

STRONG SUPPORT FOR MATHEMATICS SPECIALISTS IN VIRGINIA

J. SINGLETON and D. BLOUNT
*Commonwealth Educational Policy Institute
L. Douglas Wilder School of Government and Public Affairs
College of Humanities and Sciences, Virginia Commonwealth University
Richmond, VA 23284-2028*

Introduction

Strong, consistent support from state and local policymakers is essential to the establishment of effective Mathematics Specialists programs in local school divisions. When policymakers and policy leaders understand that there is a positive relationship between school-based Mathematics Specialists and significantly improved student mathematics achievement, they are likely to take legislative, regulatory, and budget actions that initiate, nurture, and sustain successful programs. This article presents specific state and local policy actions that have contributed to Virginia's nationally-recognized accomplishments in implementing and supporting Mathematics Specialist programs in elementary and middle schools.

In 2004, the National Science Foundation (NSF) awarded a consortium of three Virginia universities and five partner school divisions a five-year Teacher Professional Continuum (TPC) grant having as its overall goal determining the effectiveness of a school-based Mathematics Specialist program in grades K-5. The program core has been a pilot program to prepare, deploy, and support—with NSF and local funding—twenty-four Mathematics Specialists in elementary schools for two years each. Twelve Cohort I Mathematics Specialists started their school assignments at the beginning of the 2005-06 school year; twelve Cohort II Mathematics Specialists, with the 2007-08 school year.

From its inception, the NSF-TPC grant has focused on identifying and taking into consideration the state and local policy climates that underlay the successful implementation of Mathematics Specialist programs across Virginia. The grant's project management team has included two policy associates who have analyzed policy, legislative, regulatory, and funding issues at the state and local levels, and also guided the team and the partner divisions in understanding the relationships between policymaking and establishing effective, sustainable Mathematics Specialist models.

In the fifty states, education policy is established and funded, to a greater or lesser extent, by the state legislative body. For Virginia, this body is the Virginia General Assembly, advised by the gubernatorially-appointed Virginia Board of Education. State public education policy is set by the legislatively-enacted Standards of Quality (SOQ) found in the *Code of Virginia*, the biennial budget's appropriation of elementary and secondary education funding based on the SOQ and various other legislation, such as laws regarding personnel, transportation, and health.

Virginia's local school divisions are creations of the General Assembly and, in almost all instances, follow the political boundaries of counties, cities, and towns. The local school boards are given specific limited powers in the Virginia Constitution and are to be either popularly elected or appointed by the local elected governing body; that is, the county board of supervisors or the city (or town) council. Local school boards carry out state education policy, and adopt congruent policies for employing instructional staff and addressing local priorities. The school board determines the school division budget, subject to the approval and appropriations of the local government.

For the purposes of this article, *policymakers* are considered to be those state and local government legislators, elected officials, and local school board members who are empowered by law to set and, in some cases, fund education policy. *Policy leaders* include the superintendent and administration of local school divisions who are key influencers of the policies adopted or not adopted by the *policymakers*. *Policy leaders* initiate policy recommendations to the school board, analyze policy suggestions and directives, inform the school board's policy decisions, and carry out these decisions. In this same manner, at the state government level, the members of the Virginia Board of Education are seen as important *policy leaders*, while the Governor and General Assembly are seen as *policymakers*.

While the terms *policymakers* and *policy leaders* are used more or less interchangeably in this article, sometimes, for simplicity, *policymakers* may refer to either. However, as described above, the makers and the leaders, while working closely together, differ markedly in terms of actual authority and responsibilities.

Support from Policymakers and Policy Leaders

Throughout the five years of the NSF-TPC grant, state and local policymakers and policy leaders have strongly and consistently backed the preparation and support programs provided for the grant's elementary school Mathematics Specialists. School administrators have enthusiastically endorsed the in-school implementation model developed and used for the NSF-TPC grant. As this article will detail, the policymakers have funded as well as endorsed the program.

