



COMMUNITY FOR ADVANCING DISCOVERY RESEARCH PREK-12

CADRE: Serving DRK-12 2009-Present



This project is funded by the National Science Foundation, grant # 0822241, 1449550, 1650648, 1743807, 1813076 and 2100823. Any opinions, findings, and conclusions or recommendations expressed in these materials are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



CADRE Learning Series

Rural Partnerships

Webinars

Part 1: January 24, 12:30 PM - 2 PM ET

Part 2: February 13, 12:30 PM - 2 PM ET

Learn more at go.edc.org/learning-series-rural



Ilana Horn
Vanderbilt University



Julie Amador
University of Idaho



Rebecca Sansom
Brigham Young
University



Ryan Summers
University of
North Dakota

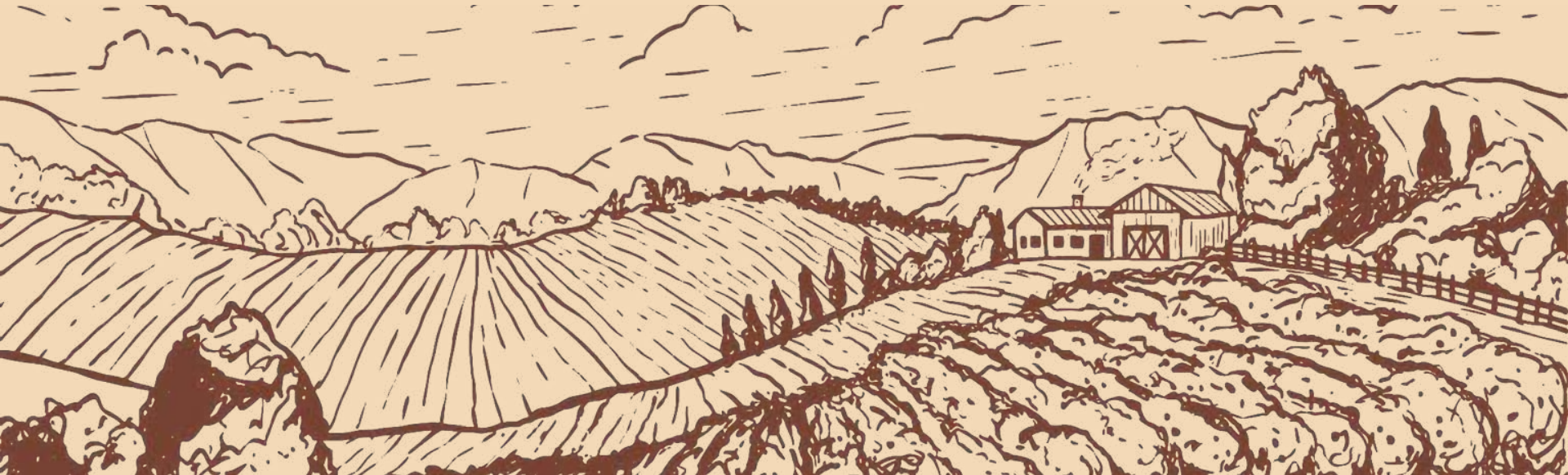
Agenda



- Overview of Rural Partnership work
- Presenters:
 - Julie Amador, University of Idaho
 - Rebecca Sansom, BYU
 - Ryan Summers, University of North Dakota
- Discussion with participants

Rural Schools

- Not one single definition of “rural”
- More diverse than popular representations
- ~ $\frac{1}{3}$ of U.S. schools are rural
- ~ $\frac{1}{5}$ of U.S. students attend rural schools
- Often policy disparities



EPSCoR Program

- Since 1979
- Established Program to Support Competitive Research



Vision

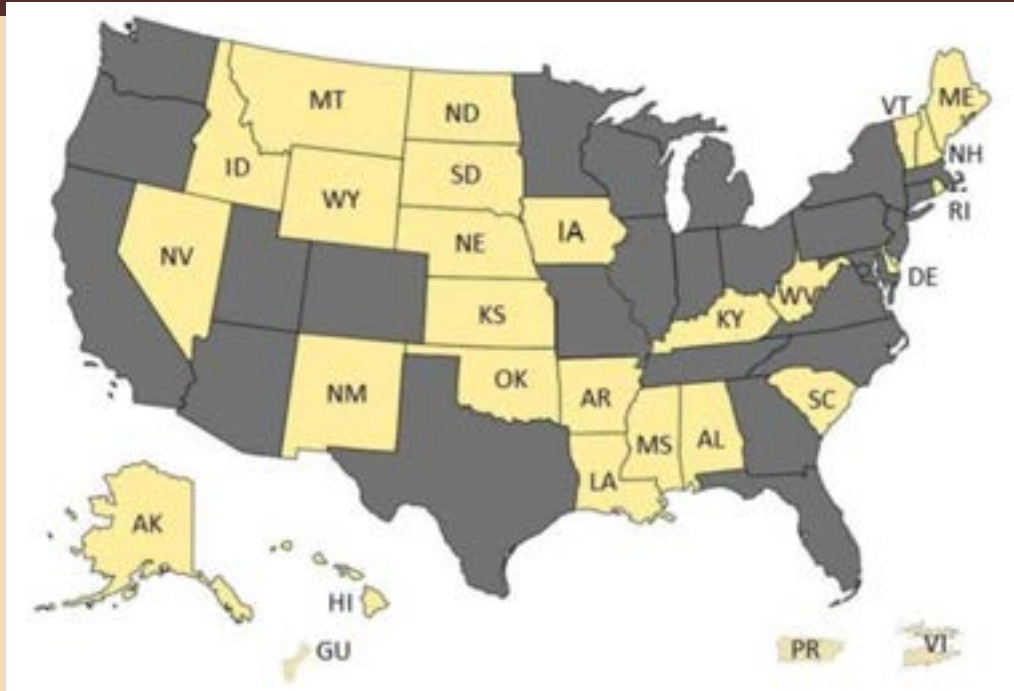
Catalyze research capabilities

Broaden impacts

Establish research
infrastructure

Impact R&D, economic
development

EPSCoR States and Territories





University of Idaho

College of Education,
Health and Human Sciences

JULIE M. AMADOR

ASSOCIATE DEAN

RESEARCH AND FACULTY DEVELOPMENT

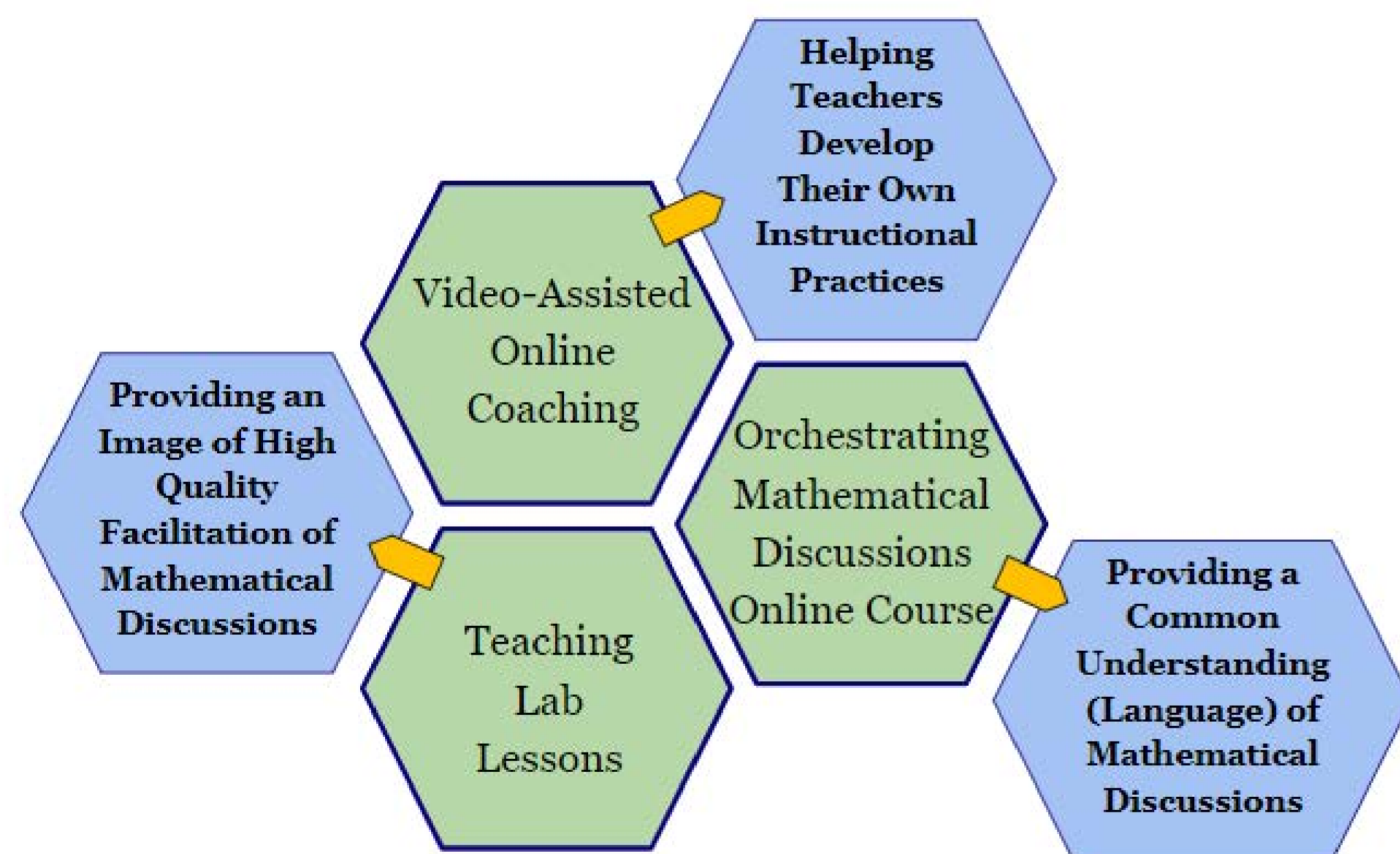


The material is based upon work supported by the National Science Foundation under Grant # 2006263.

