

## REFLECTIONS ON WHAT YOU HAVE LEARNED: A RAPPORTEUR'S REPORT ON VIRGINIA'S "WHAT WE HAVE LEARNED SYMPOSIUM"

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### Abstract

In this Rapporteur's Report on Virginia's "What We Have Learned Symposium" about a statewide Mathematics Specialist program, I discuss emergent topics resulting from presentations and discussion at the Symposium. Topics include defining Mathematics Specialists and coaches, addressing mathematics content in the program, providing ongoing support for Specialists and coaches, and supporting principals. I also provide suggestions, discuss absences in the program, and comment on cautions in revision and needs in dissemination.

### Introduction

Serving as the Rapporteur for the "What We Have Learned Symposium" was more than the challenging exercise I expected it to be: it was also an engaging and thoughtful endeavor to learn the details of Virginia's multi-institution, collaborative program for preparing Mathematics Specialists and to do so through the voices of the many and varied participants of the Symposium. The Symposium was an opportunity for participants in Virginia's Mathematics Specialist master's degree programs, offered collaboratively at six Virginia universities, to report on, discuss, and reflect upon their work. My thoughts on the work emerge from my academic background as a mathematics teacher educator with K-12 experience in teaching mathematics in schools, experience working with K-12 teachers, and my own experience as a Mathematics Teacher Leader in an elementary school. That position afforded me the opportunity to do much of the same kind of work the graduates of the Virginia program may do, and also formed the foundation for my current work in Ohio's Elementary Mathematics Specialist Endorsement and Mathematics Coaching Program [1]. As such, my insights and suggestions are grounded both in my experiences and the current directions in mathematics education. I hope they are helpful to the continuance of and ongoing development of the work being done in Virginia and in other states.

### Emergent Topics

Over the course of the Symposium and its presentations, I found that five topics emerged and provided room for discussion and growth. First, there was the need for defining the concepts

of Mathematics Specialist and mathematics coach as used in the program and in the research on the program. The second topic involved a discussion of the mathematics content component of the program and how that content is delivered across the institutions in the state that participate in this program. A third topic that emerged from the Symposium was the need for ongoing support for Mathematics Specialists upon graduation from the program and employment in the schools. A fourth emergent topic addressed the importance of the role of building principals in this work of Mathematics Specialists in their buildings. A final topic is addressed as multiple absences that emerged in the discussions. I discuss each of these five topics.

### **Defining Mathematics Specialists and Mathematics Coaching**

In the Virginia program, preparation clearly is intended to support professionals developing an advanced expertise in mathematics education. That expertise includes a deepened knowledge of mathematics content and pedagogy (including learning about equity and diversity issues), as well as experience and support in leadership development. There are no particular roles intended in that training, with the options expected to be broad. Still, much of the language across the participants in the Symposium, and the time-on-task kind of analysis of what the graduates working as Specialists do in their new positions, speaks to the Mathematics Specialists working as mathematics coaches, even though the two labels of specialist and coach are often intertwined and not differentiated from each other in discussion [2]. This condition calls for definitions and answers to related questions. What is a Mathematics Coach? What is a Mathematics Specialist? Do these roles differ? Assuming so, how do the roles differ?

Although the question of defining Mathematics Specialists and coaches emerged in the Virginia work, it is not a question unique to the Virginia program. The question has been raised by others and is a current topic on conference schedules and professional organizations' agendas. Maggie McGatha's inquiry reveals the varied definitions of specialist and coach, and the inconsistency of those definitions as used in the literature [3]. At the time of this writing, nine states offer professional credentials for elementary mathematics specialists, and coaching programs are underway in a number of states. From those initiatives, we are able to begin to define needed features of mathematics coaching programs, but the increased interest, the growing literature, and the lack of consistency in definition move all of us to the same place at which I see Virginia at the time of this Symposium: to define and differentiate specialists and coaches [4].

The Association of Mathematics Teacher Educators (AMTE) has supported a national dialogue on Elementary Mathematics Specialists (EMS). The AMTE Task Force released its

“Standards for Elementary Mathematics Specialists” certification/endorsement at the organization’s 2010 annual conference. In the EMS Standards, the organization describes the foundational knowledge, skills and leadership qualities necessary for the roles and responsibilities an EMS professional may assume [5]. These standards suggest: a prerequisite experience of at least three years of successful mathematics teaching experience; general program guidelines of at least twenty-four semester hours (or equivalent) across mathematical content knowledge, pedagogical knowledge for teaching mathematics, and leadership knowledge and skills; and, a supervised mathematics practicum. The mathematics content knowledge is expected to include both a deep understanding of mathematics in grades K-8, as well as specialized mathematics knowledge for teaching. Pedagogical expectations are grounded in the “NCATE/NCTM Program Standards: Standards for Elementary Mathematics Specialists” and cut across the topics in the categories of learners and learning, teaching, and curriculum and assessment [6]. Leadership preparation should afford specialists the skills and knowledge to work with teachers in a non-evaluative role, but also to know the relevant resources available, work outside the classroom and school to improve mathematics instruction, and use a data-based and informed voice in doing so.

