

MATHEMATICS SPECIALISTS IN THE ELEMENTARY SCHOOLS: “THE ARLINGTON STORY”

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Arlington Public Schools, a relatively small school district with 1,150 elementary teachers, serves an extremely diverse population of 10,000 elementary students in 22 schools. The overall student population includes 33% Hispanic, 14% African-American, 10% Asian, 42% Caucasian, 25% ESOL, and 37% on free or reduced lunch. More than forty languages and seventy countries are represented. In addition to 22 elementary schools, six middle schools, and four high schools, students attend five alternative or special programs.

Arlington Public Schools strives to deliver the highest quality instruction and curriculum to all of its students. Its goals are to ensure a rich and rigorous curriculum, provide sustained professional teacher development, improve SOL performance, and close the minority achievement gap.

Arlington schools have a total of 62 reading teachers, 25 of which are funded through Title 1. Special education and gifted programs also provide substantial services within the school day. Each elementary school is staffed with a .5 gifted resource teacher. Yet, elementary teachers in Arlington lack necessary in-school mathematics support. Some schools have developed ad hoc approaches, sometimes using their special education or gifted resource teacher positions to enhance mathematics instruction. While many of these approaches are creative and attempt to supplement the mathematics program, they are not efficient. They are not mathematics trained, and they are not targeted for the entire school system.

During the summers of 1992 and 1993, Arlington Public Schools participated in the Mathematics Lead Teacher State Initiative, a two-week summer training session for Mathematics Lead Teachers in selected schools. In Fall 1993, Arlington had a Mathematics Lead Teacher in twelve of its elementary schools. Since 1994, elementary and middle school principals have appointed Mathematics Lead Teachers for their schools. Currently, there are also Lead Teachers for science and social studies. Although these Lead Teachers act as leaders, they all have full-time teaching responsibilities.

In addition to their classroom obligations, the Mathematics Lead Teachers function as the primary advocate for mathematics instruction within each elementary school. The Lead Teachers encourage and support their colleagues by helping them interpret and effectively implement the

curriculum, by clarifying the expectations of the *Standards of Learning (SOL)*, and by acting as a liaison between the Department of Instruction and the elementary schools [1].

The Mathematics Lead Teachers have many opportunities for professional development. At the elementary level, substitutes are provided quarterly for whole group meetings to enhance instruction and share ideas on how to help colleagues. Professional development activities include: questioning strategies, classroom discourse, teaching for understanding, and family involvement. In addition, Lead Teachers attend off-site professional conferences and assist the mathematics office in leading countywide workshops. Although the present Lead Teacher program helps with communication and the dissemination of materials, teachers in these positions have classroom responsibilities and therefore, cannot model lessons in other classrooms or help teachers plan using best practice strategies.

Our mathematics office continues to pursue initiatives that support teacher development in mathematics. After the current textbook adoption, training began in 1999 on the use of the NSF-supported *Investigations* curriculum materials, the supplemental program adopted with the textbook series [2]. A *Teaching for Understanding* group began in Summer 2000 and continues to meet regularly [3]. During the summer of 2002, Arlington Public Schools made the Wiggins and McTighe *Understanding by Design* model a countywide priority for instruction [4]. The mathematics office is providing opportunities for elementary teachers to write mathematics lessons using this model. Although these initiatives have had some impact at individual schools with individual teachers, the school system has not had the resources to fund a broad systemic project for elementary mathematics support. A few schools have been able to get some full-time help, but the struggle continues.

In 1995 and 1998, Arlington's Mathematics Advisory Committee, a group of volunteers consisting of Arlington parents and other community members, recommended that all elementary schools have full-time Mathematics Specialists. Unfortunately, the request was denied both times. In 2000, Arlington's Mathematics Advisory Committee's recommendation to place five full-time Mathematics Specialists in the schools with the greatest need was also denied. During the 2001-2002 school year, two elementary school principals made it possible for their schools to use their Lead Teachers as school-based Mathematics Specialists by reconfiguring their staff allocations. In addition to performing their Lead Teacher duties, the elementary school-based Mathematics Specialists were available to work with all classes during the school day modeling

lessons and supporting quality instruction. As of October 2002, two more elementary schools received school-based Mathematics Specialists because of the No Child Left Behind legislation. These positions were made possible through reallocation of Title I funds from reading support to math support.

During the school year 2002-2003, the four school-based Mathematics Specialists met monthly with central office staff. All four positions were previous Mathematics Lead Teachers and participants in the *Teaching for Understanding* group. Through their work, a more detailed job description evolved. The four teachers were a resource for each other as they shared what had worked.

In the final budget, approved May 2003, there was another full-time equivalent position for a school-based Mathematics Specialist. For the year 2003-2004, the principal of a new elementary school used creative staffing to accommodate a full-time elementary school-based Mathematics Specialist. Because of the full-time position in the new budget and another .5 position from Title I, three more schools in 2003-2004 had an elementary school-based Mathematics Specialist, bringing the total to seven positions serving eight elementary schools. Two more positions were approved for 2004-2005. Another elementary principal reallocated resources to have a school-based resource position, bringing the new total for 2004-2005 to ten positions serving thirteen elementary schools.

As Mathematics Specialists have been added, a more unified and systematic professional development program has resulted, ensuring that all students receive the same high quality service and that more teachers are properly trained to deliver this service. School-based Mathematics Specialists attend monthly daylong meetings to share ideas, look at the research, and analyze data. They also participate during that time in focused professional development on coaching and mathematics content. Regular communication with the principals of those schools is built into each Specialist's plan. Specialists are required to submit monthly reports. During July 2003, seven of the school-based Mathematics Specialists attended *Investigations* training and two attended *Developing Mathematical Ideas (DMI)* training [2,5]. During Summer and Fall 2004, eight Mathematics Specialists, ten elementary teachers, and four middle school teachers participated in a *DMI* class. The opportunity for the *DMI* training was made possible through ExxonMobil grants. The grants also make it possible for these school-based Specialists and the

teachers in their schools to work with a mathematics consultant to develop more effective questioning strategies in the classroom.

With an eye toward Mathematics Specialist certification, Arlington has offered three, three-credit math courses since Summer 2003. Though the road to full implementation of a Mathematics Specialist program has been slow and bumpy at times, we feel that addressing mathematics needs in this way is essential to the ultimate success of our goals for teachers and students. With the current No Child Left Behind legislation for reading and mathematics, it is hoped that more mathematics support will be possible.

References

- [1] *Standards of Learning for Virginia Public Schools*, Board of Education, Commonwealth of Virginia, Richmond, VA, 1995.
- [2] *Investigations in Number, Data, and Space*, TERC, Cambridge, MA, 1998, Internet: <http://investigations.terc.edu>
- [3] *Teaching for Understanding*, Harvard Graduate School of Education, 2004, Internet: <http://wideworld.pz.harvard.edu>
- [4] G. Wiggins and J. McTighe, *Understanding by Design*, Association for Supervision and Curriculum Development, Alexandria, VA, 1998.
- [5] D. Schifter, V. Bastable, and S.J. Russell (eds.), *Developing Mathematical Ideas*, Dale Seymour Publications, Parsippany, NJ, 1999.