Making It Their Own: Preservice Teachers’ Experiences, Beliefs, and Classroom Practices

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Educational researchers widely recognize the need to better prepare preservice teachers for the challenges they will face in classrooms (Brookhart & Freeman, 1992; Fullan, 1991; Goodlad, 1990) Kagan, 1992). Novice teachers report that their undergraduate education programs do inadequately prepare them to face the demands of teaching in classrooms with increased numbers of children who do not speak English; children with disabilities; children with inadequate family support for learning (Vaughn, Bos, & Schumm, 1997); and students who remain unmotivated to learn, disillusioned with their school progress, and alienated from the dominant school culture (Goodlad, 1984; Kozol, 1991). Many teachers become discouraged and disillusioned with their profession. Their lack of perceived effectiveness, along with other factors, contributes to this frustration.

Much research on teacher socialization has led to a pessimistic perspective on the ability of teacher education programs to substantially change classroom practice (Hoy, 1968; Hoy & Rees, 1977; Lortie, 1975). Pugach (1992) characterized these researchers as being in the functionalist tradition of teacher socialization research, which contends that the individual teacher is acted upon by the powerful, pervasive school culture so that individual teaching philosophies are subsumed into the existing school culture. Beginning teachers, insecure and lacking in confidence, are vulnerable; their first years of teaching are often socialized to the status quo (Pugach, 1992, p. 142). Those adhering to the functionalist perspective contend that the teacher as change agent is an unattainable goal and that socialization is basically a process that sustains conservative educational practice (Pugach, 1992, p. 135).

Goodman (1988) questions the functionalist contention that beginning teachers are as a group sculptured into a given predetermined form by external forces (p. 133); he states that the socialization process is individually mediated. Those from the interpretive tradition of teacher socialization give greater weight to individual teacher flexibility and control in classroom interactions and collegial relationships, empowering teachers to exert greater influence on the school culture (Little, 1982; Rosenholtz, 1989). Renzaglia, Hutchins, and Lee (1997) suggest that those novice teachers who have a firmly established core of beliefs and practices (p. 361) are more likely to act as change agents in their classrooms and experience satisfaction in their roles as teachers.

Preparing teachers as change agents begins with an understanding of the beliefs that underlie teacher decision making (Pajares, 1992; Richardson, 1996). Beliefs and attitudes are not only reflected in teacher decisions and actions, there is evidence that teachers’ beliefs and attitudes drive important decisions and classroom practice (Renzaglia et al., 1997, p. 361). A growing number of educational researchers have shifted their focus from instructional strategies and teaching behaviors to the beliefs and perspectives that prompt teachers to use these instructional strategies and exhibit these behaviors (Beijaard & De Vries, 1997; Goodman, 1988; Renzagliaet

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al., 1997; Richardson, 1996; Schön, 1983; Tasso, 1998; Tillema, 1997).

Much has been learned from research on preservice teachers’ beliefs (Clark, 1988; Foss & Klein, 1996; Hollingsworth, 1989; Munby, 1982; Schuck, 1997; Veenman, 1984). They form their beliefs about teaching and learning early and are highly resistant to change (Kagan, 1992; Munby, 1982). These beliefs serve as filters for new information in a way that culturally held beliefs are frequently confirmed rather than confronted (Hollingsworth, 1989; Kagan, 1992).

Preservice teachers tend to be relatively passive in their student roles (Goodlad, 1990), and, as insiders (Pajares, 1992), they are reluctant to challenge the status quo. Having been in classrooms for many years, they have internalized, through an apprenticeship of observation, many of the values, beliefs, and practices of their teachers (Anderson & Piazza, 1996; Lortie, 1975). They frequently do not understand the importance of challenging their beliefs.

Preservice teachers have a tendency to judge the quality of everything encountered on grounds of perceived practicality. They are drawn powerfully to the discrete and utilitarian—things unencumbered by whatever intellectual roots once nourished them (Goodlad, 1990, p. 225). They are concerned with being able to do it (Goodlad, 1990, p. 214) and, for most, doing it primarily means maintaining classroom discipline and motivating students (Veenman, 1984).

Preservice teachers have erroneous and simplistic beliefs about what it takes to be a successful teacher. They often believe that liking children is sufficient (Lasley, 1980) and, although their beliefs about teaching are well established, . . . [they are] usually unarticulated and simplified (Pajares, 1992, p. 321). Frequently, teaching is viewed as simply a process of transmitting knowledge and of dispensing information (Pajares, 1992).