Two NSF-Funded Projects

2016-2020

SyncOn for Teachers



Synchronous Online Professional Learning Experiences for Middle Grades Mathematics Teachers in Rural Contexts

2020-2024

SyncOn for Coaches

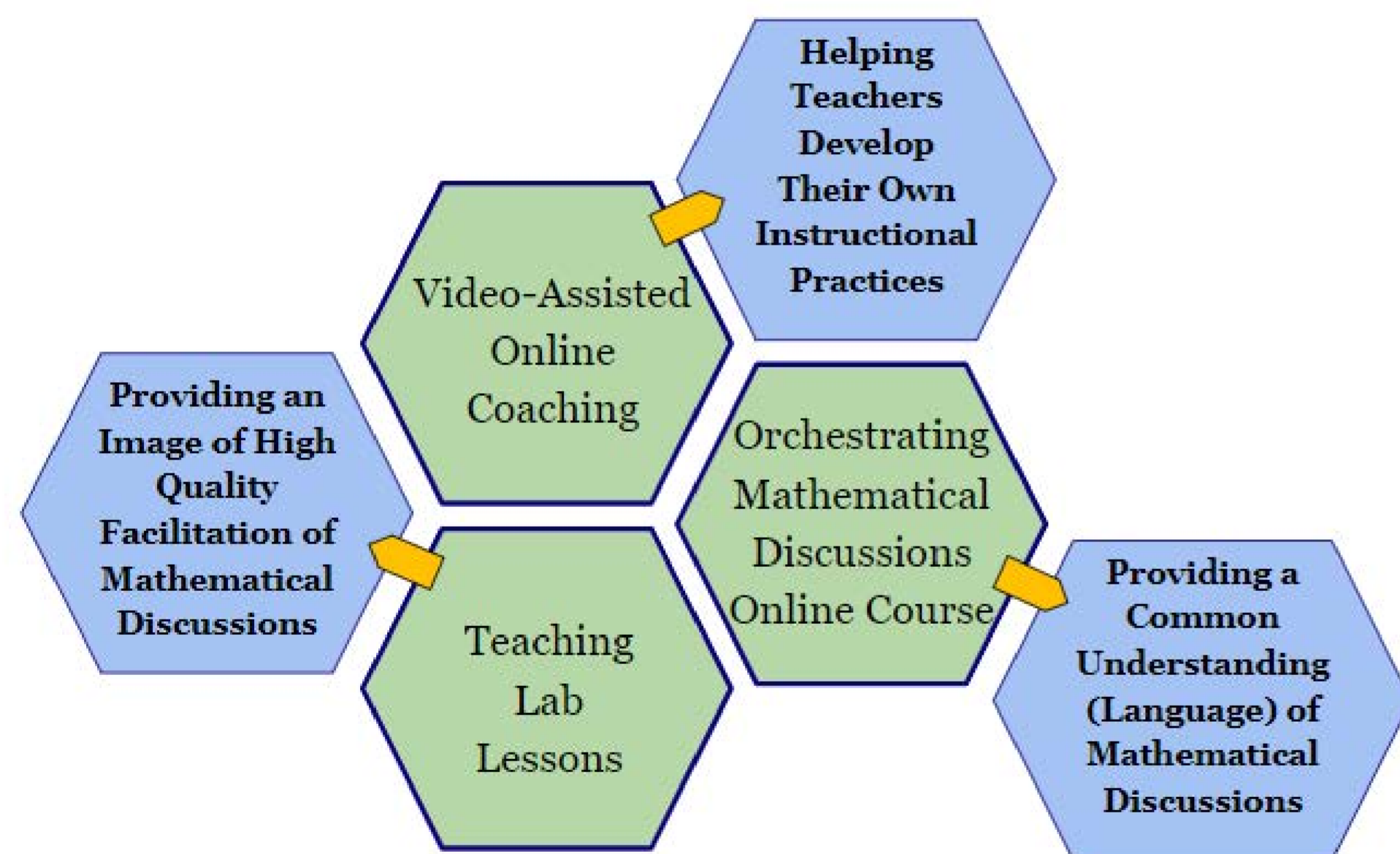


Collaborative Research: Synchronous Online Video-Based Development for Rural Mathematics Coaches

Two NSF-Funded Projects

2016-2020

SyncOn for Teachers



Synchronous Online Professional Learning Experiences for Middle Grades Mathematics Teachers in **Rural** Contexts

2020-2024

SyncOn for Coaches

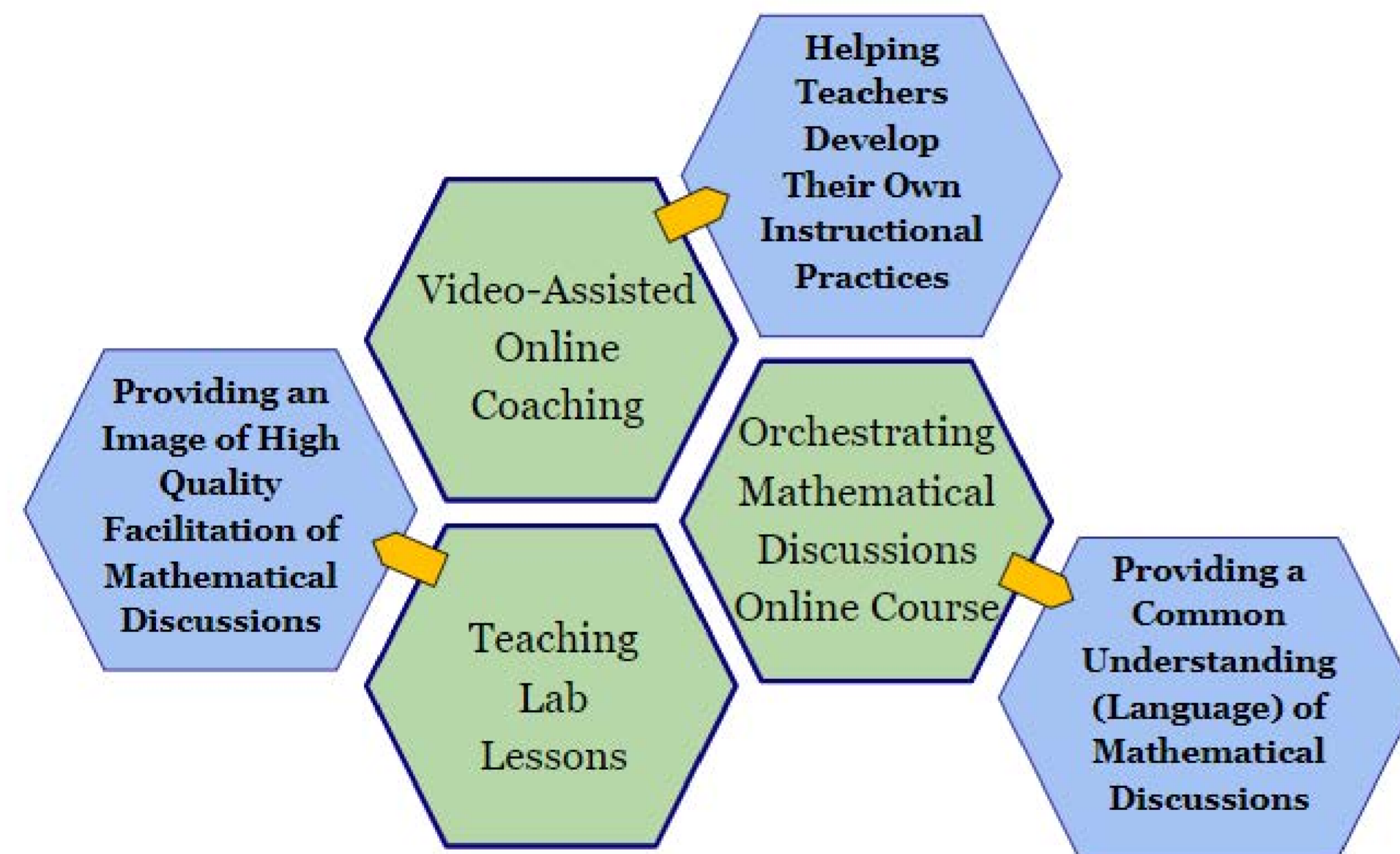


Collaborative Research: Synchronous Online Video-Based Development for **Rural** Mathematics Coaches

