classrooms in these differing settings may look essentially the same to me, but to the students who live them, they may support very different explanatory notions.

This would mean that myself-as-practitioner needs to craft new methodologies for inviting preservice teachers to talk about the very specific contexts in which they have put together lay-theories about learning and what influences it. What else do preservice teachers know? How can I use a course-work setting on campus to discover more of what they know and what they mean by what they say?

Preservice Teachers Hold Beliefs They Have Yet to Discover

On the other hand, these data may show that, while I have discovered an adequate range of beliefs that preservice teachers bring to course work, my strategies for helping them make these beliefs explicit to themselves are inadequate for helping some preservice teachers overhear their own thinking. This hypothesis points me-as-practitioner in another direction. It suggests that helping preservice teachers notice their own thinking may be a longer, slower process for at least some preservice teachers than I have thought.

Logically, noticing one's own ideas about learning is prerequisite to noticing that these ideas 'fail' in some dramatic way. Perhaps we can learn from this study that some preservice teachers--like Kayla and Jenna---arrive on campus more ready to act in self exploratory ways than others---like Perry. I would do well, then, to direct my attention toward inventing ways to identify those preservice teachers for whom acting in self exploratory ways is not yet realistic. My teaching currently assumes that all preservice teachers have implicit or tacit lay-theories about learning and that we can, together, locate or discover these. If this discovery requires first an ability to act self-reflectively, and if this ability is a skill that can be learned, then at least a portion of my teaching time will need to be directed toward the development of this ability in all those enrolled in the course. Where and how preservice teachers and I begin "studying teaching" will change.

Insufficient Impact:

Preservice Teachers Hold Beliefs I Have Yet to Learn How to Engage

It is possible to argue that these data, Perry's case in particular, show interactions between lay-beliefs and course ideas that I have not noticed or predicted so far. Of the hypotheses we've considered, this one bears the closest resemblance to the assumptions by which I already operate. My teaching is currently skewed toward an attempt to overhear how preservice teachers use lay-beliefs that I already recognize to make meanings I do not recognize.

An example helps me think through the implications of this hypothesis. Let's consider Perry's lay-belief about teaching as doing things with students via activities that interest them. This evidently means something very different than Jenna's belief that when teachers are interesting students learn. I have assumed that lay-theories about the interestingness of teachers themselves and the interestingness of activities interact with course concepts in pretty much the same way. For both beliefs, I have attempted to introduce a felt need for instructional activities in addition to the pursuit of interestingness for its own sake. If Perry's case demonstrates that a belief about how interesting activities help students learn interacts differently with course ideas than a belief about how being an interesting teacher helps students learn, then as frames, these beliefs lead very different places. I will need to build an additional line of logic for helping preservice teachers value activities that teach and separate them from activities that simply interest students. 'Not that, this' moves are required here in ways I have never noticed.

Researching Teaching

I can no longer imagine doing teaching that is not also research. Each of these hypotheses suggests that as teacher I need to become a better researcher. My teacher's knowing and my researcher's knowing are not headed in totally different directions; much of what I did as teacher found support in the data collected as researcher. My teaching moves themselves---the strategies I use as a teacher---were not poor choices.

They "worked " for some preservice teachers almost exactly as I hoped. However, the researchlike knowing which would have informed their substance and directed their aim was incomplete. They failed to "work" for some preservice teachers.

I need to know more about what is now a wider array of pieces of my work as a teacher educator. However, Linda and Steve will, in all likelihood, never again throw their research energies into a semester of my teaching. The luxury of third-party research into my practice is unlikely to be repeated. Unless I find ways of making the acts of teaching and the acts of research one and the same, I am unlikely to continue the learning they have helped me begin. Doing teaching and doing research must become one and the same for me.

This very likely means developing more paper trails. Currently, much of my methodology for beliefs elicitation is oral and occurs around in-class events. This nonpermanent medium called conversation makes straight talk safe for students; it makes noticing the coherence across sessions for any one preservice teacher's ideas very hard for me to achieve. There are 25-30 preservice teachers present in any given class session. They participate unevenly---some talk more, others less. In the conversational chaos that so typically accompanies very engaging discussions, I can hear some things; others I miss. I can follow up on even fewer---it is necessary to choose one direction at a time. While I am focused on facilitating the corporate conversation, I am less focused on 25 individual constructions of meaning. It is easy to let a Perry who sounds on target pass by and, instead, to grapple actively with an energized and curious Kayla or Jenna. My attention in class is a scarce resource.