This on-going support is rooted in two bases: 1) the direct positive experiences of school divisions employing Mathematics Specialists either in locally-developed programs or through participation in NSF Mathematics Specialist grants; and, 2) the convincing body of evidence which has emerged from grant-supported quantitative research. This research has determined that, over time, K-5 Mathematics Specialists contribute directly to raising the mathematics achievement of the student populations they serve.

While this article draws on interviews and interactions with policymakers and policy leaders, it does not specifically address research findings. Let it be noted that the research conducted for this grant shows that overall, students in schools having elementary Mathematics Specialists in place for three years had statistically significant higher scores on the Virginia Standards of Learning mathematics assessments than did students in the control schools without such Specialists.

At all levels of government, policymakers and policy leaders are, by necessity, financial realists. They know that funding constraints may understandably limit the expansion and/or retention of the numbers of Mathematics Specialists employed by local school boards as Virginia struggles during the current economic recession. Moreover, they are aware that funding shortfalls may determine how the role of a Mathematics Specialist develops within a school division or in a specific school.

This article reports actions and interview statements from partner division policymakers and policy leaders. Also, it expresses the conclusion of policymakers and policy leaders that the key obstacle to employing Mathematics Specialists is not unwillingness but insufficient funds.

State Policymakers and Policy Leaders

State policymakers and policy leaders quickly recognized the value of Mathematics Specialists in increasing student mathematics achievement by enhancing the quality of mathematics instruction. For more than six years, the General Assembly and the Virginia Board of Education have taken actions in support of Mathematics Specialists. These have included creating a Mathematics Specialist add-on endorsement, recommending requirements and appropriations for mandated K-8 Mathematics Specialists in public schools, providing funding in support of a third year of employment for Cohort I Mathematics Specialists, and amending the Virginia Standards of Quality to require specialized assistance for students evidencing problems in learning mathematics. Recall that the Standards of Quality are the sections of the *Code of Virginia* which govern public elementary and secondary education, and drive its funding. It should be noted, not surprisingly, that the actual funding formulas are a source of continuing controversy between the Commonwealth and the local governments.

Endorsement — As a result of amendments recommended by the Virginia Board of Education to the *Virginia Licensure Regulations for School Personnel*, an add-on endorsement for a Mathematics Specialist for elementary and middle school education became effective in September 2007. In 2005, the General Assembly had requested the Board to consider such an endorsement in its licensure regulations revision in order to improve student achievement in mathematics. As of March 2010, 229 individuals had achieved this endorsement.

Legislative Mathematics Education Study — During its 2006 session, the General Assembly commended several Virginia school boards for both recognizing the value of Mathematics Specialists and taking the initiative to employ them to help elevate both teacher and student performance. In that same session, the legislature created the Joint Subcommittee Studying Science, Math and Technology Education, stating in its resolution that increased emphasis on science, mathematics, and technology education is necessary at the elementary and secondary level. In 2007, this Joint Subcommittee introduced legislation for a pilot program providing grants to six school divisions to hire Mathematics Specialists. The proposed legislation was not enacted.

Mathematics Specialist Position Requirement — In 2006, the Virginia Board of Education recommended that the Commonwealth of Virginia include requirements and appropriations for K-8 Mathematics Specialists in the public schools through the Standards of Quality which drive funding for many instructional positions. Enabling legislation was introduced during the 2007

legislative session to provide one, full-time Mathematics Specialist for each 1,000 students in grades K-8. Its failure may be largely attributed to its very large costs. The FY10 financial impact estimate of the state share of the cost for K-8 Mathematics Specialists at the proposed ratio was \$28.6 million. The local share, also based on the controversial state funding methodology, was \$22.8 million.

Mathematics Specialist Grant Support — For FY07, the General Assembly did provide one-time funding for salary support for some NSF-TPC grant-supported Mathematics Specialists so that an additional third year of research data could be obtained. The NSF grant had provided \$25,000 per year to the partner school divisions for each of the Cohort I Specialists employed during 2005-06 and 2006-07 only. The General Assembly provided \$12,500 to the partner divisions per Specialist employed during 2007-08 and the partner divisions provided the additional funding for each of the twelve Specialists. This third year of data proved to be key to the positive findings of the quantitative research component of the grant.