What this means for Virginia’s efforts is that it would serve them well to define their meanings of Mathematics Specialist and mathematics coach. As far as the program is concerned, the definitions would help the state clarify the kinds of work Specialists might do and in turn help constituents see the value of earning the Specialist degree. This would suggest defining the Mathematics Specialist as one having developed particular skills and learned particular knowledge bases, and defining coaching as one of the roles the Specialist might have in a building or school district. However, for the Virginia work, the research may be even more impacted by the definitions. As the Specialists enter into their positions in schools, they define their Specialists’ roles dependent on the context; that is an appropriate approach in many if not all cases. However, when Campbell’s research seeks to define how much time the Specialists spend doing certain tasks and otherwise meeting the needs of the building and its staff, the real difficulties arise. Without fully vetting the tasks that are part of a coach’s role by definition, one cannot accurately account for such time, categorize it, explain, or question it [2].

### **Mathematics Content in the Project**

Clearly the project is grounded in a strong belief in the value of knowing mathematical content, and program structure reflects that foundation. It is just as clear, though, that something very good is happening in the mathematics training. First of all, teachers in the Specialist program—and graduates—continue to want *more* mathematics! I feel confident in saying that for

many and maybe all of us who have worked with elementary teachers, it is truly rare that they ask for *more* mathematics. Undoubtedly, as we do our work, as teachers learn more mathematics and do so in supportive environments, we certainly encounter requests for more mathematics; but, that is typically the result of teachers learning with course instructors under certain conditions. That is what seems to be happening in the Virginia program. Coaches providing feedback to the program, and those reporting and participating in discussion at the Symposium, not only wanted more mathematics, but also appreciated the importance of knowing more mathematics when they teach it. So, not only do they *want* to know more mathematics, but they also *value* the impact of that knowledge for their teaching. This led me to conclude that something very good is happening in the program with respect to mathematics content, and that is a strength of the overall initiative.

Part of the success of the mathematical component of the statewide program is the result of the ways in which the content courses are developed, taught, and coordinated. Mathematics instructors share a common syllabus and, more importantly, share ideas about pedagogy across the state. These instructors remain connected in terms of *how* they teach the content, and that pedagogy discussion allows them to develop a practice that models the pedagogy the Specialists are being asked to learn as well.

Still, the call for more mathematics brings other issues to the discussion, not the least of which is the fact that, for practical reasons, no program can simply add more courses. Doing so might make the program unattainable for some constituents, or doing so might make such a program undeliverable in terms of instructors. In addition, solving the problem of needing “more mathematics” with the simple addition of coursework also removes or at least discourages the need for deep reflection. It is this deep reflection on the content of the program, in their case from a broadly collaborative perspective, which emerged as another asset of the Virginia program. Perhaps it was because the simple solution of adding additional courses was not a *practical* solution, for the reasons I mention above, that a reflective approach emerged. In any case, that reflective component—one that I might add is an obvious part of the instructors in this project—revealed some interesting insights. One of those was that instructors and program developers recognized that future Specialists’ call for more mathematics needn’t necessarily be about *more*, but, rather, about *different* mathematics. Suggestions from instructors included thinking about applications of the mathematics to provide a context for more depth of understanding of the content. One possibility suggested by the participants is to explore geometry in the context of builders and carpentry [7].

I would add a few ideas to this direction of other ways to address the program participants' needs for more mathematics. One is to think about how one can make better use of the program content in other courses, to save time and build on or form the foundation of teaching about a certain concept. What I mean by this is that instructors, since they are as well versed in the content of courses other than the one they are teaching, can use what I would call a "remember when" strategy in teaching. Although not all of the courses are sequenced, it might be possible to avoid taking time to build on a concept so that one can move to some connected topic that is the content of the course being taught. One approach could be simply to take the students back to another lesson they would have experienced in another course, suggesting they "remember when" they did that work and use that as the start for moving on. This approach would not only help the students see a connectedness across contents, but it would also buy precious time in the current course.

