

# THE ROLE AND IMPACT OF THE MATHEMATICS SPECIALIST FROM THE PRINCIPALS' PERSPECTIVES

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## Introduction

The National Science Foundation (NSF) Teacher Professional Continuum (TPC) program grant includes a parallel utilization study of local school and school district policy and implementation issues associated with the introduction of Mathematics Specialists in elementary schools. In this parallel utilization study, policy and implementation issues are viewed as distinct. School district policy is established by the local appointed or elected school board in the contexts of state policy decisions, local education community priorities, and the availability of personnel and resources. The district superintendent, principals, and other staff create the structure and practices necessary to implement the local board's policy choices, such as the placement of Mathematics Specialists in selected elementary schools.

The five-year NSF grant, now in its third year, has as its centerpiece two cohorts of twelve teachers each preparing and then serving in elementary schools as Mathematics Specialists for two years. Funding for the two-year school assignments for each cohort of Specialists is provided jointly by the NSF and the five partner districts of Portsmouth, Richmond City, Spotsylvania, Stafford, and Virginia Beach.

The first phase of the parallel utilization study focuses on local school implementation of Mathematics Specialists. During July and August of 2006, the grant's two policy associates interviewed the principals of the schools in which the first cohort of twelve Mathematics Specialists had begun their assignments in September, 2005. The twelve elementary schools vary in grade configuration (PreK-5, PreK-6, K-5) and a few schools had changed configurations for the 2005-2006 school year. One school is quite new; others are rather old. There is also variety in student demographics, school size, and in Title I eligibility with some schools having schoolwide Title I programs, some targeted programs, and some not participating. Math achievement is variable as well. For example, on the 2005 *Standards of Learning (SOL)* assessments, fifth grade pass percentages ranged from the high 60's to the low 90's [1].

## **Methodology**

Each policy associate traveled to six of the twelve schools so that all interviews were conducted in person. The principals were cooperative and verbal, apparently pleased to talk about their first-year experiences. Interviewer-interviewee rapport was easily established. Almost all came across as highly engaged in integrating the Mathematics Specialists into their schools. While all principals viewed the Specialists as positive staff additions and were eager to have them back for the second year, their responses are considered credible.

The utilization information sought was school specific. The interview itself was loosely structured by means of a list of recommended discussion items provided to the principals before the interviews. A summary of the interviewer's notes taken during the meeting was sent to the principal for revisions and additions.

The major focus of each discussion was how the Mathematics Specialist's activities reflected the seven-part definition being used for Virginia's grant [2]. Other areas of planned discussion included the reason for the school's inclusion, work space provided to the Specialist, other school responsibilities assigned, as well as school and parent satisfaction. In addition, the principal was asked for comments on any area not explicit in the discussion plan and about their expectations for the program during the 2006-2007 school year, the second year the Specialist would be working in the building.

For this article, the principals' comments, along with the related observations of the policy associates, are reported for themes that appear to provide the most helpful information about implementation and school-level decision making regarding the use of the Mathematics Specialist: 1) the role of the principal in integrating the Specialist into the school; 2) the Specialist's actual activities compared with the Mathematics Specialist definition; 3) teacher improvement and retention; 4) diverse learners; 5) parent and community interaction; and, 6) the principal's expectations for the second year—2006-2007.

## **Summaries and Observations**

The Role of the Principal in Integrating the Specialist into the School — As might be expected, the principals were forthcoming about their roles in introducing and supporting their new Specialists. There were several instances of principal/Specialist collaboration prior to the start of the school year: interactions that included discussions about school test scores, the direction of the math program, and about transition to a new math series. However, the principals were

equally forthcoming about the personal and professional qualities of their Specialists; many of them noted their Specialist's personality traits as ingredients for success. Some illustrative accounts follow.

- “Because the school’s math scores seemed good to us, my veteran staff was concerned about the Mathematics Specialist’s impending arrival. They required reassurance from me that the scores really were good and they were not doing anything wrong!”
- “I made a concentrated effort to create a good relationship between the incoming Mathematics Specialist and my great Title I Teacher, initially holding a social meeting with the two of them and then progressing to meetings to define math goals as well as the two individuals’ roles.”
- “The positive and active role of the principal is critical to the Specialist’s acceptance and success. I was visible in supporting her, attending the grade-level planning meetings she held with the math teachers, and meeting with her regularly.”
- “The Specialist came with great things in mind and the staff embraced her. She has been good at putting teachers at ease over their apprehensions about math, and works especially well with veteran teachers.”
- “The Specialist was a very calming and patient person, and her performance exceeded expectations.”
- “She was very resourceful, organized, task oriented...and available.”

Two predominant factors arose from this set of interview data as strongly influencing the nature and quality of school-site implementation. They are: 1) a principal with vision and force; and, 2) a Specialist with confidence and knowledge. When both were present, a noticeable synergy resulted; when both were absent, not much appeared to be accomplished mathwise in that building. Other factors, such as student demographics, school size, grade configuration, and parental involvement, did not seem relevant to successful implementation.