These beliefs may impede the development of teachers capable of making substantive changes in classroom practices (Anderson & Piazza, 1996; Brantlinger, 1996; Foss & Klein, 1996; Giangreco, Dennis, Cloninger, Edelman, & Schattman, 1993). Preservice teachers view the transition from being a college student to being a teacher more as an occupational than an intellectual transcendence (Goodlad, 1990, p. 214).

The preservice teachers in the education program at Elon College displayed many of the beliefs found in the literature. They entered their methods classes with a utilitarian focus, expecting that they would learn motivating strategies and techniques for classroom instruction. We were interested in how they would respond to a methods class focused explicitly on the relationship between teacher beliefs and classroom practice. Would they engage in the emotionally and intellectually challenging task of reflection on their beliefs? Would they buy into this approach in a methods class? Would they consider this approach too esoteric and be disappointed in a class that did not place primary emphasis on activities and strategies?

We redesigned the Mathematics and Science Elementary Methods class to respond to these questions, using mathematics beliefs to challenge preservice teachers to explore long-held beliefs regarding the nature of mathematics, themselves as learners, and the teaching-learning process. In this article, we present their reactions to the learning experiences in the methods class, and describe the process by which we provoked them to reflect upon their prior experiences with mathematics, the effect of these experiences on their beliefs about the effective teaching and learning of mathematics, and the effect of these beliefs on their choice of instructional strategies and teaching behaviors in their future elementary classrooms.

The course met for one 13-week semester, 4 days per week, for 2 hours each day. For the first 2 1/2 weeks of the course, preservice teachers met in the college classroom. During the next 7 weeks, classes were on campus for 2 days and in the public school classrooms for 2 days of observation. During the next 2 1/2 weeks, preservice teachers spent all 4 days in public school classrooms implementing their lessons. They returned to the college campus the final week of the semester to continue processing their experiences.

Twenty-six students participated in this study. All had met requirements for admission into the teacher education program, which included maintaining a 2.5 GPA and passing Praxis I in reading, writing, and mathematics.
Preservice teachers were assigned to one of eight triads; each triad was assigned to one classroom teacher. (Two students were in a dyad.) The purpose of the triads was to provide students with rotating responsibilities. During the teaching phase of the semester, one student taught the class; one student assisted; the third completed a peer observation. (The role of assistant was eliminated in the case of the dyad.) Preservice teachers had multiple opportunities during the teaching weeks to assume each of these roles.

We informed the students that they were going to be part of a research project that would focus on how their beliefs about the teaching-learning process, the nature of mathematics, and themselves as learners would influence their decisions, actions, and choices concerning classroom practice. They were aware that their work would be made public (with identities concealed) to each other and the educational community. We considered this awareness an important part of the process as beliefs and conceptions must be opened for debate and exchange; beliefs become of relevance for action only when they can be shared with others (Tillema, 1997, p. 286).

Data collected from the Mathematics and Science Integrated Methods class included preservice teacher interviews and written responses to journal prompts, mathematics autobiographies, final examination questions, and in-class writing on the teaching and learning of mathematics. Two graduate research assistants made field observations in the methods class and the practicum settings. The author not involved in teaching the course and two professors in the Education Department who were knowledgeable of qualitative research methodology conducted two semi-structured interviews with each student in the study. One interview occurred during the first 2 weeks of the semester, and the final interview occurred during the final 2 weeks of the semester.

Making the Connection Between Experiences and Beliefs

Many preservice teachers entered the methods class without the awareness that the term beliefs was relevant to mathematics. In their worldview, mathematics simply was: one did not have beliefs about mathematics. We believed it essential that they recognize that they held beliefs about mathematics that could vary from those of their classmates. We encouraged them to reflect upon personal experiences with mathematics by reading Beliefs and Their Influence on Mathematical Performance (Garofalo, 1989a) and then writing a mathematics autobiography beginning with their earliest memories. These autobiographies became the basis for exploring early experiences and served as a starting point for an ongoing examination of the connections between their experiences, perceptions, and beliefs. While they were writing their autobiographies, classroom discussions and reading assignments focused on research describing beliefs of young mathematics students. For example, they examined the following passage in class: Suppose that during your entire academic career, every mathematics problem that you were asked was in fact a straightforward exercise designed to test your mastery of a small piece of subject matter. You were expected to solve such problems in just a few minutes: If you did not, it meant that you had not understood the material and the material should be explained to you again. Suppose in addition that this scheme was reinforced in class: Problems were expected to be solved rapidly, and teachers gave you the solutions if you did not produce the answers quickly (Schoenfeld, 1987, p. 27).