A second suggestion in thinking about addressing participant needs for more content is to think about how it is we determine if the criticism, in this case that the program needs more mathematics, is justified. Certainly, one cannot discount the belief on the part of the participants that they need mathematics. The developing Specialist's voice should be heeded; but, do we hear it literally and add content because they want it? Or do we make the content different so they recognize there is more depth, but not necessarily more content? Or do we think about what else their request might mean? If they have a positive and rich experience with mathematics and want more of it, should we perhaps be teaching that mathematics in even different ways, so that they discover how to learn mathematics on their own—with peers, in private study, and solo exploration—and not just in being taught (and led) in order to become better mathematics teacher educators? I don't have answers to these questions, but I do think the group of instructors and directors in this project is a perfect group, because of the reflective tendencies, to tackle these more-than-academic considerations. It would be important for the program and the field to consider these issues, to better study how the work of Specialists and coaches does indeed need to be content-focused, and how their content knowledge impacts student achievement.

### **Ongoing Mathematics Specialist Support**

In the Virginia program in particular, but more than likely in others as well, ongoing support for the Specialists emerges as a critical issue addressing two particular needs: combating isolation and ensuring continued professional growth. In any context, the Specialist, regardless of his/her role, could be the only person in that role in a particular building, making the job an isolating one. Additionally, the Specialist would not only be alone, but very separate from the

teachers in the building. Even though the Specialist is not an administrator, and is not suggested to be in an evaluative position, s/he is also not considered a classroom teacher. This puts the Specialist in a type of in-between position within the schools' infrastructure. Even if a particular Specialist's role is one that is defined by being a classroom teacher, but teaching only mathematics, s/he is again exists in an in-between space, in part distinguished by and separated from the other teachers by virtue of an advanced mathematics education expertise.

Since the program prepares the participants with competencies for any number of positions, the graduates may be hired in one or more possible roles. To prepare them for that work, with support specific to the job, strands for additional professional development could focus on coaching, curriculum development, professional development, and more. For this and any other context with Specialists in schools, the isolation and limited number of professionals in these roles also suggests that these professionals are not likely to find that support in their schools and perhaps not even in their districts. To counter this situation, I would suggest support of professional gatherings, in the form of local (by region or district) support networks, annual conferences focusing on Mathematics Specialists (and coaching if indeed that is the main role performed by the Specialists), and a statewide professional organization to prevent the isolation understandably related to positions these professionals may hold [2].

The nature of the support, regardless of its purpose being to combat isolation or provide professional development opportunities, could simultaneously address the call by Specialists for more content. Professional development courses where Specialists continue their mathematics learning, perhaps in learning communities as opposed to traditional courses, could meet the need for more (or different) mathematics content while simultaneously helping the Specialists achieve the goal of becoming more independent mathematics learners. Topics that developers and instructors at the Symposium identified as possible additions to the mathematics curriculum, such as discrete mathematics or topics that emerge in their Specialist work, could be worked into the follow-up support. Although content-driven, these courses or other learning experiences can focus on pedagogical moves or particular mathematical processes, all contextualized by mathematics content.

The call for support is, as always in education, limited by funding; however, in this case in particular, technology could help limit costs while connecting the Specialists across the state. Technology-blended courses to reach rural areas of the state, along with a professional "social network," can help program graduates maintain contact and continue professional growth

interactions. This would be more than a website, perhaps password-protected, and serve as a both a storehouse of their own ideas and a source of discussion, support, and ideas for implementing their work. Finally, creating a system—perhaps through the technology, but not limited to that venue—where graduates of the program have the opportunity to mentor new Mathematics Specialists. Again, as with the other suggestions noted herein, this would serve both to prevent isolation and to assure continued professional growth of the Specialists who graduate from the program.

### **Principal Involvement**

From nearly every perspective presented at the “What We have Learned Symposium,” the role of the building principal is recognized as critical. Principal support and understanding of the goals and potential of having a Mathematics Specialist professional in the building impacts the work the teachers do in that building and in many ways determines the success of the initiative. Symposium participants also note how the principal support has already improved over time, by virtue of exposure to the program and having a Specialist in the building. I would suggest taking what is currently more or less happenstance exposure to a level of explicit support by means of any number of opportunities. One is to generate monthly newsletters directed to building principals and distributed to all administrators. These can be distributed electronically to all buildings employing Mathematics Specialists, but also could go to all buildings in the state. If the latter, this would serve to prepare principals and other district administrators *before* they hire a Specialist. Another way to support principals’ understanding of the roles and potential of Mathematics Specialists, I suggest inviting them to classes where their Specialists-in-training and Specialists who have completed the program study, are in attendance. They would be expected to work side by side, and learn in the same manner as program participants. Finally, principals should be offered the following opportunities:

- Specific opportunities for them to learn, ask questions, and participate in their own network;
- A course specifically for their leadership needs in a school with a Mathematics Specialist which could also serve as the start of participation in a principals’ network;
- Continued support within their own professional “social network” which would also serve as a venue for the solicitation of success stories for inclusion in the monthly newsletters; and,
- Sessions specifically for principals in an annual conference for Specialists.

