

# MATHEMATICS SPECIALISTS INCREASINGLY APPRECIATED AND SOUGHT

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## **Introduction**

The overall goal of the National Science Foundation (NSF) Teacher Professional Continuum (TPC) program grant, now in its fifth and final year, has been to determine the effectiveness of a school-based Mathematics Specialist program. The grant's core has been the preparation and support of two cohorts of twelve Mathematics Specialists each, deployed in twenty-four elementary schools in five Virginia partner school divisions. This article reports and discusses the third round of parallel utilization interviews conducted in these divisions as part of the grant's policy research component.

Compared with the group of principals who received the first cohort of Mathematics Specialists in 2005 and who were interviewed in 2006, the group of principals who received the second cohort in 2007 and who were interviewed for this study in 2008 were more prepared to integrate the Specialists into their schools. They were more involved with the Specialists' activities and responsibilities, and facilitated their primary roles as teacher leaders.

These two groups of principals are identical in their enthusiasm for their Mathematics Specialists and the grant-sponsored model, namely—the built-in, everyday support for their schools' mathematics instruction programs. They also are united in their apprehensions about losing their Mathematics Specialists with the grant's conclusion. Said one, “We really need a Math Specialist in every building.”

## **Background and Methodology**

The NSF-TPC grant's parallel utilization study focuses on local school and division implementation of the twenty-four Mathematics Specialists provided through the grant; particularly, the Specialists' actual roles in their schools and their acceptance by classroom teachers and the school community. The five partner divisions, which contribute significant funding and support for their grant-provided Specialists, are the cities of Portsmouth (four

Specialists), Richmond (eight Specialists), and Virginia Beach (four Specialists), and also the counties of Spotsylvania (two Specialists) and Stafford (six Specialists).

The findings from the 2006 interviews of the Cohort I principals are reported in “The Role and Impact of the Mathematics Specialist From the Principals’ Perspectives” [1]. The findings from the 2007 interviews of school division policy leaders, including school board members, division superintendents, and supervisors for instruction, are reported in “School Division Leaders Keen On In-School Mathematics Experts” [2]. The policy leaders interviews focused on division-level implementation decisions, which included the reasons behind the division’s participation and perceptions of the Mathematics Specialists’ impact on instruction and achievement.

During Summer 2008, both of the grant’s policy associates interviewed six principals. All principals were cooperative and spoke freely about their experiences with their Mathematics Specialists. The interviews were loosely structured using the same discussion items as had been used with the Cohort I principals. Areas addressed included the following: 1) school population information; 2) principal and faculty preparation; 3) supervision; 4) areas of focus; 5) activities included in the Mathematics Specialist definition used in the grant [3]; 6) classroom teacher response; 7) school responsibilities; 8) school and parent satisfaction; and, 9) expectations for the next school year.

This descriptive list of discussion items was provided to the principals well in advance of the interviews, and all principals were encouraged to speak about any areas not included in the discussion outline. Rapport was easily established and conversations flowed freely. The principals received and reviewed summaries of the interviewers’ notes for the purposes of corrections and additions.

Analysis of the principals’ responses revealed several central tendencies which illuminate positive growth since the first NSF Mathematics Specialists were placed in schools at the start of the 2005-6 school year. The observations and summaries which follow discuss program maturation in these areas: 1) principal’s familiarity with the Mathematics Specialists program; 2) knowledge and use of data; 3) specific plans for focus; 4) leaders, not teachers; 5) faculty acceptance; and, 6) school and community support.

**Observations and Summary—Principals’ Familiarity with Program**

Understandably, the Cohort II principals had a much higher degree of awareness of the role and benefits of Mathematics Specialists than had their Cohort I counterparts. In the intervening two years between the two cohorts’ school placements, experiences and discussions about Mathematics Specialists had increased at both the state and local levels. More information about the Specialists was appearing in professional journals and in newspapers, and the Mathematics Specialist was a topic at educational conferences.

The principals interviewed in 2008 reported contacts with division mathematics staff and their Cohort I forerunners. They had been following the local implementation with interest, “hearing that good things were happening in the Cohort I schools.” These exposures led to the principals’ determination to have Specialists in their own buildings, one principal saying, “I knew I needed one.” Even though the school placements of Specialists had been predetermined by grant protocol, the principals reported begging the administration for inclusion. One principal who transferred from another division where she had had a math coach lobbied for one in her new assignment. Such familiarity publicized the Specialists throughout the divisions and likely accelerated the acceptance and use of the Mathematics Specialists in their new schools.

