Study of Challenges and Support Structures for Beginning Mathematics and Science Teachers

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The Problem: Teacher Shortages

- U.S. schools face a growing and critical shortage of qualified teachers, especially in mathematics and science, where the workforce is plagued with an insufficient supply of qualified teachers and retention difficulties.
- By 2010, the U.S. will need 2,000,000 new teachers.
- The teacher workforce is rapidly changing due to STM teacher shortages, attrition (teachers leaving the field for other careers), migration (teachers moving to different schools), retirement, and class-size reduction initiatives (Feistritzer, 1999; Haberman, 2001; Hussar, 1999; Ingersoll, 2001; Schaefer, 1999; U.S. Department of Education, 2001).

The Problem: Teacher Attrition

- 9.3 % of first year teachers quit during their first year (Weiss & Weiss, 1999).
- 20-30% of new teachers leave the field within the first three years (DePaul, 2000).
- After 5 years, between 40 and 50 percent leave teaching altogether (Ingersoll, 2003).

Your Turn with the Problem

- Identify three causes of high attrition levels for mathematics and science teachers in the first few years of teaching.

Teacher Attrition: The Research

- Teachers who lack adequate initial preparation are more likely to leave the profession (Darling-Hammond, 2003).
- Teachers report two related causes: seeking to better their careers and dissatisfied with teaching as a career (Ingersoll, 1997).
- The most common reasons given for job dissatisfaction are low salaries, a lack of support from the administration, student discipline problems, lack of student motivation, and lack of influence over school decision-making (Ingersoll, 2000, 2003).

Teacher Attrition: The Research

- Beginning teachers commonly receive the most difficult teaching and advising assignments yet are expected to perform as expertly as experienced teachers (Wonacott, 2002).
- Other factors include perceptions of a lack of power, voice and influence over school programs and policy (Hendrick & Childress, 2002).

Solutions?

As a result of the striking statistics related to teacher attrition, states and districts have established policies such as teacher induction and mentoring programs to address the problem.

Yet, teachers are still leaving the profession.

Our Study: The Context

- A Closer Look at Teacher Perceptions
- Beginning Teacher Institute
- Conducted 1 hr. phone interviews with 18 mathematics/science teachers with 1-3 years of teaching experience

Our Study: Research Questions

- What are the challenges faced by beginning mathematics and science teachers?
- What are internal and external support structures (e.g., people, tools, programs) used by beginning mathematics and science teachers? Which components of these structures are considered helpful/not helpful to their teaching?

Preliminary Findings: Challenges

- Problematic Student Interactions (18)
- Problematic Professional Interactions (16)
- Teacher Emotions/Feelings/Expectations (15)
- Time (14)
- Teaching Assignment (14)

Problematic Student Interactions

(Classroom Management, Motivation, Setting/Maintaining Student Expectations) (18)

- “I feel I have worked so hard getting ready to come and I’ve prepared a lesson that I think is great and then when that energy and enthusiasm isn’t being reciprocated by your students it can be so difficult.”
- “And I did have a classroom teacher come and join me, the special education teacher came in, and really just was available to help me manage those students. But they were, the total group of students on a whole were very disruptive.”

Problematic Professional Interactions

(Administrators, Other Teachers, Mentors, Parents) (16)

"I feel like the math teachers will help me out if I ask them, but I don't feel really comfortable to be like, I really don't understand this, can you help me out."

Teacher Emotions/Feelings/Expectations

(Feeling Overwhelmed and Uncomfortable; Failure to Keep Up; Fear of Failure) (15)

- “I was, I was afraid to. I was afraid of I don’t know losing my job or, I don’t know what I was afraid of.”
- “I was really; my back was beginning to break with these students. I just felt like everyday I was pouring myself out and everyday I was just being drowned.”

Time

Lack of Time; Managing Time (14)

"I think time management as well just because it's really easy to get burnt out your first year because you're starting from scratch and so every night you're grading and every night you're planning and every night you have something school related."

Teaching Assignment

(Teaching remedial courses; Teaching multiple courses requiring multiple preparation; Sequence of courses taught daily) (14)

- “I’m teaching six classes a day instead of four.”
- “A big challenge my first year was that I taught physics. Which was, I have taken one physics class in high school and I took a science class in college and I was the teacher of that, so I had to go through and learn as I was going and try to be prepared for everything.”