Standards of Quality Amendment — At the request of the Virginia Board of Education, the 2007 General Assembly amended the Standards of Quality to require school divisions to identify and assist students having difficulty with mathematics. Previously, the Standards of Quality had required such interventions only for students having difficulty with reading. This amendment codifies the legislative intent to improve student mathematics achievement.

Flexibility Budget Amendment — In advance of the termination of the NSF-TPC grant's funding with the 2008-09 school year, the Virginia Board of Education submitted a budget amendment to the Governor to authorize local school divisions to draw from certain existing funding sources, which had been established for different but complementary educational purposes, to employ Mathematics Specialists. The Governor and the 2009 General Assembly accepted this amendment, a token of their continued support for Mathematics Specialists during a gloomy budget cycle. Local school divisions have used this authority.

Local Policymakers and Policy Leaders

Local policymakers and policy leaders are convinced and confident about the value of the in-school coaching model that Mathematics Specialists bring to improving mathematics achievement. These widespread views were particularly evidenced at three points during the NSF-TPC grant's course when the two policy associates interviewed key local policy leaders and

policymakers regarding their perceptions and intentions regarding the employment of Mathematics Specialists.

During July and August 2006, the policy associates interviewed the principals of the schools in which the first cohort of twelve Specialists had begun their assignments in September 2005. During the summer of 2008, they interviewed the principals of the schools in which the second cohort of twelve Specialists had begun in September 2007. In the intervening year, they interviewed division policy leaders, including division superintendents, directors of instruction, and a school board member.

The thirty-six individuals interviewed were similar in their views of the effectiveness of the Mathematics Specialists and the effectiveness of the in-school model. Principals quickly homed in on the Specialists' value in improving inexperienced and weak classroom teachers. In addition, the Specialists were directed to teachers with a range of diverse learners because the principals recognized their ability to help with accelerated as well as special education. Division-level policy leaders appreciated the rigorous mathematics content courses taken by Specialists, the focus on classroom teacher education, and the daily imbedded on-site assistance; they saw these as essential components of the model. One noted that resident expertise was a big positive for teachers, for instruction, and ultimately, for the students.

Retention — Beyond the voluminous anecdotal information, those interviewed offered the fact that *all* five partner divisions retained *all* Mathematics Specialists beyond the two years of NSF grant support for each Specialist is proof of the division policymakers' belief in the efficacy of Mathematics Specialists. Despite downward-trending budgets, the partner divisions have provided *all* funding to continue Cohort I Specialists for the fourth and fifth years and Cohort II Specialists for the third year. In all years, no matter the existence or level of grant or state assistance, the divisions have voluntarily borne a significant part of each Specialist's salary and benefits.

For the 2009-2010 school year, twenty-two of the twenty-four original TPC Specialists continued to be employed by their partner divisions as Mathematics Specialists, despite the cessation of all grant-related funding. One Specialist retired and one moved to a non-participating division for employment in a school mathematics instruction supervisory role.

Grant Requirements Fulfilled — The five partner school divisions fulfilled all requirements under the NSF-TPC research and policy study over its five years. In addition to employing the Specialists for the required periods, the divisions provided access to schools, staff, and data. The divisions were agreeable to numerous visitors, technology requirements for transmitting research data, and release time for Mathematics Specialists and other staff. The mathematics supervisors in each partner division were able to devote many hours to supporting their Specialists and were of great value during the grant period. The building principals were gracious, persistent, and innovative in adapting their faculties and communities to the Specialists' presence, as well as in guiding the Specialists in their new placements.

Participation in New NSF Mathematics Specialist Grants — Nineteen local school divisions are participating in one or both of two new NSF-supported Mathematics Specialist research studies awarded in 2009. One division already participated in the NSF-TPC grant.

