CULTIVATE, CREATE, AND CONNECT

VIRTUAL NETWORK BUILDS COMMUNITY AND SPARKS CONTINUOUS IMPROVEMENT

BY DARLA EDWARDS

When I was a principal, it was difficult to gather my staff for professional learning after school. They wanted to learn the material but seldom had time to participate in these learning opportunities because of time, classroom responsibilities, family commitments, or child care issues. As a result, many teachers didn't have the benefit of sharing best practices with colleagues or learning innovative teaching techniques, so I couldn't justify further investment in the professional learning.

I soon learned that other principals were having similar challenges with their teachers. We all faced the same question: Is it possible to help teachers overcome these challenges while still providing them access to meaningful collaboration opportunities and professional learning?

Since my time as a principal, I have learned that the answer is yes. But it doesn't happen through after-school workshops. It happens through ongoing networks of support and learning.

An innovative solution is a

networked improvement community (Bryk, Gomez, & Grunow, 2010). Networked improvement communities bring together educators from across schools and districts so they can overcome physical and financial obstacles to professional learning, share resources, and centralize information sharing.

A networked improvement community can be a tremendous resource for people who share a common interest and desire to learn from each other, and, thanks to technology, this can occur even when participants are separated by a large distance.

This has been the case with the Rural Math Innovation Network, a four-year project funded by a U.S. Department of Education Investing in Innovation (i3) grant. The Rural Math Innovation Network is a virtual networked improvement community of middle and high school math teachers.

Participants collaborate to share and learn best practices for helping students develop growth mindsets and self-efficacy in mathematics, specifically pre-algebra and algebra 1. Experience with participating teachers and leaders as well as an evaluation study have supported the hypothesis that connections across geographic boundaries are valuable for teachers and, ultimately, for students.

CHALLENGES IN RURAL SCHOOLS

Virginia Advanced Study Strategies developed the Rural Math Innovation Network as a virtual network to address major challenges to professional learning in rural districts, where teachers are often isolated both professionally and geographically (Beesley & Clark, 2015).

Few rural teachers have the opportunity to connect with role-alike colleagues, as they are often the only teacher of a specific course or content area within their school and possibly even their district. Furthermore, rural districts often have limited fiscal and human resources (Dessoff, 2010).

The virtual network gives teachers the flexibility to connect with each other at anytime from anywhere. It allows them to build strong social connections and trusting relationships, even across a physical distance, that help the members appreciate and respect the knowledge and expertise that each member brings to the collective effort. This in turn can spark new ideas for continuous improvement.

BUILDING THE NETWORK

Virginia Advanced Study Strategies established memos of understanding with 18 school divisions in southwest and southside Virginia, which enabled math teachers within these divisions to submit applications to participate in the network.

At the end of the first year in December 2017, the project had a 34-member teacher cohort across 25 schools. By the end of the second year, most of the schools and teachers continued to participate, and the cohort included 30 teachers (19 middle school teachers and 11 high school teachers) across 20 schools within 16 rural districts.

The network began with an in-person summer institute in 2017, where teachers engaged in technology topics important to their role in the networked community, such as using tablets, recording and loading videos, viewing and critiquing videos, and navigating the project's online network. This in-person convening provided a strong foundation for the virtual connections that would happen throughout the year.

Teachers unable to attend the summer institute could connect through webinars, review videos of key sessions from the summer institute, and communicate with network facilitators.

FEEDBACK AND REFLECTION

Following the summer institute, participants developed and shared anchor lesson plans to guide math instruction. Each teacher created a lesson plan that includes instructional strategies that increase students' beliefs that they can learn and master math through practice and that make math relevant through real-world applications. Relevance helps students see the value of learning math to their everyday life.

Teachers shared the lesson plans with the others for feedback and revision. Using a template designed by the project consultants, teachers created and uploaded their lesson plans to an online platform that is shared with other teachers in the network.

