

Institutionalization of Reform

Written by Wayne Patty

1. Provide a brief description of the context of your LSC as it relates to your topic area.

Our LSC involved three organizations: Virginia Tech (a comprehensive land-grant university), Albemarle County Public Schools, and Montgomery County Public Schools. The participating schools are all schools in these two districts that teach any combination of grades K-5, and the subject area is mathematics. As Virginia's largest university with 25,600 students and one of the top 50 research institutions in the nation, Virginia Tech is rooted in its land-grant missions of instruction, research, and solving the problems of society through public service and outreach activities.

Albemarle County is the fifth largest county in Virginia by geographical area. It encompasses 726 square miles in the Northern Blue Ridge and Northern Piedmont of Virginia. At the center of the County is the independent city of Charlottesville (the home of the University of Virginia), and Charlottesville City Public Schools is a separate school district. Albemarle County Public Schools serves approximately 13,100 students in sixteen K-5 schools, five 6-8 schools, and four 9-12 schools. The Albemarle County School Board adopted Investigations in Number, Data, and Space as the mathematics instructional materials in grades K-5 with the understanding that the LSC would provide professional development for the K-5 teachers as they implemented this instructional material.

Montgomery County is located in the southwestern part of Virginia in the region known as the New River Valley and lies in the picturesque area between the Appalachian Plateau and the Blue Ridge Mountains. The district serves approximately 9,300 students in one K-2 school, one 3-5 school, ten K-5 schools, four 6-8 schools, and four 9-12 schools. Montgomery County benefits from having two local universities – Virginia Tech and Radford University. The Montgomery County School Board adopted Everyday Mathematics as the mathematics instructional materials in grades K-5 with the understanding that the LSC would provide professional development for the K-5 teachers as they implemented this instructional material.

The key personnel are Wayne Patty, PI and Project Director, Jesse (Jay) Wilkins, co-PI, Marlene Robinson, and Betti Kreye. Wayne was promoted through the ranks as a research mathematician, served as Head of the Mathematics Department at Virginia Tech for twenty-four years, and served as the PI on a grant from the State Council of Higher Education (as part of Virginia's statewide systemic initiative) to improve the grades 9-14 math and science curricula, and served as PI on a previous LSC for grades 6-12 mathematics. Jay is a research

elementary mathematics educator who was involved in providing professional development for the 6-12 LSC. Marlene is the K-12 Mathematics Instructional Coordinator in Albemarle County Public Schools, and she was a professional development provider for the implementation of two middle school instructional materials: Connected Mathematics and MathScape: Seeing and Thinking Mathematically. (Albemarle County had previously implemented the latter with professional development provided by the 6-12 LSC.) Prior to her position in Albemarle County, Marlene was a middle school mathematics teacher in the Chicago area. Betti is the Mathematic Supervisor K-12 for Montgomery County. She was a mathematics instructor at Virginia Tech prior to joining Montgomery County as a high school mathematics teacher. She served as a professional development provider for the implementation of Contemporary Mathematics in Context, a high school curriculum, and Connected Mathematics. (Montgomery County had previously implemented the latter with professional development provided by the 6-12 LSC.)

2. Provide a brief description of how your LSC addressed these areas.

Albemarle County chose to implement Investigations in Number, Data, and Space over a three year period: grades K-1 the first year, grades 2-3 the second year, and grades 4-5 the third year. In each case, the LSC provided 60 hours of professional development in the summer prior to implementation, 45 hours during the first year of implementation (and the teachers received credit for a 3-semester hour graduate level mathematics course at Virginia Tech with the tuition being paid by Virginia Tech), 30 hours in the summer following the first year of implementation, 18 hours during the second year of implementation, and 10 hours during each of the third and fourth years of implementation. A description of the training for the K-1 cohort will suffice because we did same thing with the 2-3 cohort one year later and with the 4-5 cohort two years later. Marlene and Wayne worked together to plan the training. They felt that it was necessary for an experienced teacher of the designated instructional materials to be the primary workshop leader in the summer prior to implementation, and Marlene was well acquainted with two such people from the Chicago area, Jane Moore and Diane Deckert. Because of the number of teachers involved (approximately 60), we divided the K-1 teachers into two groups, but by schools rather than grade levels. We wanted the teachers to be exposed to both Jane and Diane so each day Jane would spend three hours with one group and then three hours with the other. They walked the teachers through various units in order to make sure that the teachers knew how an NCTM Standards base curriculum was supposed to be taught. Manipulatives play an important role so one of the goals was to ensure that the teachers used the manipulatives in an appropriate manner. Wayne and Marlene also served as workshop leaders, and they also alternated between the two groups. Wayne's primary role was to make sure the mathematics was correct, and he also provided "Dr. Math" sessions in order to extend the content knowledge of the teachers. Virginia has adopted statewide Standards of Learning (SOLs) and SOL tests at the elementary level