Two NSF-Funded Projects

2016-2020

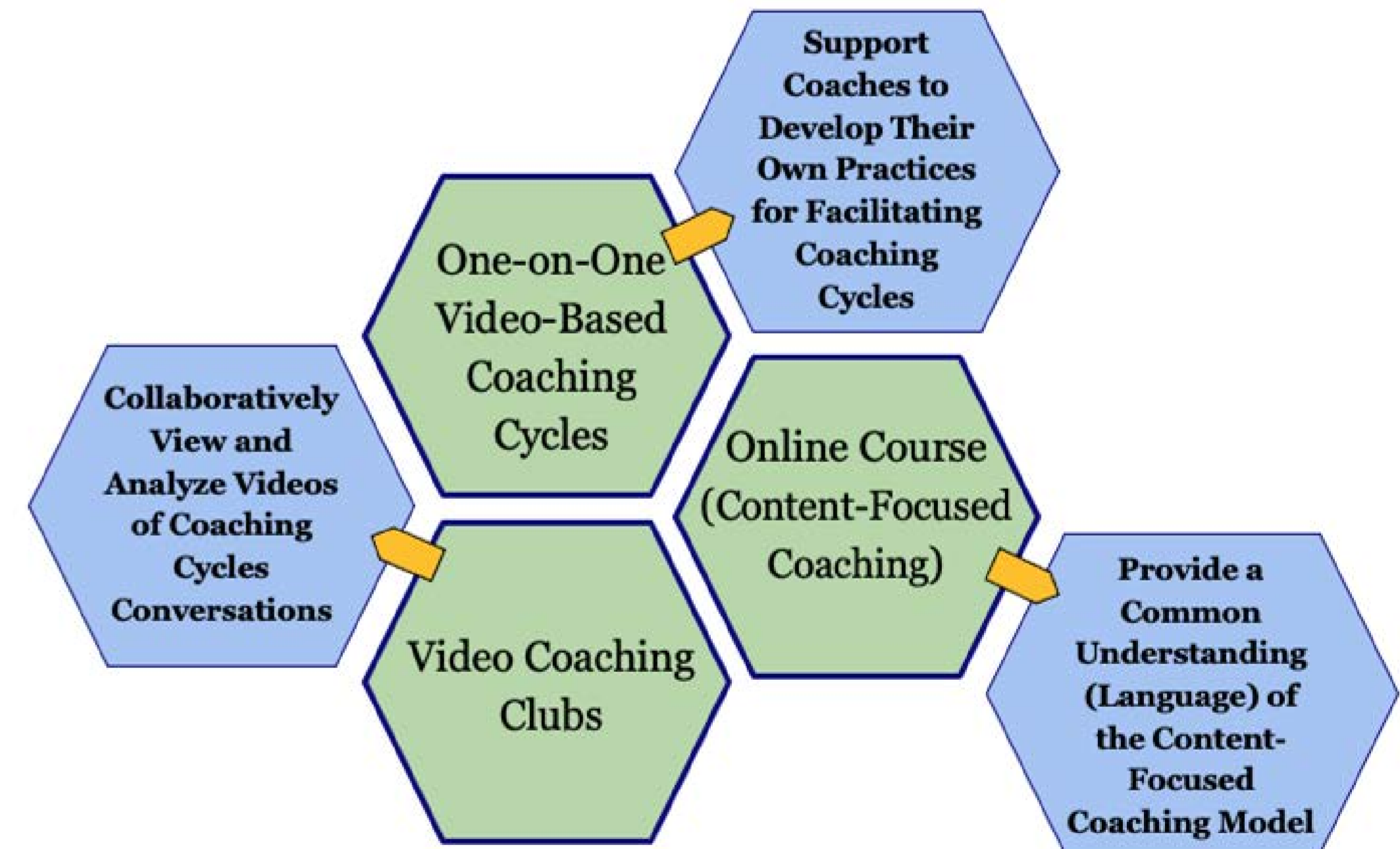
SyncOn for Teachers



Synchronous Online Professional Learning Experiences for Middle Grades Mathematics Teachers in Rural Contexts

2020-2024

SyncOn for Coaches



Collaborative Research: Synchronous Online Video-Based Development for Rural Mathematics Coaches

PARTNERS



University Partners:



Our Team:

- Julie Amador (UI) - Principal Investigator
- Jeffrey Choppin (UR) - Principal Investigator
- Cindy Callard (UR) - Co-Principal Investigator; Lead of Mentor Coaches
- Cynthia (Cyndi) Carson (UR) - Project Director
- Ryan Gillespie (UI) - Project Leadership Team/Mentor Coach
- Jennifer Kruger (UR) - Project Leadership Team/Mentor Coach
- Maryanne Maves (UR) - Project Leadership Team/Mentor Coach

Advisory Board:

- Rebekah Elliott, *Oregon State University*
- Miriam Sherin, *Northwestern University*
- Peg Smith, *University of Pittsburgh*
- Mary Kay Stein, *University of Pittsburgh*

SCHOOL PARTNERS



SHARED GOALS: FOCUS ON COACHING

Facilitate productive planning and debriefing conversations with teachers

Notice salient coaching practices and their impact on teachers' thinking

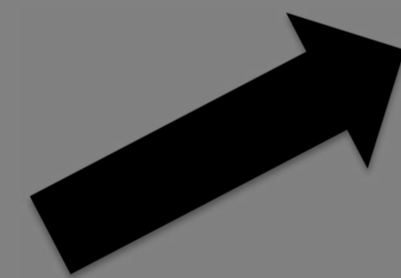
Use evidence of teacher learning to make decisions about their own coaching practices

SHARED GOALS: FOCUS ON COACHING

Facilitate productive planning and debriefing conversations with teachers



Support teachers with ambitious teaching practices (e.g. Lampert et al., 2010)

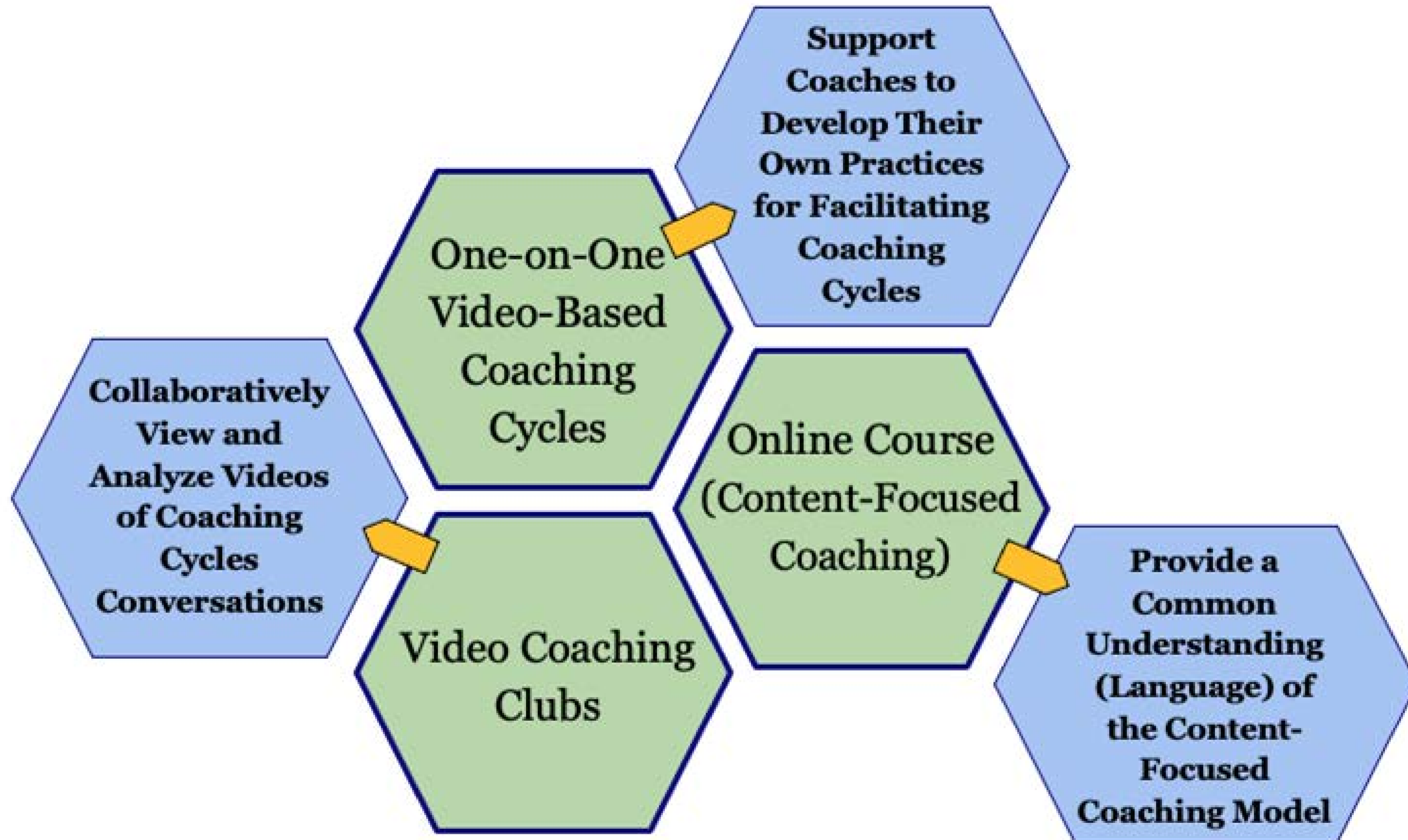


Notice salient coaching practices and their impact on teachers' thinking



Use evidence of teacher learning to make decisions about their own coaching practices