Sixteen divisions are involved in the Middle School project which has as a prime goal preparing a group of fifty exemplary middle school teachers (grades 6-8) with a profound understanding of mathematics studied in the middle grades in order to provide intellectual leadership as school-based Mathematics Specialists. All NSF-TPC grant divisions had expressed a need for help at the middle school level.

Thirteen divisions are involved in the Rural K-5 Schools project which is dedicated to extending Mathematics Specialists to the rural settings where the majority of Virginia's divisions are located. This grant addresses the challenges of delivering course content via distance learning and providing induction and on-the-job support to beginning Specialists in divisions with few or no mathematics support personnel.

Numerous Other Local Mathematics Specialist Programs — More than forty local school divisions in Virginia, in addition to the five TPC partner divisions, currently employ Mathematics Specialists who fit the criterion of specially-trained teachers released to work with other teachers. This number is approximately 30% of the Commonwealth's school divisions.

Some of these local programs have existed for several years and pioneered the use of Mathematics Specialists in elementary schools. They all demonstrate a variety of position responsibilities, support models and preparation programs, and have been a great source of ideas

and experiences for the NSF-TPC grant model, as well as the Rural K-5 Schools and Middle School research projects now underway.

Funding—The Key Obstacle

Policymakers and policy leaders acknowledge that the key obstacle to the employment of Mathematics Specialists is insufficient state and local funding. Budget pressures that emerged a few years ago have worsened, not abated. Revenues are down, spending is down, and new or expanded instructional programs have become rare.

The fact is that Virginia's biennium budget for FY11 and FY12 slashes general operating funds to FY06 levels. Almost all state funding for K-12 public education comes from the state's General Fund. Moreover, the adopted K-12 public education budget for FY11 is nearly three-quarters of a billion dollars (\$773 million) below the FY10 base adopted in 2009.

Another funding impediment which makes local school division employment of Mathematics Specialists challenging at this time stems from the Commonwealth's funding methodology for mandated versus non-mandated instructional positions. Mandated positions are those that are required by the Standards of Quality. Local school divisions are obligated to share the mandated costs with the Commonwealth on the basis of their ability to pay, as determined by a complex and controversial formula.

The Standards of Quality (SOQ) require local school divisions to employ elementary classroom teachers at legislatively-established ratios; but, the SOQ does not require local school divisions to employ Mathematics Specialists. Accordingly, since required instructional costs are shared between the Commonwealth and the local divisions, the Commonwealth shares the cost of employing mandated classroom teachers, but not the costs of non-mandated Mathematics Specialists. Financially-strapped local school divisions are less likely to create new instructional positions in the absence of a state requirement and funding support to do so. Moreover, they are more likely to discontinue instructional positions for which the costs are entirely locally borne.

Conclusion

While the current financial situation is difficult, the future of Mathematics Specialists is not dark. Mathematics Specialist programs are established in Virginia, the economy is expected to eventually improve, and federal policy will continue to stimulate state and local governments to raise mathematics achievement.

The more than forty Mathematics Specialist programs in Virginia school divisions, the growing number of endorsed K-8 Mathematics Specialists, the several established preparation programs at institutions of higher learning throughout the Commonwealth, and the nineteen divisions participating in the new grant programs have created a synergy in which Mathematics Specialists will continue to thrive. Mathematics Specialists are now widely known and well regarded in the public schools and their communities.

The National Science Foundation's award to Virginia of three Mathematics Specialist grants has not only encouraged the building of a state-wide infrastructure, but also enabled a growing number of school divisions to establish footholds for growth. The Rural K-5 and Middle School projects recently funded are helping to sustain the drive for program expansion and improvement.

The federal No Child Left Behind legislation has unarguably motivated public elementary and secondary education to examine instructional delivery systems, scrutinize teacher performance and preparation, and use assessment data to focus instruction and intervention. The reauthorization of the Elementary Education and Secondary Education Act with its promised focus on readiness for college and career will continue to drive the quest for strong mathematics achievement throughout the country.

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