are administered near the ends of grades 3 and 5. Marlene's primary role was to make sure that the teachers realized how and when the various SOLs were being covered and to provide local information about the Albemarle County Schools. Jill Cragg was Marlene's Intern, and Jill also assisted with the professional development in much the same manner as Marlene. On a typical day, for example, Diane, Wayne, and Jill would be working with one group of teachers while Jane and Marlene would be working with the other group, and then the leaders would switch groups. A correlation of Virginia's SOLs with the designated curriculum was also done by the teachers so that they could see that the SOLs would be covered. During the school year, Wayne and Marlene were the primary leaders with assistance from Jill, but either Diane or Jane were often present in order to share their expertise on how the curriculum was to be taught. They continued to walk the teachers through units that had not been covered during the summer, to extend their mathematics content knowledge, and to address the SOLs. Also issues that arose in the classroom were addressed, and the teachers shared information on what works and what doesn't work. The 30 hours during the summer following the first year of implementation was a time for reflection. An example would be: Now that you have taught the curriculum, what changes do you plan for next year? In the second year of the grant, Jill took a job with another school district, and she was replaced by India Haun.

Montgomery County chose to implement Everyday Mathematics over a two year period: K-2 the first year and 3-5 the second year. Just as in Albemarle County, in each case, 60 hours of professional development were provided in the summer prior to implementation, 45 hours during the first year of implementation (with the teachers receiving credit for a 3-semester hour graduate level mathematics course at Virginia Tech with Virginia Tech paying the tuition), 30 hours in the summer following the first year of implementation, 18 hours during the second year of implementation, and 10 hours during each of the third and fourth years of implementation. Again a description of the training for the K-2 cohort will suffice because we did the same thing with the 3-5 cohort one year later. Betti and Wayne worked together to plan the training. In order to obtain an experienced teacher of the designated instructional materials to be the primary workshop leader in the summer prior to implementation, Wayne contacted the Everyday Learning (the publisher of Everyday Mathematics) rep. He was extremely helpful and provided the names and phone numbers of kindergarten, first, and second grade teachers who were not only experienced teachers of the curriculum but were also experienced in working with other teachers. While the two weeks of training in Albemarle County had been consecutive weeks, we arranged a week of training for each of the three grade levels in the first three weeks of June following the end of school and the last three weeks of August prior to the beginning of school. In addition to Wayne and Jay, two other university professors, Maria Timmerman, from the University of Virginia, and Bobbye Bartels, from Christopher Newport University, were involved in the training for the Montgomery County teachers during the summer prior to implementation. The leaders in each session consisted of an experienced

teacher of Everyday Mathematics, Betti, and one of Wayne, Jay, Maria, and Bobbye. The experienced teachers walked the teachers through units of the curriculum. Betti provided insight into the SOLS, and Betti and a university professor were present in order to guarantee the correctness of the mathematics. During the school year the primary workshop leaders were either Wayne and Betti or Jay and Betti. An experienced teacher of the curriculum was present for some of the sessions. These sessions were quite similar to those in Albemarle County.

There was quite a bit of teacher turnover in both counties. As a result, beginning with the third year, in both counties we have offered professional development in August prior to the beginning of school for teachers who had previously not participated. We tried to get in as many days as possible but this was usually only about five days because of the lateness in hiring teachers and the fact that the administration scheduled "orientation" for new teachers for several days prior to the time teachers had to report to their respective schools in order to prepare for the beginning of classes. Most of the participants in these sessions were new teachers, but there were a few continuing teachers, who for whatever reason had not previously participated in this training. In Montgomery County, we have always brought in an experienced teacher of Everyday Mathematics as the primary workshop leader. We did the same thing with Investigations in Number, Data, and Space in Albemarle County during the third and fourth years, but in the fifth year Marlene decided that she and India would be the primary workshop leaders, and they will do the same thing in this the sixth year. Betti was always present in Montgomery County, and Wayne has been present in both counties whenever he could arrange to do so.

During the third, fourth, and fifth school years, we also offered a 3-semester hour graduate level mathematics course (with Virginia Tech paying the tuition) for those teachers who had not previously received such credit. Wayne and Betti were the workshop leaders in Montgomery County, and Wayne, Marlene, and India were the workshop leaders in Albemarle County. We walked the teachers through units that they would teach and continued to provide mathematics content sessions.