In one division, a foursome of principals, two in Cohort I and two in Cohort II, met during Summer 2007 to discuss the past year’s experiences with Mathematics Specialists and lessons learned. Before the school year started, the four principals lunched with their four Specialists to discuss entry strategies and goals for the upcoming school year. They continue to encourage the Specialists to meet regularly for support and sharing. When a division budget oversight omitted local money for the Mathematics Specialists, threatening their continuation, the four principals became an ardent (and successful) team of advocates for restoration of the needed funds.

**Observations and Summary—Knowledge and Use of Data**

Comfort levels and capabilities in interpreting and using data to drive instruction rose considerably during the intervening two years. A principal observed that data use is becoming easier and more routine for teachers. This upward trend is related not only to the presence in their schools of Mathematics Specialists trained in data use, but also may be attributed to the intense focus on data by school division leadership and dedicated support from Virginia Department of Education (VDOE) staff. Principals were quick to praise accelerating division and VDOE efforts

in improving the use of data, sharing analyses of school and division data, and providing a range of professional development opportunities to faculties.

The principals have given major responsibility to their Specialists for disaggregating, analyzing, and interpreting the school mathematics data from both state and division testing. Data discussions occur between principals and Specialists, within administrative and data team meetings, and ultimately, with grade level teams. Notwithstanding, the principals remain the instructional leaders and communicators of priorities in their buildings.

Data typically is used to target the instructional needs of the teachers as well as the achievement needs of the students. One principal commented that, “It is important to learn from last year’s mistakes—how, for example, a specific instructional area needs to be taught differently.” Specialists share reviews of individual pupil or class deficiencies with classroom teachers to strategize instructional methods and interventions at the same time. Discussions such as these were described as “specific, not global.”

Data is used for reward as well as intervention. One Specialist has the responsibility of maintaining the “85% lists” in the library. These lists recognize both the students who have achieved a pass score of 85 or above and teachers whose classes have done the same.

### **Observations and Summary—Specific Plans for Focus**

Each principal had several specific areas of focus for the Specialist, some identified by data analysis and some “the old-fashioned way,” through observation and experience. Some principals singled out specific grades for focus, generally those grades performing at an unsatisfactory level on previous testing or those grades where mathematics testing had been recently instituted.

The Mathematics Specialists had responsibilities for assisting teachers in addressing areas of deficiency. In many instances, Specialists were paired with new or weak teachers to boost their classroom instruction. One principal noted that the Specialist was “great at collaboration with teachers on problem identification and strategies for solving problems.”

The principals’ expectations are numerous and require a range of content and pedagogical skills on the part of the Mathematics Specialists. Among the areas of school mathematics focus listed by the twelve principals are the following: lessening traditionalism in a school’s

mathematics instruction program; stressing concepts and active engagement in instruction as well as memorization; arranging more mathematics instructional time in specific situations; focusing on teaching teachers to improve grouping for instruction; algebra readiness (“a thorn in our side right now”); problem solving as a whole; basic operations of multiplication and division; “teacher quality”; ensuring proper curriculum pacing and use of materials; and, “helping teachers teach the entire mathematics curriculum, not just what they are comfortable with.”

Data and the desire to improve student achievement appear to have increasingly focused schools on individual teacher skills. Principal and classroom teacher expectations for Mathematics Specialists in this regard are high and have resulted in more requests for coaching and resources.

### **Observations and Summary—Leaders, Not Teachers**

Mathematics Specialists often find themselves in leadership roles in their schools. Many serve on planning or improvement teams that address division and school goals. One serves as school committee chair for math action and the mathematics Lead Teachers. Another is serving as the academic coordinator for the No Child Left Behind math tutoring program. Yet another is the school liaison to the division mathematics supervisor and introduces division ideas and materials to teachers. One principal noted that she appreciated “another set of eyes and hands to observe instruction.” Another principal stated, “As far as math goes, she *is* the leader.”

Principals frequently commented on how motivated and hard working their Specialists were, and admired how quickly they took the initiative in a variety of areas. More than one has assumed responsibility for the university instructors’ algebra readiness program. Some have assumed roles in leading or restructuring the school remediation program.

Another scheduled herself frequently with a long-term fifth grade substitute which, in the principal’s view, enabled the students “to hold their own in math” during their regular teacher’s absence. Yet another encouraged teachers to attend division workshops or other professional development opportunities, even finding specific programs for teachers according to their instructional needs. It was reported that the teachers appreciated this individualized assistance.

Many comments demonstrated that Mathematics Specialists also enhance the school mathematics climate in subtle ways. One Specialist is described as “carrying the torch” for mathematics. Another elevated the importance of mathematics at the school, establishing it as a

separate goal in the school improvement plan where previously it had been only embedded. Math clubs, math awards, math displays and contests, parent and Parent Teacher Association interactions have raised the importance of mathematics throughout the schools and communities.