Teachers then video recorded

TEACHER SURVEY PRACTICE/BEHAVIOR SUBSCALE AVERAGE SCORES AND DIFFERENCES FOR YEARS 1-2

Practice/behavior subscales	N	Year 1		Year 2		Difference (Y2-Y1)	Stat. Sig.
		Mean	Std. Dev.	Mean	Std. Dev.		
Observation	22	2.45	1.35	3.97	0.57	1.52 (standard 1.13)	*
Lesson plans	24	4.25	0.63	4.64	0.60	0.39 (standard 0.62)	*
Growth mindset	24	5.39	0.53	5.56	0.46	0.17 (standard 0.34)	*

Std. Dev. = standard deviation Stat. Sig. = statistical significance Standard = standardized effect size

TEACHER SURVEY BELIEF SUBSCALE AVERAGE SCORES AND DIFFERENCES FOR YEARS 1-2

Belief subscales	N	Year 1		Year 2		Difference (Y2-Y1)	Stat. Sig.
		Mean	Std. Dev.	Mean	Std. Dev.		
Collaboration	21	3.83	0.53	4.50	0.38	0.67 (standard 1.26)	*
Observation	23	3.78	0.64	4.41	0.46	0.62 (standard 0.97)	*
Technology	24	4.13	0.57	4.40	0.53	0.28 (standard 0.49)	*
Applied math	24	3.95	0.44	4.20	0.45	0.25 (standard 0.57)	*
Growth mindset	24	4.20	0.42	4.45	0.39	0.24 (standard 0.57)	*
Innovation	24	4.01	0.42	4.22	0.45	0.21 (standard 0.50)	*
Self-efficacy	23	4.05	0.43	4.26	0.43	0.21 (standard 0.49)	*

Std. Dev. = standard deviation Stat. Sig. = statistical significance Standard = standardized effect size

their lesson delivery in the classroom using project tablets and uploaded the videos to the platform. In small peer groups, teachers served as critical friends to critique each other's lessons and instruction, using a feature in the online platform that allows the viewer to tag and comment on specific points in the video. Teachers then used an iterative cycle to revise and strengthen their lesson plans and instruction.

Through this process, teachers are able to self-reflect on their own practices and also provide constructive feedback to their colleagues.

We scaffold and support these interactions with other virtual support. We have led several webinars that provided follow-up support in specific areas, such as classroom communication strategies to increase student self-efficacy and growth mindset, lesson plan template tips, and use of the virtual platform. Other virtual network activities have included professional discussion through teacher forums that focused on specific subtopics of interest.

TRUST AND COLLABORATION ENABLE SUCCESS

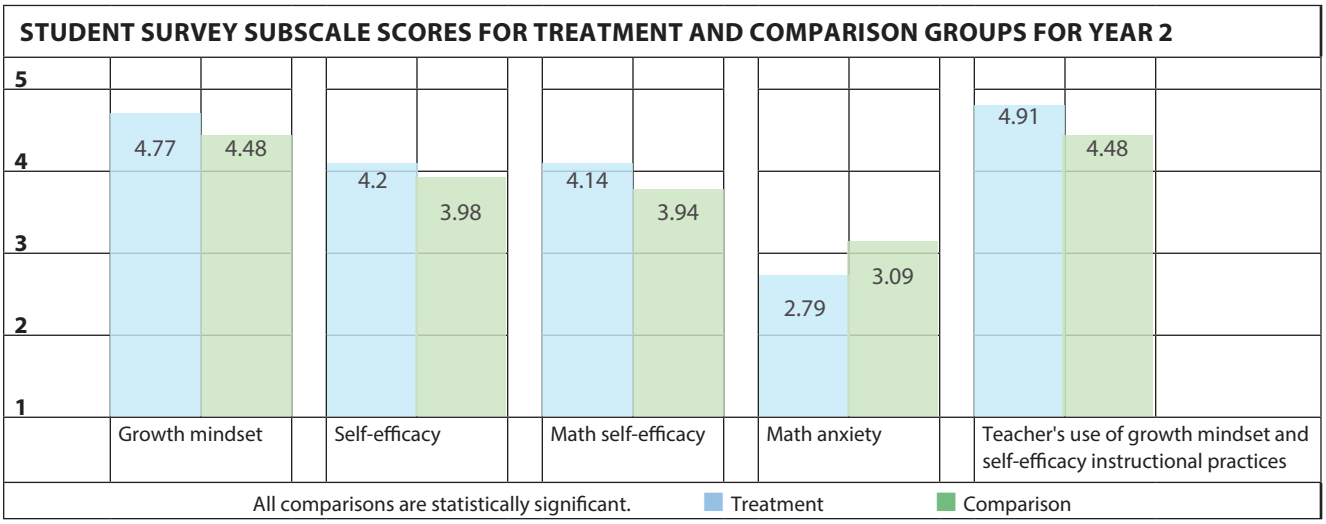
One of the main reasons that the Rural Math Innovation Network has been successful is because the colleagues have formed meaningful relationships and strong bonds. When you trust and respect your colleagues, you are more likely to listen and take their advice because you feel that they genuinely want you to improve.