When we shift to written mediums, I have access to individuals, but now each is constrained by the awareness of the permanence of his or her comments as they appear on the page and go home with me. Assignments read in stacks of 30 lead me only to conclusions about the class as a whole. These may be very different from conclusions I might draw about any one individual were I to read his or her assignments in a collected bunch. As researcher, I had the opportunity to revisit each of the written assignments of those who participated in the study. Perry's assignments, for example, read one after the other as a set reveal some rather surface-level thinking. I missed this

as I read them separated from one another by real time and always as one of 25 versions of a particular assignment. As a cohesive set, they are far more troubling than they were read one at a time across a term.

Based on that experience, I vowed to keep copies of students' work across the semester and reread the previous work of each preservice teacher as I received new assignments. The task is rewarding and far more like research than one might imagine, but it is also far more time-consuming than my other assistant professor's duties allow.

My knowing in the moment of the teaching simply needs to be better, more like my knowing after the moment in research. Yet, I do not see clearly how to make these kinds of knowing more like one another or how even to facilitate their ability to inform one another more directly. These issues trouble me in both of my roles. As other teacher educators develop ways of making teaching also the act of research, we may together evolve new strategies. If nothing else, this study and the hypotheses it has generated point to the need for and benefits potentially associated with a university life that allows and supports the integration of teaching and research.

IMPLICATIONS FOR OTHER TEACHER EDUCATORS:

STUDYING PRACTICE IN LIGHT OF PRACTICAL THEORIES

How might other teacher educators engage in similar study of their practice in light of their practical theories? They might begin, as Holt-Reynolds did, with explication of their theories about what knowledge and beliefs prospective teachers bring to teacher education and how it interacts with the content of their portion of the teacher education program. In addition, they might surface the assumptions underlying their pedagogy about how to teach their content so that prospective teachers modify their entering knowledge and beliefs to accommodate new ideas.

Neither of these tasks is easy to do in isolation; they benefit greatly from collegial interaction in the context of inquiry. Holt-Reynolds worked with colleagues who pressed her to reveal her practical theories while they were simultaneously gathering data

in light of her revelations. Other teacher educators might form alliances in which they trade off roles of teacher, the person responsible for running the class as well as helping to determine the direction of the research, and external researcher who focuses on a few students in a class to learn what the instructor would like to know about how those students are understanding course content. Such efforts would not need to be as large scale or as lengthy as the study described here. For starters, a pair of colleagues might agree to study only a segment of a course for one another. For example, two mathematics educators might decide to study how prospective teachers' beliefs about "natural mathematical ability" enters into their interpretation of particular content based on recent guidelines developed by the National Council of Teachers of Mathematics (e.g., students should engage in dialogue with one another as they puzzle through complex and authentic mathematics problems). Such a study might take only a few weeks' time and would generate additional ideas about other beliefs and other content that could be studied.

A key site for studying the relationship between theory and practice in teacher education is inside the heads of individual teacher educators as they craft their practice in particular situations. As practical theories are explicated and data are examined about whether and how students' learning was predicted and explained by those theories, teacher educators can fine-tune their practice and their theories simultaneously. In so doing, they model for prospective teachers ways that theory and practice support one another when they are joined in reflective inquiry about teaching and learning.

Collectively, research on prospective teachers' beliefs would be advanced by a series of studies conducted by teacher educators in which they investigate which beliefs seem to matter most for their particular situations and how their pedagogy affects those beliefs. Such a body of work would provide the rich detail necessary to help other teacher educators learn how to question and listen to their students and, thus, to move beyond the generalization that prospective teachers' prior beliefs can limit the influence of teacher education. That beliefs are present and will be influential cannot be denied, but such knowledge does not advance the practice of teacher education, nor does it contribute to theories about how prospective teachers learn when it only focuses on limitations. Only when teacher educators begin to fill in the details about interactions among particular

beliefs, pedagogies, and content will they be able to use their knowledge about their students' beliefs in positive, productive ways. We hope that this case describing how a teacher educator and her colleagues studied the interaction in one setting will encourage others to conduct similar work.

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