Findings: External Supports

- Beginning Teacher Institute (15)
- Other Beginning Teachers (11)
- Family and Friends (10)
- Teacher Preparation Program (8)
- Professional Conferences (7)

Beginning Teacher Institute (14)

- “That discussion board helped me a lot, because of that, because I didn’t talk to a lot of people.”
- “… so that was helpful not feeling that I was isolated and going through these things by myself.”

Other Beginning Teachers (11)

- “It was helpful talking to the guy at school to know that the same students were bugging him and it wasn’t just me. So that helped too.”
- “… me and one of the other girls got together before school started and we worked on our plans for the first day of school together and talked about how we were going to develop our seating charts and came up with some activities. We … called each other and talked to each other about how it went and our classes and what we should change for next year.”

Family and Friends (9)

- “I could also talk to my mom since she has taught for several years. Not only because she’s taught but because she’s my mom. But, she would be very good to listen and just let me vent and then sometimes I could come back around and see, you know, what was wrong with the day and what not.”

Teacher Preparation Program (8)

- “A couple of friends that I student taught with that are teaching in other schools, I stayed in contact with them….Just being able to vent to each other. And also sharing lesson plan ideas, things that we had tried that worked or didn’t work.”
- “Calling my old colleagues at my old job and also my old professors at University X. Professor Y really helped me out this semester, talking me through the situation. So if I didn’t have access to her, and I know most people don’t call their old professors up, but that really helped.”

Professional Conferences (7)

- “Then I was fortunate enough to get a grant to be able to go to NCTM and that’s a support network once a year, not as intimate but it’s a good learning experience for math teachers to get together.”

Findings: Internal Supports

- Administrators (16)
- Department Teachers (14)
- Other Teachers in District (14)
- Assigned Mentors (13)
- Students (11)

Administrators (16)

"the principal and the assistant principal were really good about giving pointers and observations and giving feedback, so they were pretty good."

Department Teachers (14)

- “I’m so lucky because I have the other science teacher in my building and we were both first year, last year and our rooms are right next to each other and it’s just open door policy. Her into my room, me into hers, you know whatever’s going on there’s a safe place to vent. And, so she’s the number 1.”
- “I have a really close friend in my department that I typically talk to. And so we typically just debrief on the day and what went wrong and luckily she’s a really great friend and so she tries to help me focus on the positive.”

Other Teachers in District (14)

"I am the academic team co-coach with another woman [who has 6 years experience]. And her teaching style, her expectations are really high for the kids and so she and I can relate very well. So there are times when things are going wrong, I catch her in the hall or catch her in the teacher's lounge. You know I feel like I can, hey here's what's going on, give me some advice. And I can get good advice that, that meets my teaching style."

Assigned Mentors (13)

"I used that quite a bit cause the teacher that is my mentor has been here several years. And any question that I have I can go ask her about, or any like if we're going on a field trip then I can go ask her and she can tell me what I need to do and things like that. So I use that one probably more than anything."

Students (11)

- “My relationship with the kids has been the most rewarding part.”
- “You see the kids eyes and you hear in their questions that they’re really learning something new. It’s something they haven’t learned before, and they’re excited, they’re asking questions, their eyes are lighting up, they’re connecting it to other things that they know about. Those are the moments that are just incredible.”

Your Turn Again

Based on these preliminary findings, we would like you to think about what you can do within your content or methods courses to better prepare teachers for the realities of their first years of teaching.

Our Examples

Berliner (1988) describes how teachers become better at their profession the longer they teach. He details five stages of teacher career development:

novice

advanced beginner

competent teacher

proficient teacher

expert

According to Berliner, a teacher is not likely to reach the level of competence until the third year of teaching.

- Examples from MU methods courses

Your Turn Again

Based on these preliminary findings, what can you do within your content or methods courses to better prepare teachers for the realities of their first years of teaching?

Recommendations: The Research

Recommended supports for beginning teachers:

- A colleague who listens;
- A colleague to help navigate school policies/procedures;
- A colleague who asks questions to support reflection;
- A colleague who suggests resources and/or provides materials for lessons;
- A colleague who assists in planning lessons and provides lesson plans.

(Abell et al. 1995; Huling-Austin and Murphy 1987; Luft and Cox 2001; Wildman et al. 1992).

Question to Take Back

Based on these preliminary findings, what can you do to support graduates of your program during the induction years?

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