
Support Systems of Early Career Secondary Mathematics Teachers and Their Effects on Teacher Retention (STRIDES)

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Abstract

The goals of the Mathematics Teacher Education Partnership (MTE-Partnership) include building national dialogue around the preparation of mathematics teachers and promoting partnerships and model programs in the teacher development process with an emphasis on instructional chance. The goals of the STRIDES (Secondary Teacher Retention in Diverse Instructional Settings) Research Action Cluster (RAC) are aligned to these overarching goals by seeking to support teacher retention efforts. More specifically, the goal is for at least 85 percent of the early career secondary mathematics teachers in MTE-Partnership partner school districts to begin a third year of employment as a mathematics educator.

Our data was collected from a series of national surveys of mathematics teachers in their first three years of teaching. The initial pilot survey was created by a team of researchers and educators from 13 universities and four K-12 school districts and involved a yearlong study of 41 teachers. The final survey, devised from data gleaned from the pilot, was administered in December of 2016, with 141 respondents. The main objective of the final survey was to gather information about how these teachers perceive they were being supported and inform initiatives aimed at improving teacher retention rates. The survey focuses on what types of professional activities and communities in which teachers are participating, their perceptions of these activities, and how practice is influenced. Additional questions focused on administrative and university support, job satisfaction, and anticipated longevity in the field.

Keywords: professional development, teacher education, teacher beliefs/attitudes

Theoretical Framework

Research has defined key components of a more cohesive and effective system of mathematics teacher preparation and development that facilitates teacher growth and retention. Our theory of action focuses on one of these components: ensuring early career mathematics teachers have high-quality, content-specific professional support. We followed the conceptual framework laid out by Bryk, et al. (2015) and used a Plan-Do-Study-Act (PDSA) cycle throughout our research project.

Methodology

To support the efforts on teacher retention, researchers in the STRIDES RAC developed a survey to administer to early career secondary mathematics teachers to learn about their professional support. The researchers developed the “Reflection on Professional Activities” survey in iterative cycles of survey design, implementation, and data analysis, including a yearlong pilot with 41 early career mathematics teachers. The final survey is an electronic, 25-item survey asking secondary mathematics teachers in their first, second, or third year

of teaching – early career mathematics teachers – to reflect on the degree to which participating in professional learning activities and communities increased their enthusiasm for teaching mathematics and influenced their ability to facilitate student learning. The full survey was distributed nationwide by email in the late fall 2016 and as of December 2016, 141 early career mathematics teachers completed the survey. The data from this survey was analyzed in the spring 2017, interventions were devised in the summer 2017, and their implementation is scheduled for the 2017-2018 school year.

Participants

The participants of this study were solicited first through the STRIDES RAC and secondly through the MTE-Partnership team. MTE-Partnership members reached out to early career secondary mathematics teachers asking if they wanted to participate in a survey, and then administering that survey through a Google form sent via email.

Twelve percent of the respondents designated themselves as pre-service teachers, 26 percent in their first year, 26 percent in their second year, and 36 percent in their third year of teaching. An overwhelming number (94 percent) of these teachers were serving in public secondary schools in rural (13 percent), suburban (32 percent), and urban (23 percent) settings, and teaching in a full range of classes from sixth-grade general math through calculus. The schools they were serving were characterized by their teachers as low-SES (26 percent) and high-SES (9 percent). Most (72 percent) of the pre-service and early career teachers surveyed stated that between 5 percent and 20 percent of the students they were teaching had Individual Educational Plans (IEPs), 59 percent stated that between 5 percent and 20 percent of their students were designated as English Language Learners (ELLs), and 55 percent of them reported that between 40 percent to 100 percent of their students qualified for free and/or reduced lunch.

Initial Quantitative Data

Initial data analysis shows that most of the pre-service or early career teachers surveyed (81 percent) “certainly” or “probably” would become a teacher “if (they) could go back and start college again” and nearly half (46 percent) of them would remain in teaching “as long as (they) were able.” The majority of teachers (53 percent) say that they spent between one and two hours a week involved in professional learning activities and another 18 percent say they spend three to five hours a week. Teachers reported spending a large chunk of their weekly time planning with colleagues (56 percent spend 1-2 hours, another 27 percent say 3-5 hours) and another large amount of time planning alone (35 percent spend 6-10 hours, another 30 percent say 3-5 hours). Sixty-three percent of respondents report spending more than 20 hours a week teaching. Regarding professional learning activities that “increase their enthusiasm for teaching mathematics,” working/communicating with a mentor or coach rated the highest among all choices (83 percent responding that it was either moderately or very influential). In terms of support from administrators in a variety of areas (curriculum, classroom management, course assignments, assessment, instruction, collaboration and affirmation), the respondents relied to a much larger degree on those who were on-site (principals and assistant principals) rather than university professors and district office personnel.