Actual Activities versus Mathematics Specialist Definition — There is ample evidence that the Mathematics Specialists, with one exception, worked in all seven activity areas included in the definition. One Specialist’s role presented as restricted in that she was directed to work more

with students than with teachers and assigned to teachers to focus on reteaching unmastered skills. However, the principal intends that the Specialist perform more data interpretation and assist with the school's weekly math assessments in the 2006-2007 school year.

Specifically, the Mathematics Specialists engaged in frequent group and individual staff development, including coaching, mentoring, modeling/demonstrating lessons, and co-teaching. They had significant roles in data analysis as related to targeted instruction and assisted grade-level teams with planning and pacing curriculum delivery, and in introducing a new math series. In addition, they were active with diverse learners in programs for remediation, students with disabilities, and accelerated learning, and interacted frequently with Title I Teachers, and Gifted and Talented Teachers.

There was variability in the amount of parent and community contact. There were many examples of school math program leadership. Several Specialists served, or will serve in 2006-2007, as members of school leadership/improvement teams that shaped the school improvement plan or its math or literacy components. Some Specialists met with both grade-level and administrative teams to analyze test scores. Others were on teams that reviewed curriculum matters and test data. Almost all principals respected the definitional intent that Mathematics Specialists be Teacher Leaders. Some of their observations:

- “On a day of in-school in-service before school opened, the new Specialist jumped in to help teachers struggling with the assessment portion of *Everyday Mathematics*, for which they had recently attended a divisionwide in-service” [3].
- “Our Mathematics Specialist came to school to introduce herself to me and the staff *before* the teacher workdays began.”
- “She has such initiative; for example, bringing in a Norfolk State University instructor to teach selected material to the sixth grade math teachers, a grade level we had just acquired.”
- “The transition to the new math series would have been very difficult for both teachers and parents without the Mathematics Specialist.”
- “She also built a good rapport with teachers. She came on board with good ideas and was willing to work.”

- “Though there was some resistance at first, the teachers soon felt comfortable approaching the Specialist and came to see her as a colleague.”

Teacher Improvement and Retention — The principals quickly homed in on the Specialists’ value in improving inexperienced and weak teachers. Not surprisingly, many focused the Mathematics Specialists on fourth and sixth grade teachers as these grades took *SOL* math tests for the first time in 2005-2006. At times, Specialists were directed toward grade levels that had a number of new, ineffectual, or inexperienced teachers. In one school, the principal reported that after the Specialist coached and collaborated with five second grade teachers identified as having math instructional deficits, four improved noticeably. In some cases, principals ensured that the teachers-turned-Specialists spent time working with faculty at grade levels different from the ones they had taught for the purpose of gaining experience across the elementary spectrum. On the other hand, one principal realized in hindsight that she had been unwise in pairing the Specialist with a Mathematics Lead Teacher and should have placed her with a weak teacher to better utilize her as a resource.

A Specialist worked closely with a first-year third grade teacher who needed assistance and with a long-term substitute teacher in fifth grade. Another Specialist teamed regularly with a new fifth grade teacher whose principal observed, “As a result, that teacher will be a good math teacher next year.” Specialists also were asked to assist teachers moving to a new and higher grade level, a so-called “hard jump up.”

Diverse Learners — The principals used the Specialists for assistance with a range of diverse learners, and many were heartily grateful for help with the Virginia Grade Level Assessment (VGLA) used for certain students with disabilities as an alternative to the *Standards of Learning* tests. These assessments require considerable effort and extensive record keeping. At least one principal pointed out the Specialist’s role in ensuring that the individual assessment used for each student was aligned with the grade-level curriculum and in keeping the individual student portfolios current. This same principal considered the Specialist a boon for assisting with the first year of the school’s full inclusion model. Another principal had the Specialist pay special attention to the inclusion classrooms and the VGLA. Another principal made the VGLA her Specialist’s primary responsibility.

There was considerable evidence that Mathematics Specialists collaborated with and served as resources for Special Education Teachers. In one school, the Specialist served on the

district team for Special Education and identified “holes” in Special Education math instruction. Another Specialist worked with both Special and General Education Teachers on strategies to reinforce skills of students who lacked a strong mathematics foundation, specifically targeting students not meeting expected benchmarks. Keying in on her principal’s interest in accelerated as well as remedial learning, a Specialist instituted Tuesday-Thursday afternoon groups to help students prepare to take algebra in middle school. She recruited a university student to assist with the groups. The students loved the algebra readiness sessions and the principal reported that the parents were very appreciative of this attention. The principal in another school pushed a schoolwide basic facts program after the Specialist observed there was a basic facts deficit throughout all learner groups—including the gifted and talented.

A pattern emerged of principals seeking help from the Mathematics Specialist for a variety of different learning groups when the demographics or size of the student body changed due to boundary adjustments or the addition of another grade level. The Specialists are seen as key to enabling the teaching staff to instruct more and/or different types of students.