ACHIEVING GOALS



KEY PLAYERS

Coach Participants



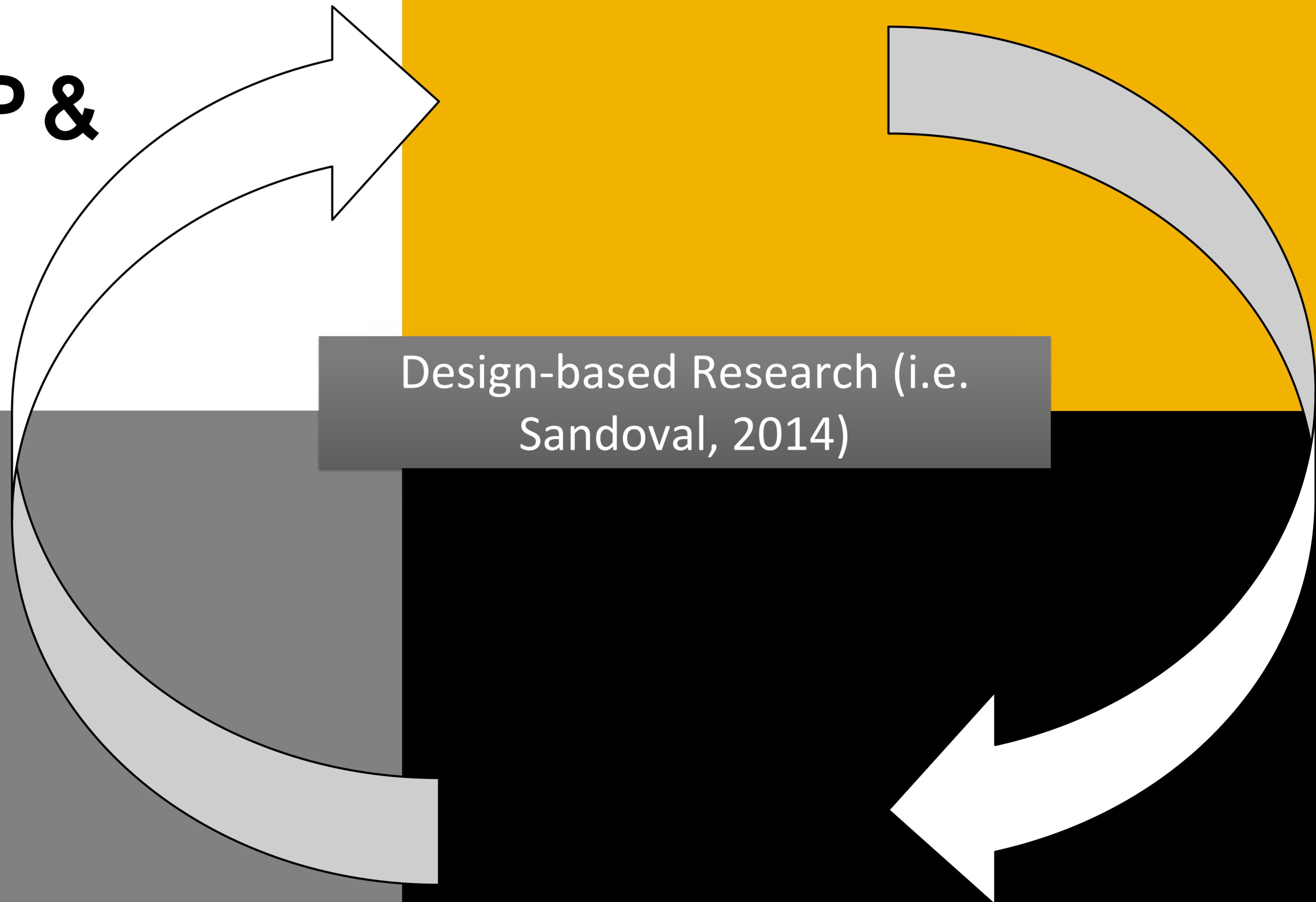
Professional Development Team

Mentor Coaches

Research Team



PARTNERSHIP & RESEARCH TRAJECTORY



Design-based Research (i.e.
Sandoval, 2014)

High Level Conjecture

Coach
Participants transform their coaching practices by engaging in collegial and structured interactions through an online video-based model



Embodiment [Learning Environment]

Tools and Materials: Zoom environment; Google documents; protocols for video club interaction; edited video for video clubs; annotation software
Task Structures: discussion of content-focused coaching; structured discussions of instances of coaching practice; selecting and analyzing video clips of coaching; engaging in planning and debriefing meetings with from Mentor Coaches
Participant Structures: cohort meetings (synchronous); individual reflection (asynchronous); one-on-one coaching (synchronous)
Discursive Practices: collegial discussions around coaching experiences; use of non-evaluative language



Mediating Processes [Practices that derive from learning environment that may lead to desired outcomes]

Use non-evaluative discourse to analyze coaching practice
Identify connections between teachers' practices and coaching moves
Justify coaching decisions in light of goals for content-focused coaching



Outcomes

Establish trusting relationship with Mentor Coach; Coach Participants; teachers
Productively lead planning and debriefing meetings using a content-focused coaching model
Attend to what teachers say and make responsive coaching decisions based on interpretation and evidence
Use evidence from coaching cycles to transform coaching practices

RURAL ASPECTS: STRENGTHS & CHALLENGES

- Often eager for support
- Appreciate collaborative opportunities
- New thought partners

- High demands on coaches in rural contexts
- Funding concerns for positions
- Mathematics Specialist (coach):
What does the term mean?

Goal of leading to positive outcomes for teachers, coaches, researchers

DISSEMINATION

Callard C, Kruger J, Gillespie R, Foster E. *Coaching mathematics teacher in-person and online: A content-focused coaching model* [White paper]. Center for Professional Development and Education Reform; 2022. Available from: <https://www.rochester.edu/warner/center/wpcontent/uploads/2022/10/coaching-video-online.pdf>

Gillespie, R. & Kruger, J.S. (2022). With the right strategies, coaches can leverage co-teaching. *The Learning Professional*, 43(2), 44-47.

Amador, J., Gillespie, R., Kruger, J., & Hanan, A. (2023). What and how experienced and novice coaches notice: A framework to analyze coach noticing. Proceedings for the 45th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Reno.

Choppin, J., Carson, C., & Amador, J. (2022). Negotiating Mathematical Goals in Coaching Conversations. In Fernández, C., Llinares, S., Gutiérrez, A., & Planas, N. (Eds.) (2022). Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education (Vol. 2). (pp. 2-147 – 2-154). Alicante, Spain: PME.

Callard, C., Kruger, J., Gillespie, R., Martin, S., Amador, J., Choppin, J., Carson, C., & Foster, E. (2021). Coaching the coaches and other efforts to develop mathematics teacher educators for inservice teachers. Proceedings for the 43rd annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Philadelphia.

Amador, J., Choppin, J., Callard, C., Carson, C., & Gillespie, R. (2021). Synchronous online video-based professional development for rural mathematics coaches. Proceedings for the 43rd annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Philadelphia.

Callard, C., Carson, C., Gillespie, R., Amador, J., Choppin, J., & Martin, S. (2020). Implementing and researching mathematics content-focused coaching models. In A. I. Sacristán, J. C. Cortés-Zavala, & P. M. Ruiz-Arias (Eds.), *Mathematics Education Across Cultures: Proceedings of the 42nd meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 137-139). Mazatlán, México: Cinvestav / AMIUTEM.



QUESTIONS?

Julie Amador

University of Idaho

jamador@uidaho.edu



3D RST

Partnerships to Support Rural Utah's Secondary Science Teachers

Rebecca L. Sansom

Brigham Young University, Provo, UT

**BRIGHAM YOUNG
UNIVERSITY**

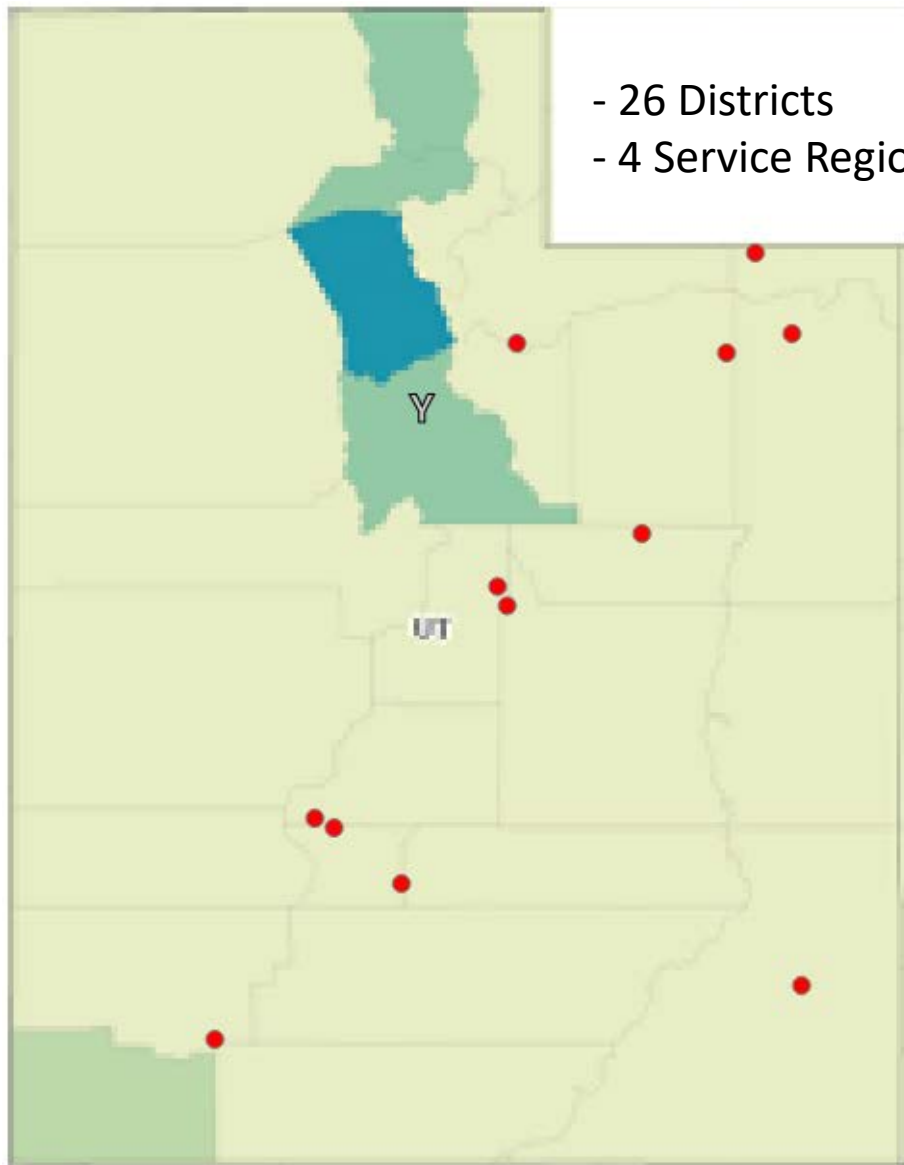
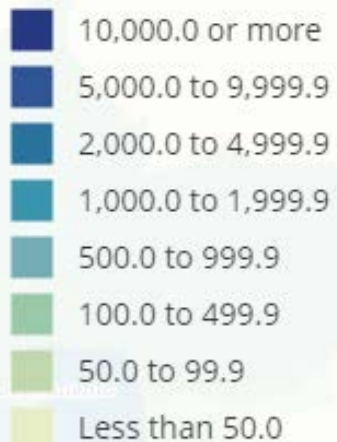
UtahStateUniversity®



