VIRTUAL MENTORSHIP OF TEACHER LEADERS: THE RIPPLE EFFECT

Joan Kernan
Petersburg City Public Schools
jokernan@petersburg.k12.va.us

Joy DeNoon
Hanover County Public Schools
jdenoon@hcps.us

Eric Roberts
Roanoke City Public Schools
eroberts@rcps.info

Tammy Sanford
Staunton City Public Schools
tsanford@staunton.k12.va.us

https://doi.org/10.25891/9vj3-3r83

ABSTRACT
In this paper, the authors reflect on the first completely online mathematics specialist preparation and mentoring program. Candidates across Virginia successfully completed this program and are now serving as teacher leaders, interventionists, department leaders, instructional coaches, mentors, and program specialists. They are impacting mathematics instruction across the state at all levels. As two mathematics specialists serving as mentors and two candidates, we share our thoughts and ideas as we continue to learn from our mentorship process. The goal is to provide continuous professional development as candidates share problems, successes, research, and best practices to improve mathematics teaching and learning. In our situation, virtual mentoring is a vital support to long-term development, growth, and success of mathematics teacher leaders. Keeping in touch with fellow leaders has benefitted us personally and professionally. We will discuss the benefits and constraints of online mentoring and how it can be a model for other virtual mentorship programs.

KEYWORDS
online mentoring, teacher education, virtual learning, mathematics education, mathematics specialists, professional learning community

In August 2019, twenty mathematics specialist candidates completed Virginia Commonwealth University's (VCU's) first fully online mathematics specialist preparation program. The program was developed and offered as part of a National Science Foundation grant project entitled *Virginia Mathematics Specialist Initiative to Prepare K–8 Mathematics Teacher Leaders for High-Needs School Districts*. As outlined in the grant proposal, this project was

> designed to increase the number and retention of highly qualified, diverse mathematics teacher leaders in Virginia's high-needs, K–8 schools and provide an online professional development and certification program to prepare teachers for these roles. These leaders … support teachers in their schools and, in turn, help increase student achievement in mathematics. (National Science Foundation, 2017, p. 1)

This paper describes a mentoring program the candidates participated in following the completion of the mathematics specialist preparation program and shares the facilitators' and candidates' feedback about the successes and challenges of the mentoring program.

The candidates serve in a variety of roles including teacher, interventionist, department leader, coach/mentor, program specialist, or a combination of these roles. As shown in Figure 1, the school divisions in which the candidates work are diverse. The divisions represented are large and small. They are urban, rural, or suburban. They represent diverse populations of teachers and students across the Commonwealth of Virginia. The question for the mentorship program developers was, "How do we support and give professional development to new candidates in order to impact mathematics teaching and student learning across five geographical regions and 42,775 square miles?" The answer to this question was to create a virtual platform for monthly mentoring sessions. Figure 1 below shows the locations of each candidate within the state. The color of the pin represents the definition of candidates' territorial locations as described below.

According to William Haver, Ph.D., early developer and advocate for mathematics specialist training,

> …grant-supported cohorts tended to have mathematics coaches in the same school system. We did a lot of work with division leaders in preparing them to provide ongoing support and mentoring to their people once they were on the job as mathematics specialists. (personal communication, June 2020)

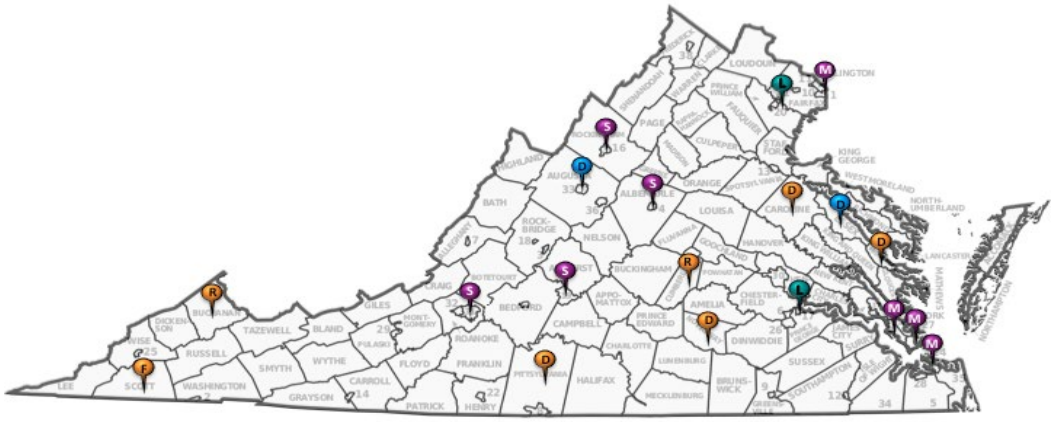
This was not an option for the online cohort. Aimee Ellington, Ph.D. devised a mentoring program to support the needs of candidates in their first years of work as mathematics specialists. The idea was to have a supportive peer group for coaches to rely on for problem-solving, success sharing, and collaboration (W. Haver, personal communication, June 2020).

