Math Teachers Come From the Darnedest Places: Adult Learners Becoming Adult Teachers

Gary L. Wright, University of Texas at San Antonio, USA

Abstract: *In this qualitative study I sought a better understanding of the experiences of mathematics educators who, prior to engaging with their chosen profession, participated in a developmental mathematics course or program. The purpose was to learn more about (i) the impact of faculty (or institutional) attitudes and behaviors on these individuals and (ii) the factors, inside or outside the classroom, that supported their decisions to pursue careers in academia.*

Introduction and Background

Each year approximately 30% of the new students entering U.S. public higher education will need some form of developmental education; that's roughly one million students nationwide every year (Dillon, 2009). Notwithstanding the emphasis on high-stakes testing, teacher-accountability, and elevated college entrance standards, the rates for those needing developmental education have remained virtually unchanged over the past couple of decades. Moreover, in these troubled economic times, many under-prepared adults are enrolling in higher education in order to expand their employment opportunities. Furthermore, since most community colleges, and an increasing number of universities, maintain "open enrollment" policies, the continuing need for developmental education for the foreseeable future is apparent.

The purpose of this study was to gain a better understanding of the experiences of adult developmental mathematics students who, after successful completion of their developmental courses, determined to become mathematics teachers and educational researchers. What characterizes their experiences? What factors, inside or outside the classroom, influenced and supported their decisions to pursue careers in mathematics education?

Related Literature and Theoretical Framework

This study emerged in response to questions posed by one of the leading researchers in the field of adult developmental education, Hunter Boylan, Director of the National Center for Developmental Education. Boylan (2000) contends, there is a need for more knowledge about developmental students' *experiences* and the implications of their experiences for instructional practice. For instance, we need "to learn more about the impact of faculty attitudes on the performance of weaker students" (p. 23). Mathematics is the subject that, for many students, forces the issues of self-esteem and confidence to the surface. It is imperative to know if some educators are exhibiting attitudes and behaviors that serve as impediments and barriers—or, alternatively, as propellants and bridges—for adult developmental mathematics students in their efforts to navigate the treacherous waters of higher education.

Moreover, developmental education and adult basic education, as sites of potential social change, deserve the attention of researchers and educators committed to equity and social justice. Therefore, I have framed this study within what Brookfield (2005, p. 16) calls "critical pragmatism," which involves promoting social justice and equal opportunity—in particular, the opportunity to receive a good mathematics education regardless of race, class, gender, sexual

orientation, or other such categorizations. My analysis of the participants' stories both recognizes social and political injustices, and also seeks to identify ways to help students overcome oppressive obstacles.

Research Design and Methodology

In order to investigate the experiences of these adult learners, I chose a qualitative design (Merriam, 2001) with narrative analysis (Gee, 1985, 1991, 1999; Tannen, 1990) as the means for exploring and understanding their experiences. A call for participants was posted on various education listservs in order to find qualified mathematics educators with a developmental mathematics background who might be interested in participating. Initially, thirteen respondents met the criteria and consented to be interviewed. These early participants included 7 men and 6 women. The occupations represented included middle and high school teachers, community college teachers, university professors, and higher education administrators. But before they were mathematics educators their occupations included work as a geriatric care nurse, a bank clerk, a truck driver, a military veteran, a high school dropout, and a construction worker. From the time of my original study (begun in 2008), a number of other former developmental mathematics students (now educators) have been identified and have agreed to share their stories, thus this research project continues to develop and expand.

Language and social interaction, as well as individual development and meaning-making, play significant roles in informing my narrative analyses of the life stories told by the participants in this ongoing study. They were asked to tell the story of their experiences with developmental education and its role in their decision to pursue a career in mathematics education. The stories were recorded and subsequently transcribed. After transcription my goal was to put each story into a form that would provide insight into the meanings being ascribed by the storytellers. This involved a blending of narrative approaches involving both structural (Gee, 1985, 1999) and linguistic (Gee, 1991; Tannen, 1990) considerations. I listened carefully to the recorded interviews and, simultaneously, worked with the transcribed text to introduce line breaks, stanzas, and other features (in response to storyteller speech patterns including intonation contours, pauses, and hesitations) resulting in what I call a *poeticization* of each transcript.