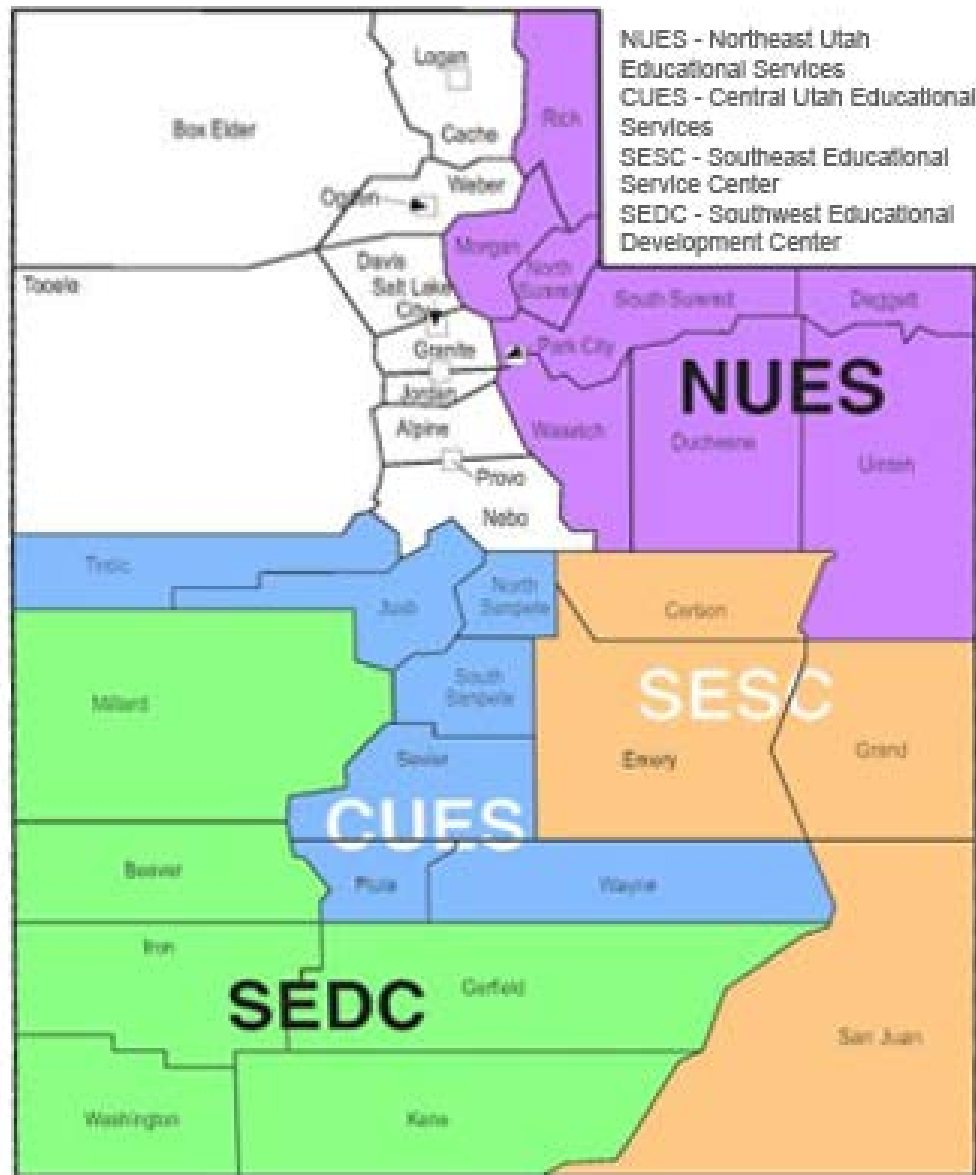
3D RST

Rural Utah

Persons per square mile equivalent)



- 26 Districts
- 4 Service Regions





Shared Goals for Partnership

- Increase capacity for 3D Science Teaching among Utah's rural secondary science teachers
 - In response to updated standards adopted in 2021, based on the *Framework for K-12 Science Education*
- Create and/or develop professional support networks among teachers who are often isolated, teaching out of their certification area, dealing with too many preps, or all the above
- Philosophy of respecting the expertise and experience of all involved



Unique Goals for Partnership

Their goals:

- Increase teachers' skills and classroom success
- Increase retention of teachers in high-need schools
- Connect ARL teachers to the course they need for licensure

Our goal:

- Understand whether, how, and why Technology-Mediated Lesson Study supports changed teaching practices and professional connection



Recent Publication (Open Access)

Hudson, M., Leary, H., Longhurst, M., Stowers, J., Poulsen, T., Smith, C. and Sansom, R.L. (2024), "Technology-mediated lesson study: a step-by-step guide", *International Journal for Lesson and Learning Studies* 13 (5), pp. 1-14.

<https://doi.org/10.1108/IJLLS-07-2023-0094>

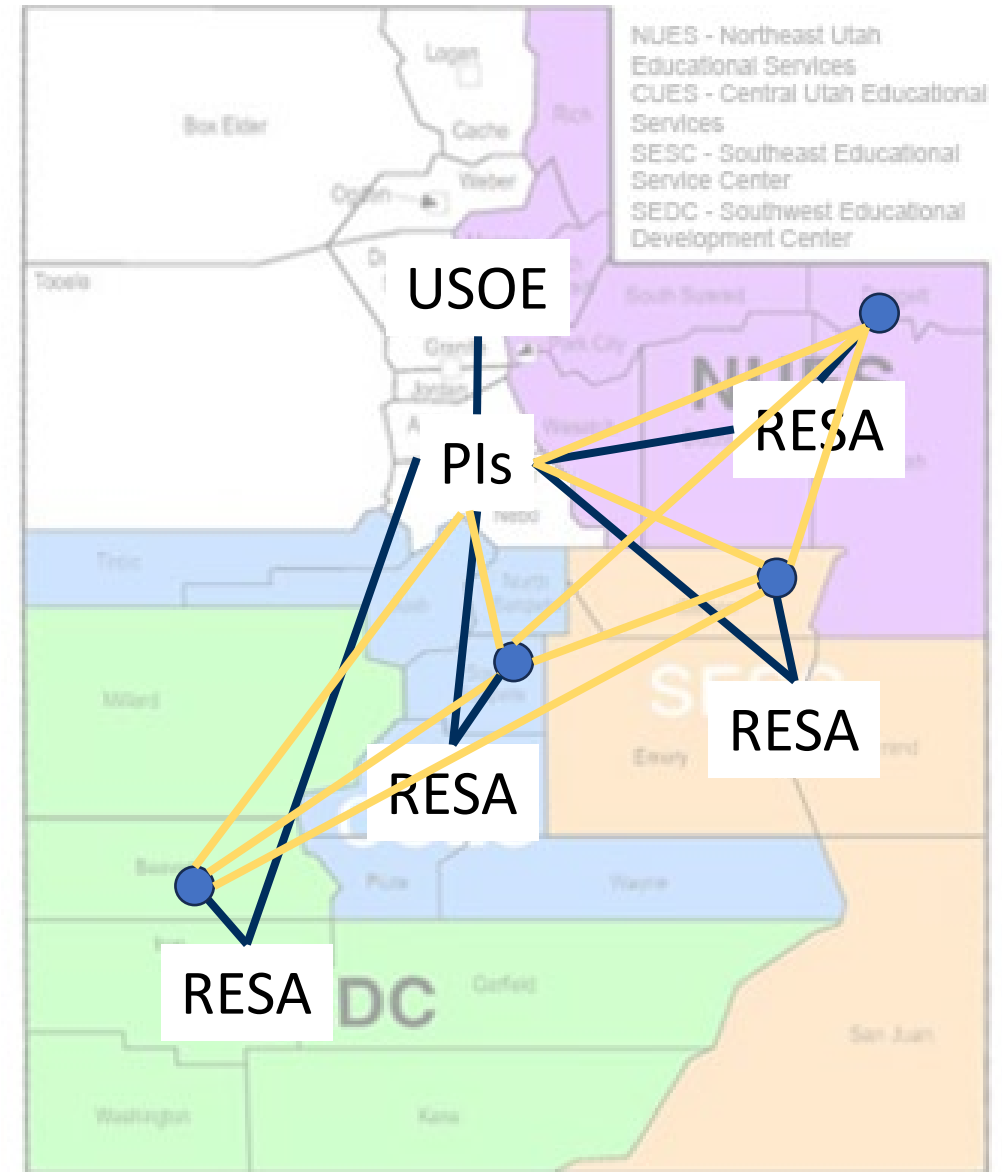
[PDF File](#)





Key Players

- PI Team (I am the primary point of contact, others fill in occasionally)
- Regional Educational Service Agency Directors
- Rural Science Teacher Leaders and Teacher Participants
- Utah State Office of Education Science Specialist