Ellington, together with a group of mathematics professionals including instructors and previous candidates from Virginia Commonwealth University and George Mason University, brainstormed and planned for this different approach to mentorship. The mentors who facilitate the monthly virtual sessions are both National Board Certified, K–8 Mathematics Specialists. One works in a rural, middle school setting and one in an urban, district-level setting. Both have been instructors for previous cohorts in the mathematics specialist preparation program.

The goal of the mentoring program is to provide continuing professional development in a synchronous setting in the areas of mathematics and pedagogy to increase student achievement. Members share problems, successes, current research, and best practices to improve mathematics teaching and learning. During the first year, the focus was on building relationships with teachers and administrators to advocate for high-quality instruction. The discussions and activities that took place during the mentoring sessions were developed in part to reinforce and enhance the

Figure 1

Geographical Locations of Math Specialist Candidates in Cohort



Locale	Definition	Locale	Definition
City		**Town**	
Large	Territory inside an urbanized area and inside a principal city with population of 250,000 or more	Fringe	Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area
Midsize	Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000	Distant	Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area
Small	Territory inside an urbanized area and inside a principal city with population less than 100,000	Remote	Territory inside an urban cluster that is more than 35 miles from an urbanized area
Suburb		**Rural**	
Large	Territory outside a principal city and inside an urbanized area with population of 250,000 or more	Fringe	Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster
Midsize	Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000	Distant	Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster
Small	Territory outside a principal city and inside an urbanized area with population less than 100,000	Remote	Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster

Note. Location designations and sizes by color on pins (Wikimedia Commons, n.d.). Letter on pins corresponds to size of locale. Legend (National Center of Education Statistics, n.d.).

connections that had formed among candidates while they completed their coursework. This communication was also designed to alleviate the feeling of isolation that candidates might experience when serving in the unique role of a mathematics coach in a school situation. Throughout the mentoring program, the mentors took a continual needs assessment to make the adjustments necessary to provide just-in-time professional development to benefit the evolving needs of the candidates.

Literature Review

Virtual mentoring is vital for the successful development, implementation, and long-term impact of candidate mathematics specialists in K–12 education. Paulus and Scherff (2008) state that "isolation and a lack of support" are two major challenges facing beginning educators that hinder success and lead candidates to abandon the profession (p. 113). Virtual mentors contribute greatly to overcoming these challenges by supporting mathematics specialists in navigating professional relationships with administration, peers, teachers, and students. Sherman and Camilli (2014) found this to be especially powerful when the mentor is an expert in mathematics or science (p. 114).

Isolation is overcome by actively participating in a mathematics learning community. This community connects educators who are geographically spread across diverse settings through a virtual, real-time network of mathematics specialists and mentors. Members communicate using a variety of platforms such as Facebook, text message, email, Twitter, Messenger, Zoom, and Google Suite applications. Li et al. (2010) found that "technological advances…provide a useful tool to facilitate mentoring" (p. 730). And Reese (2016) states, "the rapid boom in technology-based professional development and the myriad options for mentorship opportunities for educational mentoring and professional development experiences—via the Internet and various virtual technologies—are increasing exponentially" (p. 49).

The COVID-19 pandemic of 2020 has highlighted and reinforced the importance of virtual mentoring and learning opportunities. During this type of crisis, colleges, universities, and K–12 schools must limit or eliminate face-to-face instruction to protect students and staff. However, educators in this situation must continue to provide educational opportunities and support for all students (Hodges et al., 2020). Virtual mentoring provides the critical support K–12 candidate mathematics specialists need.