Many preservice teachers readily identified with these experiences and generated many of the beliefs held by children found in the research: Mathematics is computation; mathematics problems should be solved in less than 5 minutes; the goal of doing a mathematics problem is to obtain the correct answer; in the teaching-learning process, the student is passive and the teacher is active (Frank, 1988; Garofalo, 1989a; Garofalo, 1989b; Gray, 1991; Schoenfeld, 1987; Spangler, 1992; Sui & Edwards, 1982). They also admitted to holding many of these beliefs themselves; the discussion moved naturally to a more personal level.

Discussions, reading, writing, and practicum assignments led preservice teachers to understand the multiplicity of beliefs held by members of their methods class and by children. They evidenced understanding that differences in beliefs are due to different experiences in math-
emematics and to different interpretations of those experiences. Blake wrote in his autobiography: I'm not sure when this dread and fear of mathematics began, but my horror stories concerning it seem to have no end. . . . I've discovered that many of my fears were silly, although they were justified given my personal experiences with the subject (August 27, 1997).

A growing recognition that others had different perceptions and interpretations of events in their careers as mathematics learners led to an increased awareness of the origins and particularity of their own beliefs.

Beliefs and Their Impact on Classroom Practice

Students examined the impact of beliefs on instructional decisions and classroom practices by pondering questions such as What do we believe about how children learn? What do we believe about the nature of math? How will these beliefs inform our instructional decisions and classroom practices? And what instructional decisions and classroom practices will maximize student learning? We used excerpts from preservice teachers' writing to explore these important questions. The following opening sentences from Vernon's autobiography prompted a stimulating discussion: It all began in the first grade. . . . I'll admit, there's not much math to learn before first grade; so I didn't begin at Hillside Elementary with any more mathematical knowledge or ability than the average Joe (August 27, 1997).

Embedded in these statements are several of what Clark (1988) called preconceptions and implicit theories about teaching and learning. Preservice teachers speculated on the mathematics beliefs supporting Vernon's statements. The ensuing discussion yielded wide variation in responses, but at least three beliefs emerged. First, Vernon believed that mathematics was a formal school subject. Second, given this fact, he believed that children learned little math prior to entering school. Third, he believed that children enter school with about the same amount of mathematical knowledge, or lack thereof.

Preservice teachers then considered the kinds of instructional decisions and classroom practices one might expect from someone with these beliefs. They responded with ideas such as Given the fact that this teacher believes that all children come to school with the same knowledge, he would give all students the same work, and Because this teacher doesn't believe that the students have any knowledge of math, he wouldn't design lessons that would build on prior knowledge. Many students, including the student who had written this in his autobiography, found these possibilities disturbing. They reflected these concerns in interviews when characterizing an effective teacher. Heather replied that she believed that a good teacher is someone who is aware that everyone of her students is a different person. Everyone of them is going to have a different difficulty (interview, August 29, 1997).
Helen suggested that teachers need to know how to examine each individual child. [They] should be constantly evaluating each individual child (interview, August 29, 1997). As preservice teachers became immersed in reading, writing, and discussing their experiences, their beliefs, and the impact of those beliefs on classroom practice, they began rethinking some of their original, simplistic beliefs about teaching and learning.

Motivation to Consider Beliefs

In the absence of challenge, beliefs are basically unchanging, and when they do change, it is more likely to be a matter of a conversion or gestalt shift than the result of argumentation or a marshalling of evidence (Nespor, 1987, p. 321). Preservice teachers needed to emotionally connect to a personalized vision of what their classroom could be. At this point, we provided them with opportunities to immerse themselves in real classrooms. They began their classroom observations for 2 days each week, returning to the college classroom for the other 2 days to process these observations. One assignment during this observation phase was to analyze a mathematics lesson taught by a public school teacher. These observations provided relevant material for stimulating reflection on teaching practices and an emotional response to the impact of classroom practices on children. Rebecca wrote, The teacher devised incentives for good performance on the math tests: after competing and successfully outperforming other students, a football was placed by the student’s name on the bulletin board. That way, you could tell who the fastest students in the class were by looking at how many footballs they had on the wall (math lesson observation, September 29, 1997).

We chose this particular entry because variations of this practice are commonplace in mathematics classrooms, and all preservice teachers could personally relate to this observation. In the ensuing discussion, preservice teachers inferred some of this teacher’s beliefs. They conjectured that this teacher believes competition leads to increased achievement in mathematics. She also probably believes that publicly displaying student achievement or lack thereof will motivate students to work harder. She may also believe that one of the goals of mathematics instruction is to teach students to work quickly. She may believe that being able to work quickly indicates intelligence in mathematics. The preservice teachers could not assume these beliefs on the basis of one lesson observation; the purpose was not to be correct in assumptions, but to engage in understanding the interaction between underlying beliefs and instructional decisions.