On the other hand, when you do not trust your colleagues, constructive feedback can feel like a personal attack, and it stagnates growth. Any collaborative network must first invest time in building and cultivating trust among the team so that the network will flourish and thrive.

Another component for the success of effective networks is collaboration. Each member will bring his or her own ideas, expertise, and knowledge, and it is important that every member is respected as a valued expert. The teachers in our network enjoy collaborating because everyone contributes and feels like a valuable member of the team. Novice teachers gain new ideas in math instruction from veteran teachers, while veteran teachers gain innovative techniques from their novice colleagues.

Trust and collaboration are particularly important in this project because many teachers initially felt nervous about videotaping their own instruction for others to critique. Some felt nervous in front of the camera anyway, but this fear was compounded by the thought of someone actually watching and commenting on this footage.

Once teachers became comfortable



with using the tablet to videotape themselves, they soon appreciated the helpful feedback they received from their colleagues because it had a positive impact on their instruction. Teachers now look forward to videotaping their lessons and sharing ideas with their colleagues.

MAKING TIME FOR COMMUNICATION

Communication forms the foundation for trust and collaboration. It is helpful to schedule a specific time each week during the month to collaborate. This ensures that the meetings will always take place and that the time will be maximized (Wenger, 1999). Rural Math Innovation Network teachers schedule specific time for regular stand-up meetings, where they connect virtually to discuss ideas, share feedback, and provide advice related to both instruction and project requirements.

Supportive leadership is also essential. When leaders support teachers, teachers are more invested in the network and participate at higher rates. We took time to explain the network to the principals so that they felt comfortable with teachers participating.

Realizing the importance of supportive leadership, Virginia Advanced Study Strategies invited principals to the 2017 summer institute. We hosted a special session for principals guided by the National Principal of the Year. This session addressed supporting teacher innovation and highlighted techniques under principal leadership in practice.

Consultants provided expertise and support to teachers in the network and their principals. Additionally, principals participated in follow-up webinars to continue discussing ways to foster instructional innovation by participating teachers.

EVALUATING IMPACT

Through the i3 grant program, we have the funding and a mandate to conduct an independent evaluation of the project. In January 2019, an evaluation report covered the first two years of the project and the first two phases of the evaluation: a formative study of participants' reactions, beliefs, and behaviors and an implementation study of the program components.

Data sources included feedback surveys of principals and teachers, an annual online survey of teachers' beliefs and practices, teacher focus groups, and a survey completed by students of participating teachers as well as a control group of students.

In year 2, the program was implemented with high fidelity. High percentages of participants met the threshold for adequate fidelity for all three major components of the project (86% for principal training/support, 97% for teacher training/support, and 87% for teacher cohort development).

Feedback from teachers and principals has been positive, with all survey items about the program's relevance and participants' satisfaction being above 4 on a 5-point scale (4.18 for principals and 4.38 for teachers).

Principals and teachers reported increases in relevant knowledge and beliefs. For example, principals reported that their understanding of how to support teacher innovation increased by 1.63 points on a 5-point scale. The table on p. 58 shows increases in teachers' beliefs about the importance of fostering growth mindset, self-efficacy, and real-world applications of math as well as their beliefs about their knowledge of how to engage in collaboration, peer observation, technology, and innovative practices through the project.

Teachers also reported significant growth in several skills, especially in providing peer-to-peer feedback through observations, collaboratively developing lesson plans, and fostering growth mindset, as shown in the table on p. 58.

When asked about their beliefs related to growth mindset, self-efficacy, and other areas targeted by the project, students of participating teachers were more positive than those of control group teachers. For example, they were

more likely to believe they could master difficult math content and less likely to be anxious about math. (See table on p. 59.) These students also reported their teachers used strategies that promote these messages and beliefs more often.

These positive and encouraging results will provide valuable context for a planned impact study.

THE POWER OF VIRTUAL NETWORKS

Teachers who participate in the Rural Math Innovation Network have formed close connections with their virtual colleagues throughout the state. Their colleagues provide them with useful and helpful feedback on the implementation of these strategies and challenge them with new ideas and suggestions to improve their instruction.

Reflecting on the two years of this project, I wish that I had known about the power of virtual networks when I was a principal. It would have solved the barriers of time, location, expense, and frustrations associated with traditional professional learning at the school.

This innovative approach to professional learning has cultivated new ideas, inspired creative teaching techniques, and strengthened the connections between educators.

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