Methodology

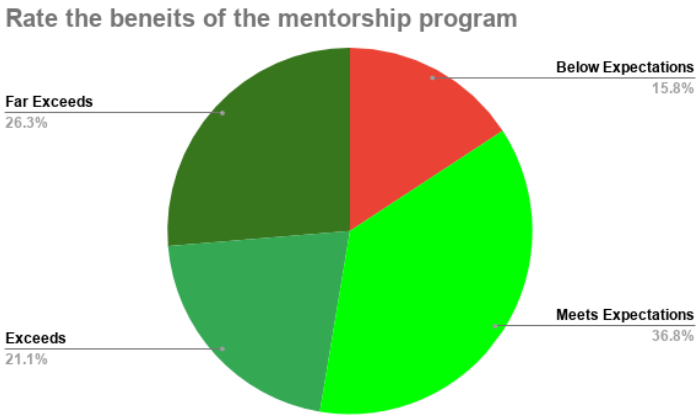
Since completing the VCU online mathematics specialist preparation program in August 2019, candidates were provided continued support via a monthly online meeting with mentors. Experienced mathematics specialists served as mentors, and the candidates were their mentees. After the first year of the two-year mentorship program, participants completed a survey to provide feedback on the effectiveness of the program and to inform the plans for future sessions. The participants were asked to elaborate on the benefits and constraints of online mentoring and offer suggestions for improvement. Candidates were asked to share a specific instance in which they personally benefited from or were supported in their role as a mathematics leader. Additional questions were asked about communication methods, frequency, and using mentors as a resource between sessions. Follow-up interviews were conducted to clarify responses and gather anecdotal details.

Data Collection

Candidates rated the mentoring program on scale of one to five, with 1 being below expectations, 3 meeting expectations, and 5 exceeding expectations. Figure 2 presents a circle graph of the survey data on how candidates rated the benefits of the mentorship program. Based on a rating of 3 or higher, 84% of participants felt the mentoring program was helpful to them with respect to the different types of professional relationships in which they engage. Of those candidates, 26% said the program far exceeded expectations.

Figure 2

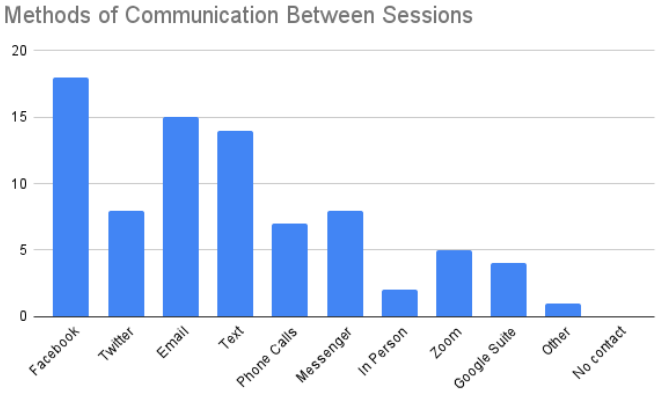
Candidates Ratings of the Benefits of Mentorship Program



There are many platforms that were utilized for continued communication between mentors and participants. According to data from interviews, approximately 95% of respondents stated that Facebook was their preferred method of communication. Most participants belong to a private Facebook group for this purpose. The graph in Figure 3 shows that candidates utilized a variety of communications methods. The preferred methods for connecting were email and text messaging. The data point that stood out to the authors was that 100% of respondents were communicating with each other outside of the monthly mentoring session.

Figure 3

Methods of Communication Between Candidates

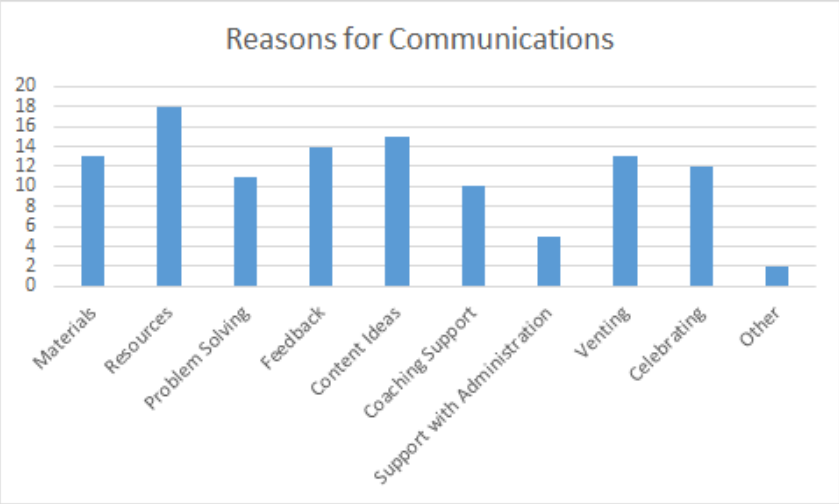


Note. All candidates are communicating between sessions in some form.