Initial Qualitative Data

When teachers were asked what they wish were different about their job, the words that were mentioned most frequently were support, non-teaching duties, class size, collaboration, student behavior, and pay. Participants also reported that the most-used online forums for professional use were blogs and Twitter. When asked to describe a professional learning opportunity the teachers participated in that had a positive effect

on their ability to facilitate student learning, teachers described a wide variety of activities, some of which were embedded in formal or informal professional learning communities. For example, one teacher described a community of first-year teachers the school district created, and many teachers described their departments as versions of PLCs that supported their teaching practice. Few teachers described formal professional learning communities created or facilitated by their university teacher preparation program or school district, but many teachers reported access to mentors or coaches. One teacher reported:

I am currently participating in an Algebra 1 blended learning pilot being conducted by the state department. I meet bi-weekly with a coach online to discuss teaching practices and strategies. Our time together is invaluable as he provided practical suggestions and recommendations for improving my teaching.

The “positive effect” of the support teachers described tended to be either related to a change in a planning or teaching strategy, move or structure (e.g., [I learned] “the regal look - a look you give your students when you want them to be quiet”) or to feeling generally “prepared” to teach. Another teacher wrote:

I participated in an activity known as Math Talk during the Integrated Mathematics Summer Institute held at Belmont University. During the activity, students are presented with a mental math problem. They are not allowed to use calculators or writing utensils, only their brains, to solve it. The students indicate with a thumbs-up if they are ready with a solution. Once the class is ready, the teacher asks for any and all solutions. The teacher does not discuss the quality of the solutions yet, just asks for all possible answers. Once all possible answers are listed, the teacher will begin asking the students to talk about how they arrived at a particular solution. The teacher also asks other students who arrived at the same answer to compare their thinking strategies with the other students who got the same answer. This activity was influential for me because it allowed me to see the endless ways students can mentally see and think about mathematics. It also encouraged me to help students compare their thinking with others, in order to grow their understanding of a topic. Most importantly, it has helped me help my students make connections between the way they currently see mathematics and all of the new ways they can see mathematics. Some of the information presented during my Residency classes has been influential. We did some community building activities and they made me realize how important a strong community is for the classroom. We talked at a conference about working on growth mindsets. It was beneficial to know how to word ideas to help facilitate and modify mindsets.

Lastly, participants were asked to describe how a professional learning activity increased their enthusiasm for teaching mathematics. Most of the responses fell into two categories. The first category is teachers who are inspired and rejuvenated by working with someone who has an infectious, enthusiastic attitude about teaching. The second category of responses was enthusiasm gained by trying out new ideas in the classroom and seeing their students succeed with them. Teachers learned of new activities via conferences, blogs, meetings with colleagues and various other ways and described how invigorating it was to customize these ideas to fit the needs of their students, try them on using their own teaching style, and see their students succeed.

Next Steps

The main takeaway from our study is that when teachers feel supported, they have the desire to want to stay in the field of education for longer periods of time, and that meaningful support can come in a variety of forms. Our next steps include working with teachers in the MTE-Partnership to identify support systems that are working and replicate those in settings where teachers are not supported. At the annual MTE-Partnership

conference in June of 2017, two initial interventions were developed. These targeted interventions will be implemented during the 2017-2018 school year with a goal to expand meaningful support for early career mathematics teachers and to increase teacher retention at large, serving as proof of principle for more wide-scale efforts. The first intervention will include replication of the best parts of mentor systems within more of our partnership schools. The second intervention includes working with administrators so that they are knowledgeable about working specifically with new teachers and supporting them during these critical years. Lastly, sharing this research will inform the larger audience as well as serve as an example of school-university partnerships that function cooperatively to solve the issues of retention of secondary mathematics teachers.

References

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