### **Wondering About Absences**

After learning all I did about the Virginia program, I wondered about two topics I did not hear or read about to any great extent. One is the data/assessment connection in the program, and the other is how the program is addressing diversity issues. Although both were mentioned, neither had much of a focus. That absence led me to ask, learn, and develop some suggestions. On the point of data/assessment, a number of questions raised by program and Symposium participants might be addressed. First, the integration of applications into the mathematics content learning could certainly be approached with the use of the program participants' own classroom data, making their experience with data analysis a more authentic one. This approach could also lead to a solution to their request for more mathematics, and the solution of deeper, applied, and different mathematics as opposed to simply including more mathematics. Additional ways to address formative assessment, too, could be embedded in coursework and the program participants' classroom work. Finally, program participants noted a need for revision of the Leadership courses, where Year 1 included too many topics and Year 2 included too few. Both formative and summative assessment topics might easily fill the Year 2 void. I would also suggest that the approach to the data work be developmental, and cut across all of the Leadership courses, perhaps with classroom formative and initial summative assessments in Year 1, deeper and more explicitly focused classroom-based assessments in Year 2, and the beginning of a review of building and district data in Year 3.

Diversity topics are actually less of an absence than less of a visible presence. There is a Diversity course in the program, but my question about addressing diversity issues goes beyond the course. What is the program's stance on diversity—as a program? Its inclusion could be cursory, making the course an obligatory one in order to fill the needs of a funding proposal or underscore mathematics education's continued commitment to serving all students. Or, it could be a foundation where the concepts are explicitly addressed throughout the program. Of course, it could be many things within that range as well. Students, and some instructors, seem to feel that the Diversity course is disconnected and in many ways difficult to teach; they questioned if having the course is appropriate. Certainly, dropping the Diversity course is an option, especially if the program believes the content can be added elsewhere (e.g., across the Leadership courses). I must note here, though, that the Leadership courses do seem to be fairly robust, and if data work is added and other adjustments made, it is not clear where in the Leadership courses the diversity work would go. Still, it is a possibility.



I have fewer suggestions and more cautions about addressing program needs around teaching for and about diversity. One is to consider if the problem is less about the content of the *Diversity* course and more about whether the content of the course or the pedagogies employed in teaching it might be revised. The program seems capable in teaching, for instance, mathematics content in a constructivist manner. So, is the Diversity course designed similarly? That course would have a different type of content than a mathematics course, and perhaps need a revised look at how it might be taught in a more learner-responsive way. That is for the course instructors to consider. Another caution regards the possibility of dropping the course and integrating the content across other courses. Having taught diversity courses myself, I, too, see the value in having an integrated approach. The caution here is not to avoid dropping the course, but instead to be certain that if the program does drop the course, to be vigilant and explicit in making and keeping the content visible through the integration. Make the invisible visible.

### **Final Remarks**

Suggestions and cautions aside, the Virginia program generates good mathematics learning, good teaching (for the Specialists and by the Specialists), thoughtful and compelling results, and is inclusive of multiple voices in the process. In short, a lot of good things are happening here. Dissemination of the work from multiple perspectives would be my last suggestion. As heard throughout the Symposium, coaches, Specialists, supervisors, mathematics content and education faculty, and principals provided perspectives that enriched the discussion. I would encourage all to pursue publication in the many and varied outlets available, both to reach different audiences and provide better understanding and support within those audiences. From the academic perspective, once the program clarifies its definitions of coaching and Specialists, the research results will be more powerful; but, we also need additional perspectives on the data. Within the program rests the potential to generate more case studies, such as the kind of work presented by Whitenack and Ellington, and other qualitative studies to enhance findings from statistical analysis of student achievement and inform the program and the field on teacher development in working with Specialists [8]. This is both a desired and vital part of this kind of work, and the Virginia collaboration is well poised to take on the task.

## References

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