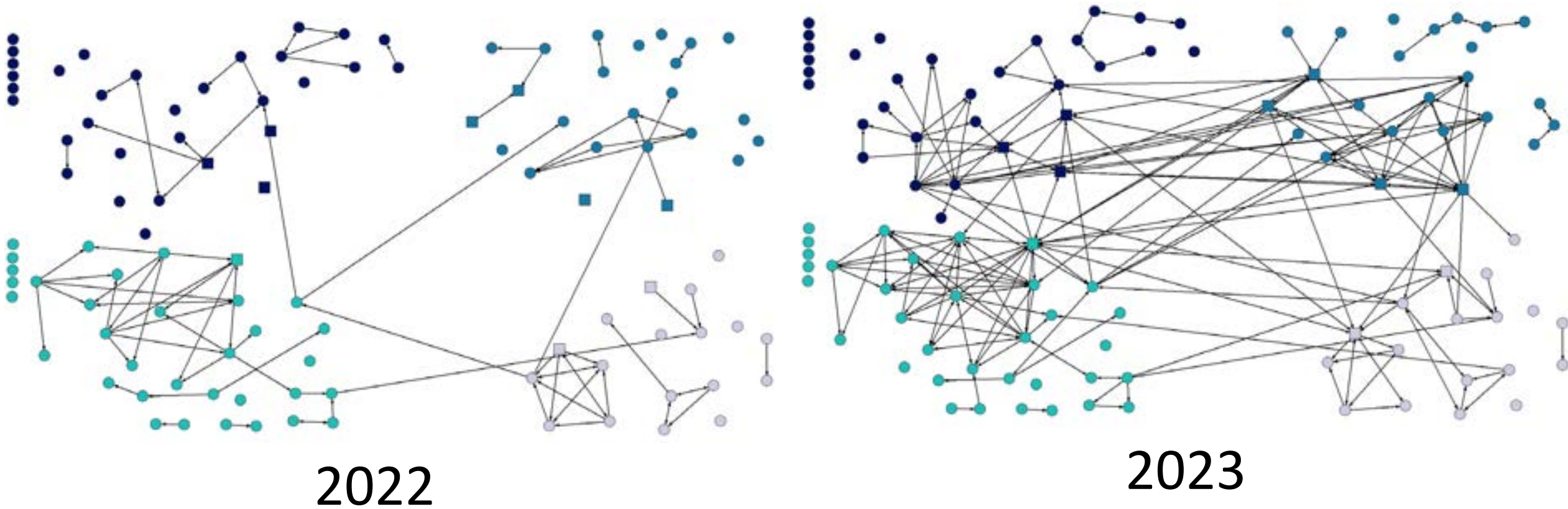
Partnership Activities

- We provide PD for teachers that they can't provide by themselves while building capacity among their teachers to continue that effort after the grant ends
- They help connect us with teachers and recruit participants
- We report back annually on how the project is going

- I have to be there: URSA conference, Regional workshops, Board meetings, Emails & Phone calls
- We need multiple layers of connections and pathways



Partnership Supports Research



Advice Network for Rural Utah Chemistry and Biology Teachers

The 3D-RST program is supported by the National Science Foundation under grant #DRL-2101383.



Rural Nature of Partnership

Strengths

- Community-embedded teachers who have a deep understanding of their students' experiences
- Resourceful and creative teachers with wide-ranging scientific backgrounds
- Rich opportunities for place-based science teaching and learning
- Deep need and desire for science PD by teachers and administrators

Challenges

- Relationships with outsiders are hard to build—we emphasize building relationships among the teachers
- Long distances make in-person work difficult and rare—we use technology to facilitate most meetings
- Varying science/3D science knowledge—we build teams with different backgrounds



Thank you!

Rebecca Sansom (PI)

Max Longhurst, Josh Stowers, Heather Leary (Co-PIs)

Michelle Hudson (Postdoc)

Tracy Poulsen, Clara Smith, Austin Moore (Grad)

Bailey Broadhead (Undergrad)

This material is based on work supported by the National Science Foundation under grant number DRL-2101383. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Rebecca Sansom: rsansom@byu.edu

Website: <https://3drst.byu.edu/>





Ryan Summers

Associate Professor

Department of Teaching, Leadership, and Professional Practice

College of Education and Human Development

NSF-Funded Project

Investigating how combining intensive professional development and modest support affects rural, elementary teachers' science and engineering practice

2022 - 2026



Materials presented is based on work supported by the National Science Foundation under DRK-12 Award #2201249.

NSF-Funded Project

Investigating how combining intensive professional development and modest support affects rural, elementary teachers' science and engineering practice

MODEST 
SUPPORTS

STEM 
STRONG

Supporting Teachers
in Rural Communities
for the Next Generation

Scaling Up Two Prior Projects

Persistence of Teacher Change in Rural Schools: Assessing the Short- and Long-Term Impact of Professional Development on K-2 Science Instruction

Modest Supports for Sustaining Professional Development Outcomes over the Long-Term

Cathy Ringstaff (PI) & Judith Sandholtz (co-PI)

2011–2016

2016–2020



Supported by the National Science Foundation under DRL-1119589 and DRL-1620979.

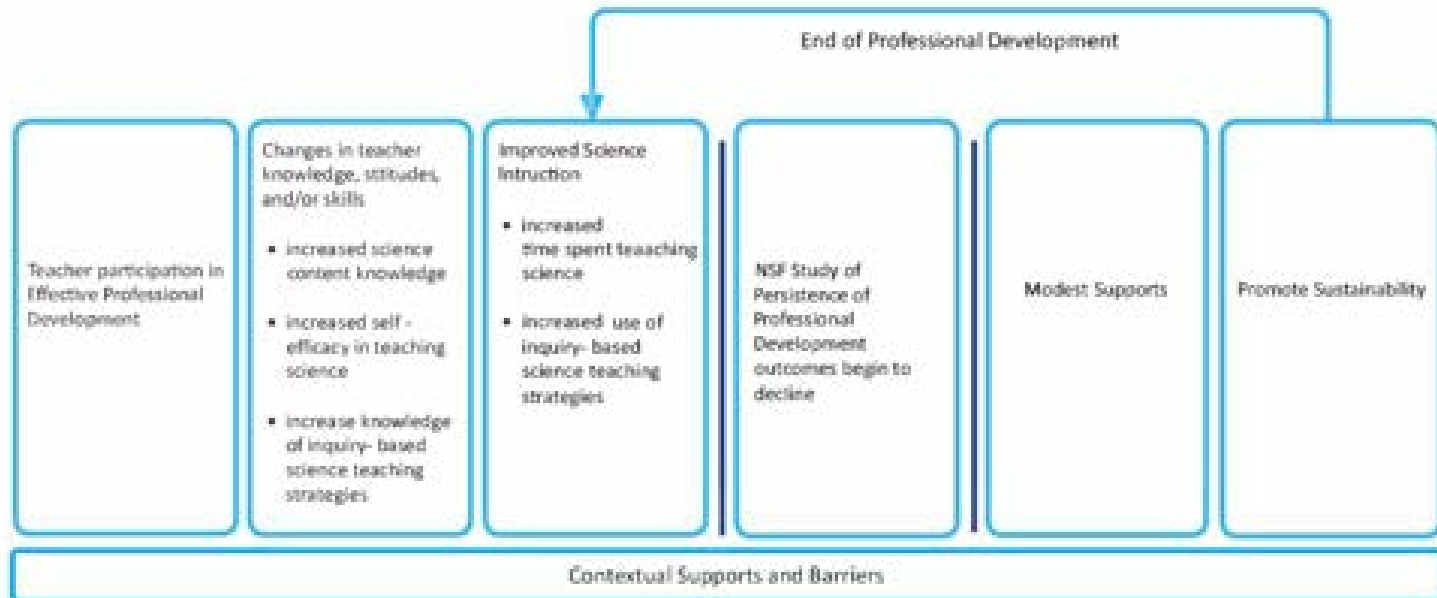


Scaling Up Two Prior Projects

Persistence of Teacher Change in Rural Schools: Assessing the Short- and Long-Term Impact of Professional Development on K-2 Science Instruction

Modest Supports for Sustaining Professional Development Outcomes over the Long-Term

Cathy Ringstaff (PI) & Judith Sandholtz (co-PI)



Our Research Objectives

RO1: Immediate Impacts of Professional Learning

RO2: Sustainability with Modest Supports

RO3: Influence on Engineering-Specific Instruction

RO4: Impacts on Student Learning



Our Research Objectives

RO1: Immediate Impacts of Professional Learning

RO2: Sustainability with Modest Supports

RO3: Influence on Engineering-Specific Instr

RO4: Impacts on Student Learning

J Sci Teacher Educ (2014) 25:729–751
DOI 10.1007/s10972-014-9393-0

ELEMENTARY SCIENCE TEACHER EDUCATION

Inspiring Instructional Change in Elementary School Science: The Relationship Between Enhanced Self-efficacy and Teacher Practices

Informed by prior studies “results showed significant increases in teachers' overall self-efficacy in teaching science” and “gains in self-efficacy were correlated with changes in reported instructional practices, particularly student participation...” (Sandholtz & Ringstaff, 2014).

MODEST 
SUPPORTS 

Our Research Objectives

RO1: Immediate Impacts of Professional Learning

J Sci Teacher Educ (2016) 27:205–226
DOI 10.1007/s10972-016-9451-x

The Influence of Contextual Factors
on the Sustainability of Professional Development
Outcomes

RO2: Sustainability with Modest Supports

“School contexts vary considerably... Differences in teachers’ science instruction after participation in professional development reflect these variations...” and “Supports are particularly important to teachers in sustaining science instruction...” (Sandholtz & Ringstaff, 2016).