We currently have a no-cost extension, and we have June workshops planned for continuing teachers and August workshops planned for new teachers in both counties.

3. What strategies did the LSC use that worked particularly well?

In Virginia, School Superintendents cannot require teachers to attend specific workshops. Albemarle and Montgomery counties adopted different strategies in order to get the teachers to attend. In Albemarle County, anytime a teacher raised the question of whether he/she was required to attend, the answer from the central administration was, "You are expected to attend." In Montgomery

County, the central administration maintained a hands-off policy, and it was left up to Betti to meet with principals and teachers in order to persuade the teachers to attend. In spite of these problems, we did have good attendance. I would say that the attendance in the first year was in the eighty-ninety percent range. The attendance improved in the second year when teachers realized that students loved the new curricula, that the students were learning at least as much as they did prior to the change in curriculum, and that the teachers really did need to attend the professional development in order to know how to teach the new curriculum. There were problems with some individual schools, and in a few cases a change in principals was made. There is one school in Albemarle County with quite a few teachers who had not participated in the professional development prior to the summer of 2004, but a new principal came on board beginning with the 2004-05 school year, and she has attended the professional development with the teachers from her school who have not previously participated.

We also made a major effort to head-off parent problems by holding parent nights in each of the schools at the beginning of each school year and by sending letters to the parents explaining how their children would be taught mathematics.

4. What challenges did the LSC face in these areas and how were they addressed?

The challenge was to get all the teachers to participate in the professional development and to get all principals on board in the sense that they would tell their teachers that they were expected to attend. Our proposal promised that we would use the pre-test/post-test concept to measure change in content knowledge and attitude of the teachers. During the first summer prior to the implementation of any of the curricula, we had an "incident" in Albemarle County. After taking the pre-test survey on content knowledge, one of the teachers stood up, announced that she knew all the mathematics she needed to know in order to teach kindergarten, and walked out of the room. Wayne had a moment of panic in which he feared that other teachers would follow. Fortunately that did not happen, and the Assistant Superintendent for Instruction met with the teacher, and, after a few days, she rejoined the group. Fortunately this was an isolated incident. The vast majority of the teachers appreciated the chance to get paid and to obtain credit for a free 3-semester hour graduate level mathematics course in order to change the way they were teaching mathematics. This is represented in a comment by one of the teachers in Montgomery County whom Wayne met in the corridor in the middle of the first year. He asked, "How is it going?", and she responded, "I'm still struggling but the kids love it."

5. If you knew then what you know now, what would the LSC have done differently in addressing these areas?

We had experience with a previous LSC so we were aware of the challenges that we would face. As a result we knew what we needed to do; namely do everything we could to get the support of the central administration and the principals, and to make them, as well as the teachers, aware that research had shown that proper teaching of the NCTM –Standards based curricula would result in improved student achievement. Information to parents is also extremely important.

CONCLUSIONS OF THE PI: The Everyday Mathematics curriculum is a wonderful curriculum and it is complete in every way. Investigations in Number, Data, and Space is also a great curriculum. However some units did need to be supplemented in order to assure that the students were prepared for the SOL tests. For example in Everyday Mathematics, the students learn all the so-called basic skills by playing games, and there are an adequate number of diverse games in order to ensure that the students get an adequate amount of practice. Both Jay and I have an opportunity to view Everyday Mathematics from more than one perspective because Jay has children in the program, and I have a grandson in the program. I don't want to take anything away from Investigations in Number, Data, and Space, but it probably doesn't provide enough practice in some skills.

As indicated we used experienced teachers of the curriculum as the primary professional development leaders, and, at least in Virginia, names of such leaders are available from the representative of the company that published Everyday Mathematics. It should be noted, however, that experienced teachers of either curricula may not have the necessary mathematical background in order to ensure that the mathematics is correct and to increase the mathematical content knowledge of teachers so that this content knowledge extends well beyond the mathematics that is being taught at each grade level. The leadership definitely needs to include individuals with strong mathematical backgrounds.

Both Marlene and Betti have been wonderful professional development leaders. Teacher leaders have also surfaced in both counties. Mathematics Educators and Mathematicians who share the NCTM vision of teaching mathematics can and should be used to support structures in the schools. The institutionalization of reform is here to stay at the elementary level in these two counties. The only thing that can derail it is a change in central leadership with a totally different viewpoint, and at least in the foreseeable future this appears highly unlikely.

The necessary financial and human capital resources to implement future efforts similar to LSCs are exactly the resources that were available in the LSC program.

A FINAL COMMENT FROM THE PI: In my opinion the LSC Program is one of the best programs that has ever been conducted, and I would like to see it reinstated.