Figure 4 represents the reasons candidates were communicating and reaching out for support. Sharing resources ranked highest, with ideas for teaching content being the second most frequent reason. Candidates solicited feedback from their peers on ideas they presented and also felt comfortable venting frustrations with each other.

Figure 4

Reasons for Communication Between Candidates



Note. Candidates are communicating for many reasons.

Two questions were asked during candid interviews to gather information about communication among candidates and their peers: (1) How has the online mentoring program been specifically helpful for you? and (2) Can you share a specific time or situation where you reached out to your peers? In the following paragraphs, we will discuss the responses to these questions.

A sixth-grade mathematics teacher in a rural district explained that when her school announced in March they were transitioning to remote learning due to the COVID-19 pandemic, she reached out to the cohort through the private Facebook group for online resources and promptly received ideas from another sixth-grade teacher. A mathematics interventionist for two schools in an urban Virginia district on the opposite side of the state shared his district's website in response to her request for resources. He also directed her to a great website with quality activities**.** She was immediately grateful for the support. Based on this interaction, she knew the resources had been vetted by her peers. We wonder if this collegiality and support would have transpired prior to the online preparation program and monthly mentoring meetings. There was a significant geographic distance between these candidates. Candidates may have had the opportunity to meet at a state or national conference, but the ongoing building of relationships and efficacy would not have been as likely to occur. Another candidate explained how the small-group breakout times during online monthly sessions allowed participants to share ideas and strategies and provide feedback to each other, which she found very helpful: "Iron sharpens iron. We're all good at math. There's always something to be learned [from peers]" (personal communication, June 2020).

Two other candidates were interviewed and asked the aforementioned questions. One candidate was from an urban district in the eastern part of Virginia and the other candidate was

hundreds of miles away in the southwestern part of the state. They described the great partnership that formed between them.

We found it interesting that candidates spoke of the comfort level they experienced using the online platform. A candidate shared, "It is easier for me to reach out online. I tend to be reluctant when it comes to face-to-face interactions. I've often felt self-conscious about my 'twang.' I'm much more comfortable talking to people online" (personal communication, 2020). This has implications for any teacher or student working through an online platform. One may become more engaged and open to sharing when in an online setting. Another candidate confirmed the overall sense of this powerful professional learning community that the authors had similarly deduced from interviewing candidates. "We have such a great network and wealth of knowledge. There's always something to take away from others' ideas" (personal communication, 2020). Each person has a part to play in this collaborative mentorship. The mentors learn from the mentees and mentees learn from each other. We agree that "well designed and managed mentoring programs can have a dramatic impact on workplace culture and people engagement. A strategic mentoring program transcends hierarchy, creating relationships and interactions to build individual and hence organisational value" (Art of Mentoring, 2019). In other words, mentoring programs can have a ripple effect on mathematics education.

Benefits and Constraints

This synchronous meeting format has benefits and constraints. According to our interviews, eighteen out of eighteen candidates stated they felt supported with the synchronous meeting format, and the meetings satisfied their expectations to date. Though the mentors and candidates are geographically distanced, this does not appear to be an obstacle because 100% of candidates stated mentors are always accessible in the online format. One of the positive comments shared several times by mentees was their appreciation for opportunities to share ideas and resources and to hear what is happening in other districts. One said, "Sharing successes and struggles with others in the same teacher leader positions confirms and validates what we are doing." The meetings provide opportunities "to stay connected with cohort colleagues" and "encourage collaboration with people across Virginia." A coach from a small city stated, "It opens doors to receive expert advice anytime and anywhere." Being able to give and receive feedback, to share, and to grow together are significant benefits to meeting in an online format.

Even so, there are some constraints with an online synchronous meeting format that can provide some challenges. As one candidate put it, "Technology is wonderful when it works." Trying to connect to a web-based platform from across the state can be difficult. There are technological challenges and certain candidates have to connect by phone and listen, not having access to the visuals being presented due to rural internet issues. To overcome this obstacle, meetings are recorded and are accessible to candidates at a later time. Data from our interviews revealed another issue: candidates are not all serving in the same positions at their schools. Some are mathematics coaches who work with teachers, others are mathematics leaders in their buildings who work with remediation, and others are classroom teachers. This provides a challenge with certain topic discussions, where individuals are coming from different perspectives and the information may not be relevant to their position. To address this, mentors set up breakout rooms based on teaching positions. In whole group discussions candidates shared topics discussed in breakout rooms. Anything shared can be adapted to different grade levels and situations. Mentors must be cognizant of the various roles of each member. Time can also be a

challenge for these scheduled meetings. An elementary coach from a large city stated, "One of the constraints is time. Some of the best discussions we have are when we are in breakout rooms, but there isn't enough time to discuss in detail what each individual would like to share" (personal communication, June 2020).