RO3: Influence on Engineering-Specific Instruction

RO4: Impacts on Student Learning

MODEST 
SUPPORTS 

Partnering with Rural Schools

Roughly 7.3M public school students are enrolled in rural school districts (Showalter et al., 2023)

- o Another 2M students attend rural schools located within non-rural districts

We set out to work with elementary teachers in small schools and rural communities

<p><u>Kings Canyon Unified School District</u> CA</p> <p>A larger district of 10,000 students spanning ~100 miles through Central Valley agricultural communities and the Sierra Nevada mountains in both Sequoia and Kings Canyon National Parks.</p>	<p><u>Park County Schools</u> MT</p> <p>A 12-school district serving mountain communities near Yellowstone, where tourism, logging, mining, and agriculture are the primary industries. Some residents have no cell phone service within 50 miles and must drive more than an hour to reach any stores.</p>
<p><u>Fremont County School District #2</u> WY</p> <p>A one-campus district of 150 students near Wind River Reservation, serving an area covering 14,094 miles² with 1 teacher for each grade K-6 and 1 science teacher for all of grades 7-12.</p>	<p><u>McKenzie County School District #1</u> ND</p> <p>A community near the Bakken field where the oil boom has led to student enrollment more than tripling in 10 years and infrastructure can't meet the demand. This hub for the oil industry is actively working to attract more teachers and other essential workers.</p>

Shared Vision of Partnership

- **We are all learners.** Professional learning (PL) helps to give teachers a foothold for NGSS-aligned instruction
 - All states involved have standards grounded in *A Framework for K-12 Science Education*
- **We will get farther working together.** Modest supports help to sustain PL in science and engineering
 - Including virtual professional learning communities (PLCs) and guided support
- **Students are the center of our work.** Our communities have assets to help engage students in science and engineering



Shared Vision of Partnership

- **We are all learners.** Professional learning (PL) helps to give teachers a foothold for NGSS-aligned instruction
 - All states involved have standards grounded in *A Framework for K-12 Science Education*
- **We will get farther working together.** Modest supports help to sustain PL in science and engineering
 - Including virtual professional learning communities (PLCs) and guided support
- **Students are the center of our work.** Our communities have assets to help engage students in science and engineering



What's in a Logo?

Science and engineering

Core ideas in the discipline

Concepts across disciplines

STEM STRONG

Supporting Student Science and Engineering Learning

17

Delivering Quality Online Professional Learning

Providing Access and Connecting Teachers as Communities

Our Vision for Student Science and Engineering Learning

An engaging classroom community that supports students as knowers and doers who are empowered to follow their wonder and curiosity to understand and make real world connections that develop their science and engineering ideas.

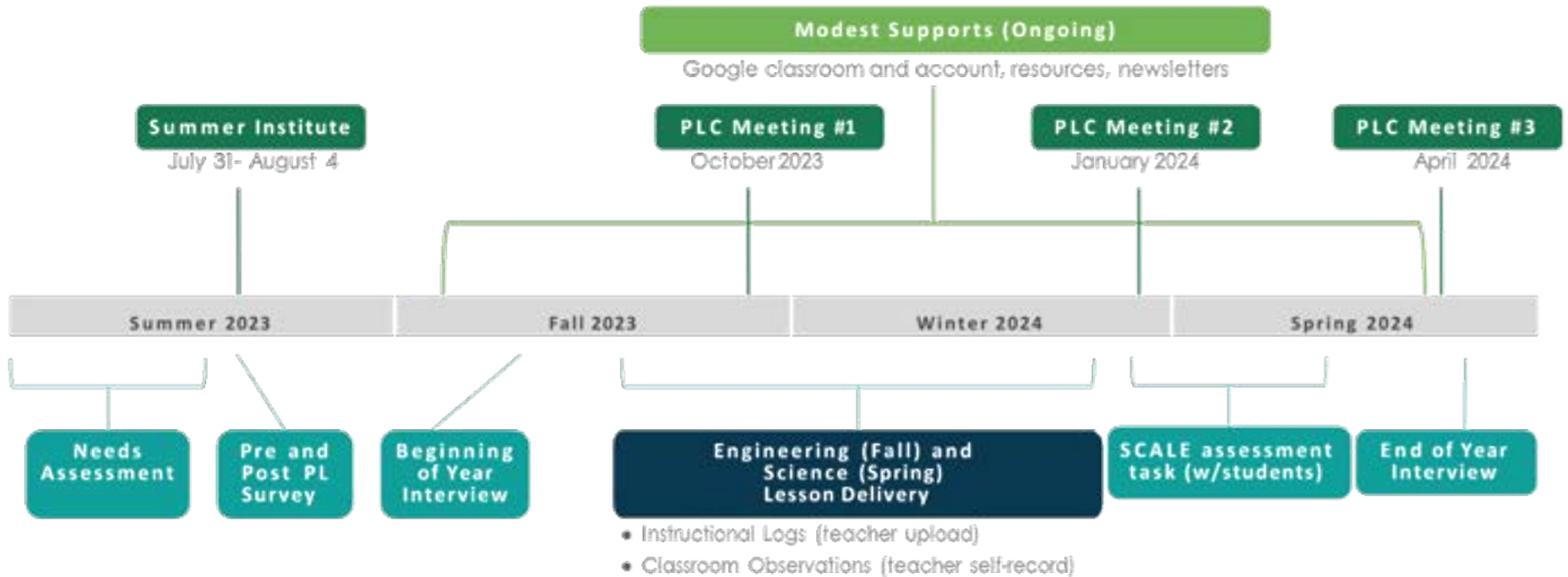
STEM STRONG

Supporting Student Science and Engineering Learning

18



Supporting Teachers
in Rural Communities
for the Next Generation



Activities During 2023-2024 Academic Year

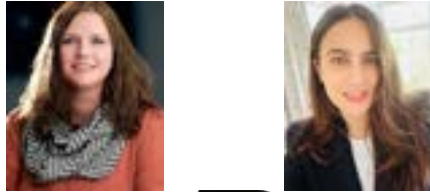
Collaborators

Advisory Board

- Judith Sandholtz (UC Irvine), Chair
- Jayne Downey (MSU)
- Christine Cunningham (Museum of Science)
- Renee Affolter (Boston College)
- Bobbi Eichhorst (WY Department of Education)

Montana

Becky Hammack, co-PI
Tugba Boz, Post-doc



North Dakota

Ryan Summers, PI
Julie Robinson
Min Jung Lee, Post-doc
Maria Zaman, GRA



California

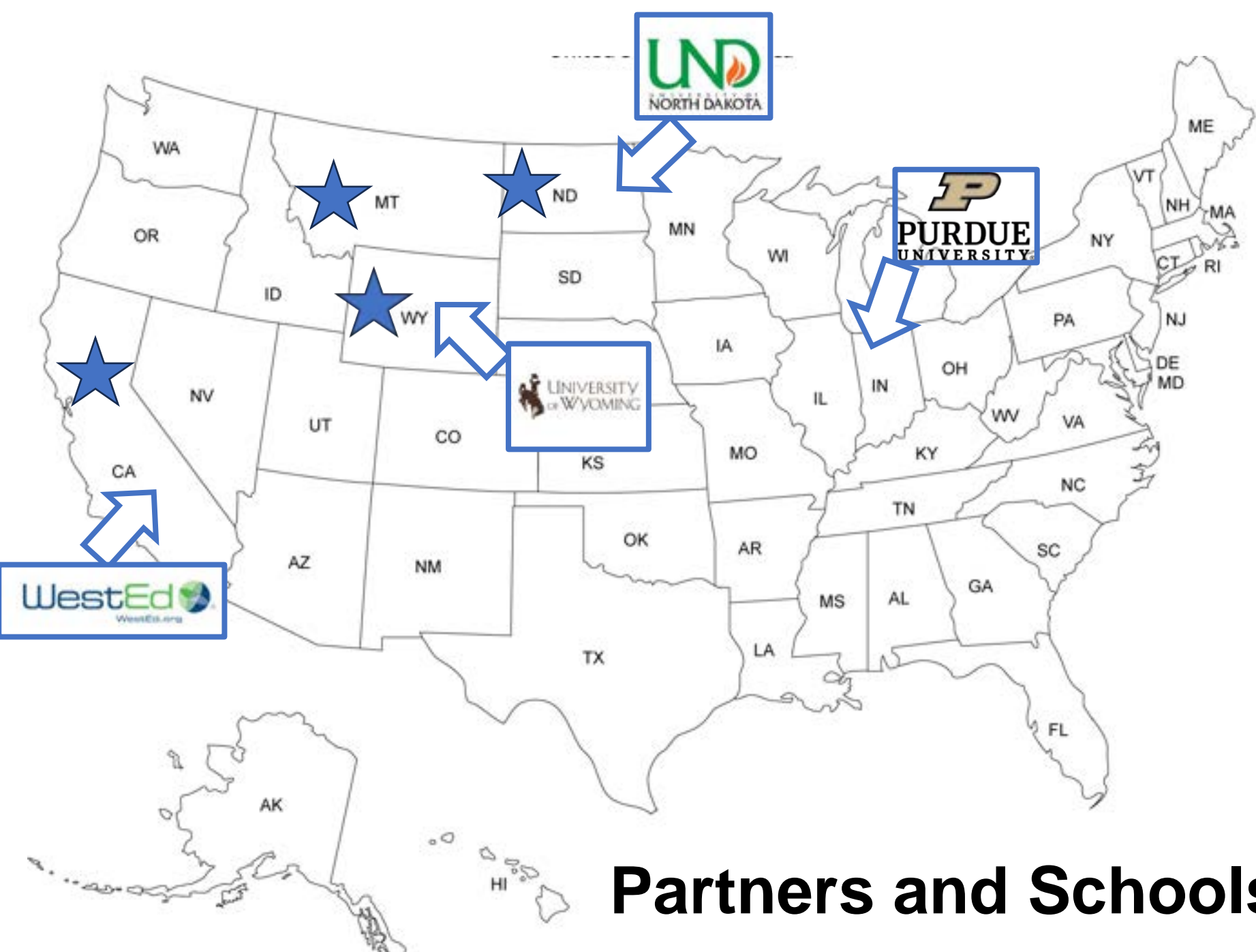
Cathy Ringstaff, co-PI
Ashley Iveland, co-PI
Meghan Macias
John Galisky, GRA