Parent and Community Interaction — Not all principals used their Mathematics Specialists for parent or community interaction. However, the responses indicated that the amount of parental involvement for the Mathematics Specialist was equivalent to that for the school. For example, one principal noted that parental involvement was quite limited because the school was not a neighborhood school.

Nevertheless, there were numerous examples of Mathematics Specialists linking with parents and the community in a variety of ways. With the institution of a new math series in one division, parents had lots of questions. The Specialists in this division’s schools fielded most of these questions and facilitated discussions about the new program in several parent workshops. They also met with parents on an individual basis. One principal noted that the Specialist was instrumental in explaining the new math program and the philosophy behind it at school open houses. In one school near a NATO installation, the Specialist met with foreign parents to answer their questions about how math was being taught in the United States.

Mathematics Specialists helped organize the math and science nights at their schools. They conducted workshops for parents of Special Education students and Title I students on math skills to enable them to assist their children at home, and shared information with parents through the school newsletter on how to help their children with math. A Specialist was praised for recruiting parent teacher association volunteers to assemble the math game kits used in *Everyday*

*Mathematics* for children to take home to play with their parents and siblings. Still another spearheaded a “Thinking and Games” event in conjunction with the parent teacher organization [3]. One principal was proud that the Mathematics Specialist, in her role as a member of the school improvement team, had brought up good ideas for the school and community in general. This Specialist led activities to build local school support and publicized improved academic achievement in the community.

### **Expectations for 2006-2007, the Second Year**

All principals have high expectations for the Specialist’s second year. According to one, “Next year will be even better than this first very good year because developing comfortable personal and instructional relationships in a new school requires a full year.”

Interestingly, each principal worded her expectations in terms of what she—the principal—would ask the Specialist do. The impression is that the principals have learned lessons about managing the Mathematics Specialist Program and have identified specific ways they will adjust the first year’s implementation plan. Moreover, they are excited about how their Specialists are adapting and expanding their roles as Teacher Leaders. A few of their expressed intentions are listed below.

- “For 2006-2007, the Mathematics Specialist will be a member of the School Leadership Team. She will chair the math action team and thus have an expanded influence on the way math is taught in our school.”
- “The Mathematics Specialist will come in early to review the 2005-2006 *Standards of Learning* test data as it becomes available. What is learned will be used in instructional team planning for the 2006-2007 school year. One focus will definitely be curriculum alignment.”
- “We’ll focus more on differentiation among the student populations, for example, taking the gifted students up a notch.”
- “She’ll have more involvement with parents and conduct a deeper analysis of *SOL* scores and strategizing to address needs of students.”

- “She’ll work with grade levels that remain concerned about pacing, breaking down data/scores to see what needs to be done for different subgroups and strands.”

### **School Satisfaction**

Without exception, all principals are pleased to have had the Mathematics Specialists assigned to their schools and are enthusiastic about the second year. In fact, a principal who was reassigned to another school during the summer said she frequently pleaded (to no avail) with the central office to allow the Specialist to move with her. A Specialist reassigned to another school in November for administrative reasons unrelated to her performance, also received high marks from her new principal.

Moreover, most principals reported that their staffs had been pleased. Their comments follow.

- “She’s a wonderful addition to our school.”
- “The classroom teachers have been re-invigorated by the Mathematics Specialist’s presence in the building. They were pleased with the in-house in-services.”
- “The staff liked her and would seek her out. Teachers who had difficulty teaching math were especially appreciative.”
- “She really became a ‘source of comfort,’ especially at the upper grades where she had been focusing her efforts.”
- “I could not imagine not having the Specialist there.”
- “Staff reaction was very positive. I don’t know what we would have done without her.”

### **Next Phase of the Study**

The second data collection phase for the parallel utilization study will be conducted during the 2006-2007 school year with division policy-maker interviews. According to the plan approved by the grant project team, the policy associates will seek interviews with school board members and the superintendents (or their designees) of the five partner divisions employing the first cohort of Mathematics Specialists.



Information will be sought regarding policy decisions about division participation in the Mathematics Specialist grant, the process that led to that decision, whether the division expectations have been satisfied, obstacles to implementation that have been identified, and estimated costs of the participation to the division. ■

## References

- [1] *Standards of Learning for Virginia Public Schools*, Board of Education, Commonwealth of Virginia, Richmond, VA, 1995; Internet: <http://www.pen.k12.va.us/VDOE/Superintendent/Sols/hom.shtml>
- [2] "Mathematics Specialists Definition," Mathematics Specialists School and University Partners, *The Journal of Mathematics and Science: Collaborative Explorations*, **8** (2005), 1-2; Internet: <http://www.math.vcu.edu/g1/journal/Journal8/Part%20I/Definition.html>
- [3] *Everyday Mathematics*, University of Chicago School Mathematics Project, McGraw-Hill, New York, NY, 2004.