At this point, we displayed the next paragraph from Rebecca’s math lesson: I could see some students getting nervous and worried. They became very anxious for some kind of positive reinforcement. The damaging part of this system is that students who are not “fast” begin to see themselves as poor math students (math lesson observation, September 29, 1997).

This practice disturbed Rebecca, who recounted her humiliation and fear of mathematics in the early grades because of the pressure of timed tests and public displays of achievement. Many preservice teachers recounted tales of humiliation and angst. Julie told the class of an elementary school experience she had described in an earlier interview: I remember in third grade playing “Around the World.” The teacher asked me what 8 x 8 was and I did not know that answer. I just wanted to die. I remember thinking, “Please don’t see me. Please don’t see me.” Of course that’s when you get called on. You felt like an idiot when you didn’t know the answer! I have experienced the anxiety way too many times of going up to the board that I will never, ever do that to a child. I do not understand what embarrassing the child will do in terms of improving their math skills. As far as I am concerned, embarrassment in a classroom is the worst unspoken punishment someone can do to another (interview, September 5, 1997).

Asked if the use of competition is an effective teaching strategy, the majority of preservice teachers responded with a resounding no. However, some said that they found competition invigorating and very motivating. This led to discussions about circumstances under which this instructional practice might be effective, ineffective, or damaging.

Breaking the Cycle

By recounting experiences in their autobiographies and writing in their journals, many preservice teachers began to gain insight into the
influence of teacher beliefs on decisions affecting classroom practices. They began to feel a need to ensure that they not pass on counterproductive beliefs to students and to understand their responsibility in breaking the cycle. Lauren reviewed her earlier autobiographical comments: in elementary school, lessons were always presented as a chore. Teachers would often say, “Let’s get our math lesson over with for the day,” or “Class, if we work really hard on our lesson today we will stop a few minutes early”... I do believe that if my teachers in elementary school were more patient and energetic I would have much warmer feelings towards mathematics than I have now. I hope I can remember these two important qualities when I begin teaching math lessons to my students (autobiography, August 27, 1997). Koury wrote, I never thought that maybe my teacher didn’t care for math much and that was why I had difficulty with it, but that may well have been a problem... my outlook on teaching math has changed. Our class has played a major role in that. Not only have I learned many fun and creative ways to teach math, but I have also learned that I enjoy it. Me enjoying the subject is important to make my students feel the same (journal entry, October 27, 1997).

It was important for preservice teachers to understand that teachers act as they do because (given their experiences and resulting beliefs) it makes sense for them to do so and that their belief systems serve an adaptive function (Pajares, 1992). The task was not to determine rightness or wrongness or sit in judgment of their past teachers or their current cooperating teachers in the practicum settings. The task was to recognize that teacher beliefs drive classroom practices and that those practices have a significant impact on student learning. Preservice teachers recognized the critical link between an examination of their own beliefs and the maximization of their own teaching effectiveness.

Acting On and Confirming a New Set of Beliefs

Guskey (1986) suggests that change in beliefs follows, rather than precedes, change in behavior. It was time for preservice teachers to be in classrooms daily to teach lessons based on their evolving beliefs about how children learn, the nature of mathematics, and—in light of these beliefs—classroom practices to maximize student learning. Heather commented, Last semester we went out there and we taught and we used plenty of great methods... But something I did this semester that I had not done in other semesters was that I actually tried constructivism as the teacher... This semester, that was a goal of mine, that I was going to get out there and I was going to do it and see if it worked for me (interview, December 8, 1997).

The following excerpts in which preservice teachers recounted their experiences as teachers indicate that many of them experienced the “I saw it with my own eyes” phenomenon [that] is existential and connected to one’s sense of self (Pajares, 1992, p. 318) and thus confirmed their new beliefs.

- I utilized this approach of discovery and working from the concrete to the abstract. One little girl, in particular, was having a difficult time understanding what she was seeing. I put my hand over hers as she held the half-peeled apple in her hand. I asked her to point to where the light was and where the shadow was. We then revolved in space together and I asked the same questions. Suddenly she said, “I got it!” And I knew she had. And I did not have to tell her... she will always own the knowledge of how the moon moves through space. It is hers because she discovered it. I was just the guide (Page, journal entry, December 10, 1997).