Both Gee and Tannen rely heavily on the poetic quality of language in their investigative approaches to narrative analysis. Riessman (1993), too, has noted, once the discourse units were represented as poetic structures, that "repeated listening to the tapes, sensitized me to subtleties of language that I never was aware of before, and certainly never attended to in previous transcripts—intonation contours, rising and falling pitch, pauses" (p. 50). I am convinced that poeticizations reveal much more vivid expressions of the storylines than traditional prose.

Gee (1999) has observed that, when individuals speak, they actually speak in *spurts* or bursts of words that carry meaning and that the mind focuses "on one fairly small piece of information at a time, encodes it into language, and puts it out of the mouth as a small spurt of speech" (p. 106). These spurts were written as separate lines—as one might write a poem—and, thus, they became the primary tools utilized to poeticize the transcripts. Moreover, as the storytellers spoke in spurts, they chose particular words to communicate particular ideas. Therefore, I looked at the *choice* of spurts as well as the poetic structure of the transcripts for additional insights into the messages being communicated and the relationships being described. I sought to contextualize the patterns for chosen speech with perspectives from linguistics, psychology, education, and critical theory in order to uncover narrative components that might

otherwise have been overlooked. I believe I obtained a much clearer understanding of the meaning being ascribed and was more fully able to participate in each storytellers' sense-making with respect to their experiences.

A Brief Look at One Participant's Story

Cathi is a 48-year-old white female of eastern European descent. She left a very tense home when she was 17. She trained, then worked as a nurse for 10 years before marrying a soldier and relocating to Europe. Shortly after returning to the US, four years later, her marriage ended in divorce. By 1998 she found herself providing for her two children as a single mom. After trying work as a geriatric care nurse, Cathi began looking for some other means of making a living. She thought a career in education, perhaps as an elementary school teacher, might be a possibility. That, of course, would mean college and college meant she would need money.

In the story that follows, Cathi tells of her early fondness for mathematics and how that was discouraged, in part, by an abusive father who "was adamant that girls are not good at math." Mathematics, he contended, is something that women simply can't do. Cathi shares the struggles she endured as a single mother leading up to a moment of shocking self-discovery instigated by a teacher's question. Today, Cathi holds a M.S. degree in mathematical statistics and teaches, among other courses, developmental mathematics at a large, growing community college. The following is an excerpt from Cathi's narrative:

I was having a tough time—
My personal life was a big struggle at times—
trying to support the children and—you know, finding childcare and—
It was a very difficult time in my life.

In developmental math, I—I had no confidence. NONE.
And if you had told me then that I would—end up with a degree in math, and—
—end up—especially, in a college—teaching math
I would have fell on the floor laughing. (laughter)

I mean there's just no way—no way would I have ever, ever believed it.
My whole belief system was against that.
You know, when I was a child … I would talk to him [her father] *and, uh—*
He always was adamant—that girls…are not good…at math!
Girls can't do math! Uh, that's for men!
I very, very much BELIEVED THAT and—
I guess he pretty much convinced me that that was so. I BELIEVED HIM.
He did math everyday and… it wasn't for girls. I BELIEVED IT.

There were two times in—maybe three—in my entire college career
that were SPECIFIC TURNING POINTS….
Two of them were just from an instructor—saying something to me.
And it changed—my whole outlook on myself—definitely.
I got injured in an armed robbery—Yeah, I was working … delivering pizza—
I was a single mom—I had a mortgage. And car payment. And two kids to feed.

That's why I told you I had it so difficult.
I was dealing with having my electricity turned off—
I had to go to charity for food. Ah, it was tough times—extremely tough times.

The robbery happened, like, the weekend before my [math] *final.*
And I DIDN'T GO TO THE DOCTOR.
I didn't have any insurance. I didn't have any money.
I DIDN'T GO TO THE DOCTOR.
I'd hurt my leg. That is where I was hurt and—
I got into the classroom—and when I sat down …
She [her math teacher] *… was there … waiting—*
And—she asked me—had I ever thought of—being—a math teacher.
And I was like—"ME?"
And she was like, "Yeah."
And I was like, "Why would you say THAT?" (laughing)

And I was just ASTOUNDED!
—that she even, you know, thought of me that way.
I was just ASTOUNDED.
—You could have knocked me over with a feather.

I—never—would have believed—myself capable of being—
… a math teacher. ***NO WAY!***
I thought well, gosh—if she thinks I'm good at math…
…maybe I'm really good at math. (laughing)
That was the first time—yeah—that I ever thought that—EVER.
That's exactly what I thought.
And I had never had thoughts like that before—ever.