In the 2006 interviews, some principals had reported assigning the Mathematics Specialist to be the math teacher on a daily basis for one class or scheduling the Specialist on a regular basis to provide student remediation or prepare the required assessment portfolios for certain students with disabilities. In the 2008 interviews, the talk was of Specialists teaching teachers, not teaching students.

### **Observations and Summary—Faculty Acceptance**

The imaginary line tracking faculty acceptance of the Mathematics Specialist appeared initially to follow the same gradual upward curve that was estimated from the Cohort I interviews. There was initial apprehension and some push-back, most often from veteran teachers who had territorial issues. Some principals set precise expectations regarding staff consultation with the Specialist. One even required each classroom teacher to invite the Mathematics Specialist into the room a minimum of one visit per month, indicating that the frequency would be checked.

However, the acceptance curve seemed to turn upward sooner and more steeply than it had for the Cohort I Specialists. Comments included the following examples:

- “News of positive peer reception flew down the hall and encouraged all teachers to access this new resource.”
- “Once the faculty understood the role, the teachers embraced her; even the seasoned teachers welcomed her.”
- “The Math Specialist keeps the teachers from being overwhelmed.”
- “Trust was the key issue in the first year and the Specialist was able to build this. The faculty became supportive as the members saw the Specialist as benefiting their efforts.”

In one school, the Specialist soon was in such demand that teachers’ daily schedules had to be adjusted to allow more even access.

Overall, the faculties took to teaming and coaching very well. The teachers appreciated the Mathematics Specialist’s help with understanding and using assessment tools. They also

appreciated the versatility the Specialist brought to their teaching in terms of another point of view about their classrooms, teaching style, alternative instructional strategies, and new resources. Students were reported to be very accepting of the Specialist's presence, too.

Mathematics Specialists with good technology skills were particularly praised by teachers with multi-level classes or in fully-included schools, as they were of great help with the classroom instructional technology so valuable in differentiating instruction for students. Observed one principal, "The teachers reach out to her because she has what they need."

### **Observations and Summary—School and Community Support**

Principals and teachers are enthusiastic. They are very pleased to have this new resource, one principal noting, "Math Specialists are a hot commodity now. Everyone wants one." Satisfaction is high. "I am absolutely satisfied. I need more Math Specialists." Another commented, "If the Math Specialist is taken out of our school, the teachers will fight!"

Principals also noticed that the Specialist's expertise and resourcefulness extended into the parent community. In several schools, the parents increasingly realized the importance of mathematics instruction for their children and stepped up their interactions with teachers. Others began calling on the Mathematics Specialist for guidance and assistance. Some Specialists became involved with parent groups requesting their expertise with teaching and reinforcing math skills at home.

One principal is proud that some of the school's community partners began asking for the school's *Standards of Learning* test scores. Some partners are supporting the achievement and attendance awards given at the local "Saturday School" for reading and mathematics remediation.

Nevertheless, as delighted as principals are with their Mathematics Specialists, they are considerably concerned that their divisions will discontinue these positions when the grant terminates at the end of the 2008-2009 school year. When the grant ends, so will the \$25,000 payments made by the NSF toward the first two years of each Specialist's salary.

Indicating high regard for the contributions of Mathematics Specialists, the Commonwealth of Virginia made a one-time appropriation of \$12,500 in salary support for Cohort I Mathematics Specialists who continued for a third year. So appreciative were the

partner divisions that they continued their local funding and made up the \$12,500 gap in the third year, and then funded all costs for a fourth year.

Reflecting their strong beliefs in the effectiveness of in-school Mathematics Specialists, the Cohort II principals most heartily recommended that the current Specialists be maintained in place and that the program be expanded to other division schools. Policymakers, in turn, have supported their principals' insistence that Mathematics Specialists have high value in their schools. At the time this article was submitted for publication, all five partner divisions had included sufficient funding in their 2009-2010 budget proposals to continue their current Specialists for another year. While these budgets have yet to be adopted, division policymakers' inclusion of such funding during hard financial times is noteworthy.

## References

- [1] D. Blount and J. Singleton, "The Role and Impact of the Mathematics Specialist From the Principals' Perspectives," *The Journal of Mathematics and Science: Collaborative Explorations*, **9** (2007) 69-77.
- [2] D. Blount and J. Singleton, "School Division Leaders Keen On In-School Mathematics Experts," *The Journal of Mathematics and Science: Collaborative Explorations*, **10** (2008) 133-142.
- [3] "Mathematics Specialists Definition," Mathematics Specialists School and University Partners, *The Journal of Mathematics and Science: Collaborative Explorations*, **8** (2005) 1-2.