- I arrived at these beliefs of how students learn because... I’ve witnessed it in my classroom, and more importantly I’ve experienced it myself as a student... I saw my students come to life when I gave them the opportunity to work with classmates... I have also witnessed students working through problems I was told were “impossible” for them after they discovered how to work it through on their own. Personally I too have seen this learning in action as I realized that I can do math in this class, as my answers to math challenges can attest. When I was given the chance to interact with other classmates I came up with a solution every time, I never gave up, and built off the group’s attempts. For all of these reasons I don’t just believe that students learn math in this manner, I know it... I have learned that I can let students discover the information themselves, and that instead of being an expert, I can be a
guide and a participant in the discovery process (Blake, final exam, December 10, 1997).

The preservice teachers left the class with a clearer understanding of the beliefs that would drive their classroom practices and a sharpened sense of the powerful impact of those practices on student learning. Heather reported in her second interview, I would say that probably if I were just to explore, if I were to have gone out and started teaching, without having the instruction I’ve had here at Elon College, that I would probably teach the way that I had been taught in elementary school (interview, December 8, 1997). Page expressed the sentiments of many when she wrote, This methods course has left me feeling empowered (final paper, December 10, 1997).

Conclusion and Future Research Efforts

Preservice teachers’ response to the Mathematics and Science Methods Course and observations of their actions in the practicum setting are promising. Many of them evidenced increased sophistication in the understanding of the critical role their beliefs may have on the many decisions they will make as teachers. They brought to their teacher education program beliefs about teaching and learning heavily influenced by their childhood experiences. They came to consciously understand and reexamine the effects of these beliefs on their decision making about classroom practice.

If preservice teachers do not bring their beliefs to a conscious level and articulate and examine them (Lasley, 1980), they will perpetuate current practices and the status quo will be maintained. This is unacceptable given that the student population has dramatically changed and that many of the beliefs teachers and children hold are counterproductive to the teaching-learning process. As preservice teachers begin their careers, they will be in a position to break this cycle, but they will be incapable of doing so as long beliefs of which they are not cognizant drive their classroom practices.

Fullan (1991) wrote, The relationship between prior beliefs and program experiences is crucial, complex, and not straightforward (p. 296). This was certainly our experience. Although the goals were clear in our minds, the process re-quired much flexibility. Each night, the instructor read preservice teachers’ work and prepared the next class on the basis of that reading. The course did not have a highly specified syllabus. The instructor read journal entries each night so that the next day’s class could respond to and build on students’ observations and reflections. Following a constructivist approach, the instructor based learning experiences on preservice teachers’ progress in moving from actions and decisions based on beliefs of which they were unaware to a conscious recognition and acceptance of their responsibility in making instructional decisions.

Crucial to the success of this process was the creation of a safe and supportive classroom environment in which preservice teachers were comfortable publicly sharing and reflecting on their personal experiences and beliefs. The instructor participated by sharing her experiences and the evolution of her beliefs as well as the rationale for the design of the methods course. The instructor was also a facilitator, presenting herself as an expert on the process of learning, not on what should be learned. In many ways, preservice teachers created the course.

Excerpts from preservice teachers’ journals and interviews and our observations indicate that many students did successfully reevaluate and change their beliefs about teaching mathematics during the Mathematics and Science Methods Course. In an aside to field notes taken during an observation of the last methods class meeting, one research assistant captured an openness to reflection and purposeful decision making that may enable these preservice teachers to become agents in their schools. Watching this exchange, I felt that it was all coming together for them (the preservice teachers) . . . I think they got the point that they had learned a lot about their attitudes toward math and science, and when they start teaching on their own, they will discover for themselves their own teaching path, and each will be guided by who he or she is as a learner-person first (field notes, Bea Gilmore, December 10, 1997).

What aspects of the methods course were most successful in prompting preservice student reflection? What were the characteristics of preservice students who demonstrated higher levels of engagement in the reflective process? What were the characteristics of those who
resisted examination and change? What will happen to them as they begin their student teaching experience and their careers as elementary and special education teachers? Will their beliefs be strengthened as they interact with students and colleagues? Or will they abandon these beliefs and accept those of the school culture due not to their own reflection, but through unexamined acculturation?

We are conducting a qualitative, 3-year longitudinal study to respond to these questions. We are observing the 26 students enrolled in the methods course during their student teaching experience. As they enter the profession, we will collect data on their classroom practices to gain a deeper understanding of the factors that contribute to the professional development of the teacher who is a learner-person first.

References


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