Gee (1991) refers to stanzas (or verses) that "fall into related pairs" (p. 23) as *strophes*, a term borrowed from Greek tragedy designating dialogical stanzas, verses, or simple conversations. Applying the idea of *strophes* as related pairs to lines, words, or phrases has been quite effective in revealing meaning, thought, and emotion. Cathi's use of strophes to convey meaning and emotion can be noted in a number of places. For example, she reveals her frustrating lack of access to healthcare when she says:

> *I DIDN'T GO TO THE DOCTOR.*
> *I didn't have any insurance. I didn't have any money.*
> *I DIDN'T GO TO THE DOCTOR.*

Also, she highlights her original conviction that women could not do math by twice emphasizing how she had "*BELIEVED*" her father's lie. And she expresses her surprise at the suggestion she might possibly become a mathematics teacher when she says:

> *And I was just ASTOUNDED!*

—that she even, you know, thought of me that way.
I was just ASTOUNDED.
—You could have knocked me over with a feather.

Here she not only utilizes a pair of lines in constructing the stanza, but she also expresses her surprise by the double use of the word *astounded*. Tannen (1990) concurs with Gee in noting the revelatory importance of such repetitions. She points out that in literary works, such as drama, repetition is used deliberately in order to play up the repetition for effect, but in spoken language such repetition is "uttered fairly automatically" (p. 27).

Like Cathi, most of the participants in this study had someone who gave them a vote of confidence, a word of encouragement, a key explanation, or a thought-provoking insight at a pivotal moment in their educational experience—a teacher or counselor who helped initiate or facilitate the participant's affective or cognitive transformation that changed everything. But, after all, that's what a transformation does. It changes everything—just as Cathi exclaimed: *"That was the first time—yeah—that I ever thought that—EVER. That's exactly what I thought, and I had never had thoughts like that before—ever."* Cathi was moved by simply entertaining the thoughts suggested by her teacher. Those words had an impact on Cathi. They became part of her story and she continues to manage those words as key components of her story. She utilizes them in her descriptions and uses them as tools to give her "life events coherence, causality, and purpose" (Rossiter & Clark, 2007, p. 162).

Findings

Boylan and Eaton (2002) contend that students drop out of an institution for a variety of reasons, but by using a "cultural lens to examine their experience, we may find that the reasons are grounded in a sociocultural context as well as [in] psychological or academic [ones]" (p. 11). Findings in this study indicate that the reasons students persist in their educational endeavors, are also grounded in the same three contexts – *sociocultural, academic,* and *psychological*. Moreover, in a study of the sources of struggle that adults confront in academic environments Quinnan (1997) assembled the responses into five categories—economic barriers**,** internal family stressors, student-to-student tensions, student-teacher strains, and organizational obstacles.

Critical theorists have long pointed out that real access to education, as well as to equality and justice, is constrained by dominant ideologies which place the interests of a group above that of the individual (Freire, 1990). Quinnan (1997) reiterates Freire's call for educators to "confront, resist, and overcome the dominant ideology (status quo) through heightened consciousness of the many ways oppression is operationalized through institutional practices" (p. 14). When administrators, teachers, and service organizations, actually do facilitate access for marginalized students, then there is the very real possibility of success via education.

Implications for Education

The early embracing of their developmental mathematics courses by many participants was instrumental to the eventual transition from mathematics student to mathematics educator for several reasons. Henningsen and Stein (1997) assert that the "prior failures of poor and minority students are due to a lack of opportunities to participate in meaningful and challenging learning experiences, rather than to a lack of abilities or potential" (p. 527). It was in their developmental mathematics

courses that a number of participants gained high quality experiences with mathematics that were both meaningful and challenging.

Success experienced within developmental courses increases the sense of self-confidence and self-worth. Especially with adults, improved attitudes and self-efficacy with respect to mathematics has the potential to open up additional lines of communication and opportunities for learning. Goleman (1995) points out that key temperaments may be tempered and cultivated by experience. "Optimism and hope – like helplessness and despair – can be learned" (p. 89). He elaborates:

> Developing a competency of any kind strengthens the sense of self-efficacy, making a person more willing to take risks and seek out more demanding challenges. And surmounting those challenges, in turn, increases the sense of self-efficacy. This attitude makes people more likely to make the best use of whatever skills they may have—or to do what it takes to develop them. (p. 89-90)

It is especially clear to those of us who teach mathematics that success breeds success. By listening carefully to our students' stories we can learn much about both them and ourselves, as well as the things we hope to accomplish during our time together.

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