The cohort stays in contact through many other online formats and often continues discussions after the mentoring session. The online synchronous meetings provide many positive opportunities and some challenges for this mentoring program.

Next Steps

The focus for year two of the mentoring program will be to have mentees take on leadership roles in the planning and delivery of the mentoring session activities. Because of our current COVID-19 social distance reality, virtual teaching and sharing will be a subject for exploration. Candidates will be asked to share monthly on a variety of topics including mathematics pedagogy and content, blended learning, building relationships, observations, collecting evidence of learning, and the impact of virtual teaching and coaching on student learning. The topics will be based on current needs, new research, and best practices. This will allow candidates to learn from each other and grow professionally.

Things to Consider

This model of coaching and mentoring can be adapted for other virtual mentorship programs. It can be scaled up or down to district or individual school levels and could pivot to different subject areas. Professional development on a virtual platform allows people across geographical distances to meet without traveling, saves time, and offers real-time mutual support.

When preparing mentoring sessions, facilitators may want to over plan, but remain flexible with the agenda. One never knows how long or short a discussion will be. Some topics demand more time from the group. Occasionally, a candidate will have a problem that needs the immediate attention of the mentors and candidates.

Use the collective knowledge of the members. Everyone has experience to share that will benefit the group. Become very familiar with the virtual platform being used. Technology issues will arise**;** attendees will need to be patient in order to overcome glitches.

Facilitators should be prepared to pivot completely. The ever present nature of the COVID-19 pandemic caused our sessions to move away from the topic of exploring coaching cycles to focus on virtual teaching and transitioning students to learn at home. It is important to remain consistent with mentor meetings. The group can continue to support each other through challenges.

Conclusion

In conclusion, this online mentoring program has been beneficial to the candidates. It is evolving and growing to build leadership capacity. While there are some constraints, they can be overcome. The basic purpose of this mentoring program should remain to support educators in content and pedagogy in order to increase students' understanding and enjoyment of mathematics. Each candidate in this mathematics community is like a drop of water in a pond sending ripples across Virginia, impacting mathematics teaching and learning.

Acknowledgment

This paper was developed in part through the project *The Virginia Mathematics Specialist Initiative: An Online Program to Prepare K–8 Mathematics Teacher Leaders for High-Needs School Districts* with support from the National Science Foundation, Noyce Track 3 Award 1660774. The opinions expressed here are those solely of the authors and do not reflect the opinions of the funding agency.

Author Note

Correspondence concerning this article should be addressed to Joan Kernan, Office of Teaching and Learning, Petersburg City Public Schools, 205 East South Boulevard, Petersburg, Virginia 23805. Email: jokernan@petersburg.k12.va.us.

References

Art of Mentoring. (2019, December 19). *Virtual mentoring*. https://artofmentoring.net/virtual-mentoring/

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online learning. *EDUCAUSE* Review. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Li, Q., Moorman, L., & Dyjur, P. (2010). Inquiry-based learning and e-mentoring via videoconference: A study of mathematics and science learning of Canadian rural students. *Educational Technology Research and Development, 58*(6), 729 – 753. https://www.jstor.org/stable/40929475

National Center for Education Statistics. (n.d.). NCES's urban-centric locale categories, released in 2006. https://nces.ed.gov/pubs2007/ruraled/exhibit_a.asp

National Science Foundation. (2017). The Virginia mathematics specialist initiative: An online program to prepare K–8 mathematics teacher leaders for high-needs school districts. https://www.nsf.gov/awardsearch/showAward?AWD_ID=1660774

Paulus, T & Scherff, L. (2008). "Can anyone offer any words of encouragement?" Online dialogue as a support mechanism for preservice teachers. *Journal of Technology and Teacher Education, 16*(1), 113 – 136.

Reese, J. (2016). Virtual mentoring of preservice teachers. *Journal of Music Teacher Education, 25*(3) 39 – 52. https://doi.org/10.1177/1057083715577793

Wikimedia Commons (n.d.). Map of Virginia Counties and Independent Cities https://commons.wikimedia.org/wiki/File:Map_of_Virginia_Counties_and_Independent_Cities.svg