Wyoming

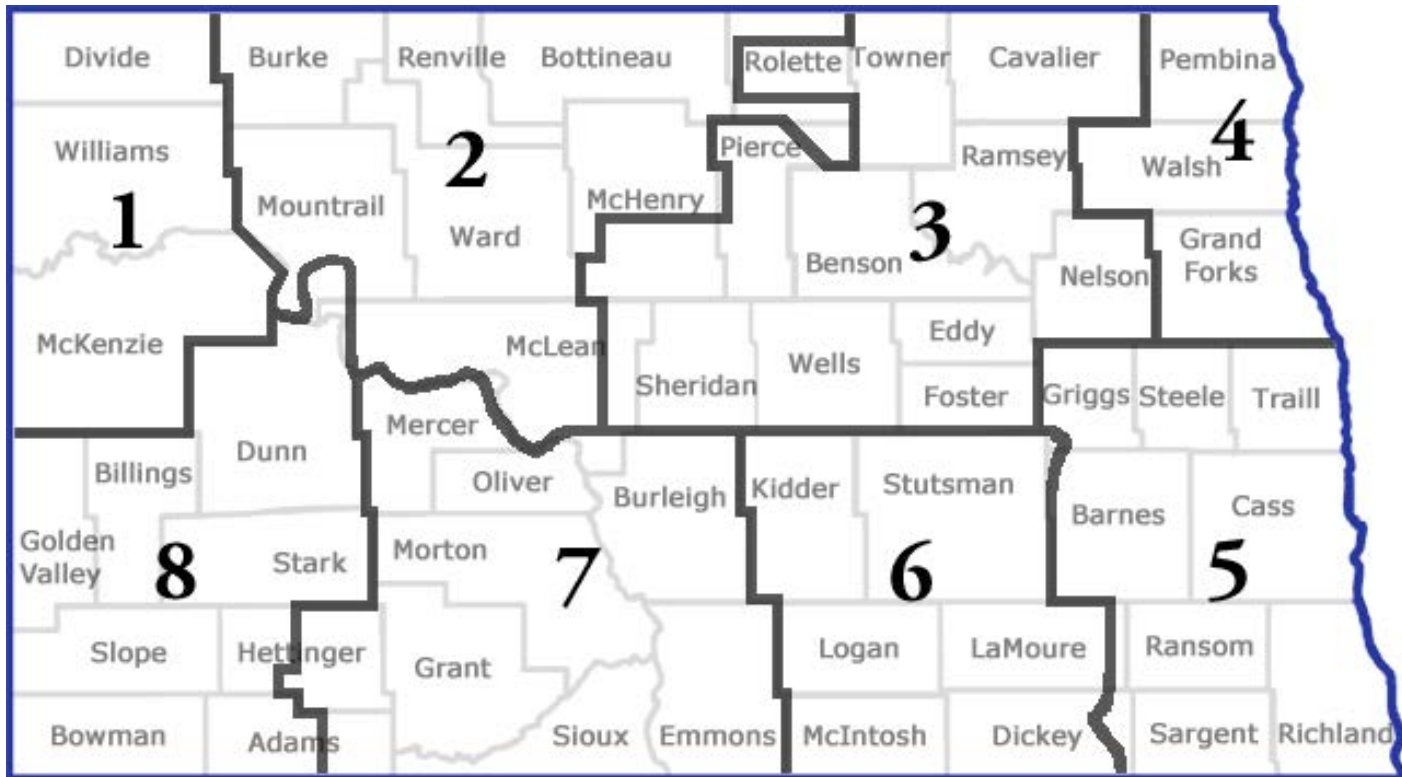
Martha Inouye, co-PI
Natalie Johansen, GRA





Partners and Schools

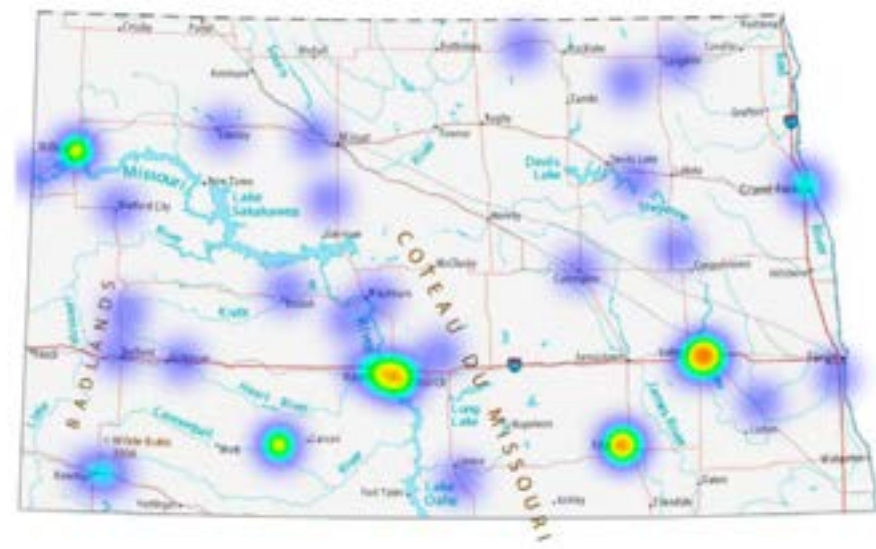
Connecting with Teachers and Schools



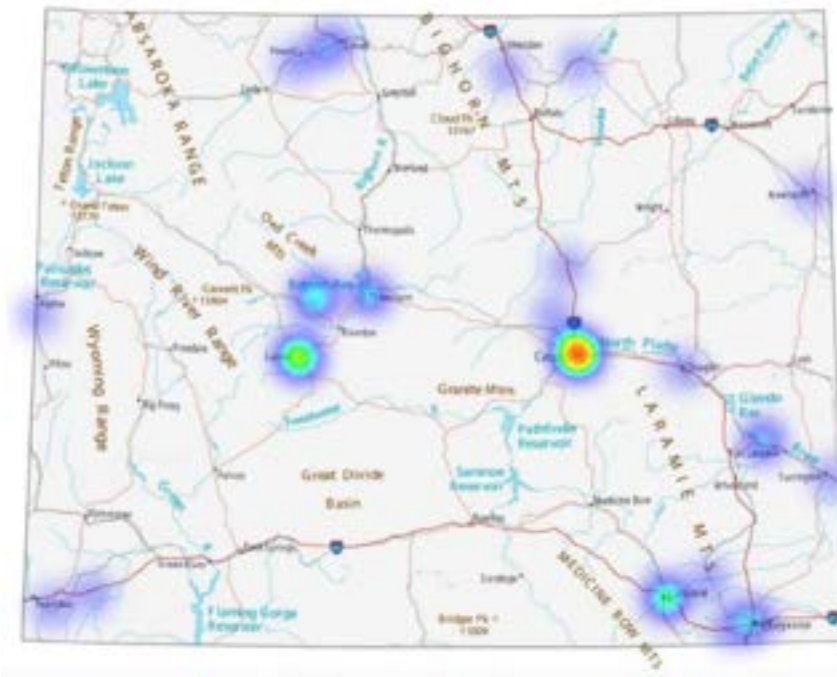
**NORTH DAKOTA DEPARTMENT OF
PUBLIC INSTRUCTION**

ND EPSCoR

**UND UNIVERSITY OF
NORTH DAKOTA**



Teachers Impacted by STEM STRONG Across CA, MT, ND, and WY



Rural Partnerships

Strengths

- Teachers are excited to participate in science and engineering PL and PLCs
- Teachers often have more control over their curriculum and science lessons
- Teachers are knowledgeable about their environment and excited to connect science and engineering topics to their communities
- Teachers are collaborators when it comes to raising awareness about the project and the assets of rural communities

Challenges

- We interact with teachers at a distance. We have worked to build a positive community and establish relationships.
- Being online changes how we deliver PL and communicate with teachers. Managing electronic communications takes work.
- Teachers have varying needs, ranging content to practice. We try to plan PL and offer modest supports that fit their needs.

DISSEMINATION

Summers, R., Iveland, A., Hammack, R., Inouye, M., Robinson, J., Macias, M., Boz, T., & Ringstaff, C. (2024, January). *Offering Rural Elementary Teachers Modest Supports to Sustain Professional Development Outcomes in Science and Engineering*. Paper submitted for presentation at the annual conference of the Association for Science Teacher Education in New Orleans, LA.

Hammack, R., Robinson, J., Boz, T., Lee, M., & Summers, R. (2024). *Supporting elementary engineering instruction in rural contexts through online professional learning and modest supports*. Proceedings of the 2024 American Society for Engineering Education Annual Convention, Portland, OR.

Galisky, J., Macias, M., Iveland, A., Inouye, M., Hammack, R., Robinson, J., Ringstaff, C., & Summers, R. (2024, accepted). *Science professional learning that offers opportunities for growth in engineering self-efficacy for rural school elementary teachers*. Paper submitted for presentation at the NARST Annual International Conference, Denver, CO.

Questions?

Email: ryan.summers@und.edu

Websites

- Project: <https://education.und.edu/research/stemstrong.html>
- Directory: <https://campus.und.edu/directory/ryan.summers>
- Research Gate: <https://www.researchgate.net/profile/Ryan-Summers>

Twitter /X

- Project @stemstrong22
- Personal @RyanGSummers