Riverpoint Advanced Mathematics Partnership - Algebra (RAMP-A):
Collaborating to improve learning in Algebra 1

Model

PD Activities

Teachers within PLCs:
- Use student thinking to teach CCSS-M with coherence: e.g. create learning trajectories, design and use formative assessment, create task dialogues.
- Solve rich tasks and unpack Standards for Mathematical Practices.
- Design tasks for higher cognitive complexity.

Administrators:
- Meet with their PLCs to understand effective teaching and learning.
- Meet together to discuss ways to support effective instruction.

Participants

- 65 Algebra 1 teachers in 14 PLCs: 17 middle school teachers, 2 middle school coaches, 42 high school teachers, and 4 high school peer teachers affecting approximately 1500 students per year.
- 19 Administrators attended PD, most often joining the PLCs from their buildings, but sometimes meeting among themselves.

Context

- 6 full-day school-year workshops each year.
- 3-day summer workshop each year.
- PLC meetings in their buildings, sometimes with administrators.
- Observations by project leaders.

Professional Learning Communities

- Work in school-based groups of 2-4 teachers.
- Meet in their buildings to look at student work and data together, sometimes joined by administrators.
- Collaboratively plan lessons, create tasks.

Goals

1) Increase Algebra 1 teachers' content knowledge in algebra and functions in the Common Core State Standards in Mathematics,
2) Improve teachers' instructional strategies in Algebra 1,
3) Improve teachers' understanding of and ability to teach the Standards for Mathematical Practice,
4) Use the Teacher and Principal Evaluation system to increase principals'/assistant principals' knowledge of and ability to support improved mathematics instruction, and
5) Improve student achievement and interest in math.

Theoretical Framework

- Learning Trajectory Based Instruction (Szatjn et al., 2012)
- Understand the algebra and functions of the Common Core State Standards – Mathematics, specifically:
  - Coherence of mathematics and of student learning
- Use of the Standards for Mathematical Practices
- Teachers' learning through teaching (Leikin & Zazkis, 2010)
- Mindfulness, noticing, awareness (Langer, 2000)
- Principles of Effective Professional Development (Elmore, 2002)
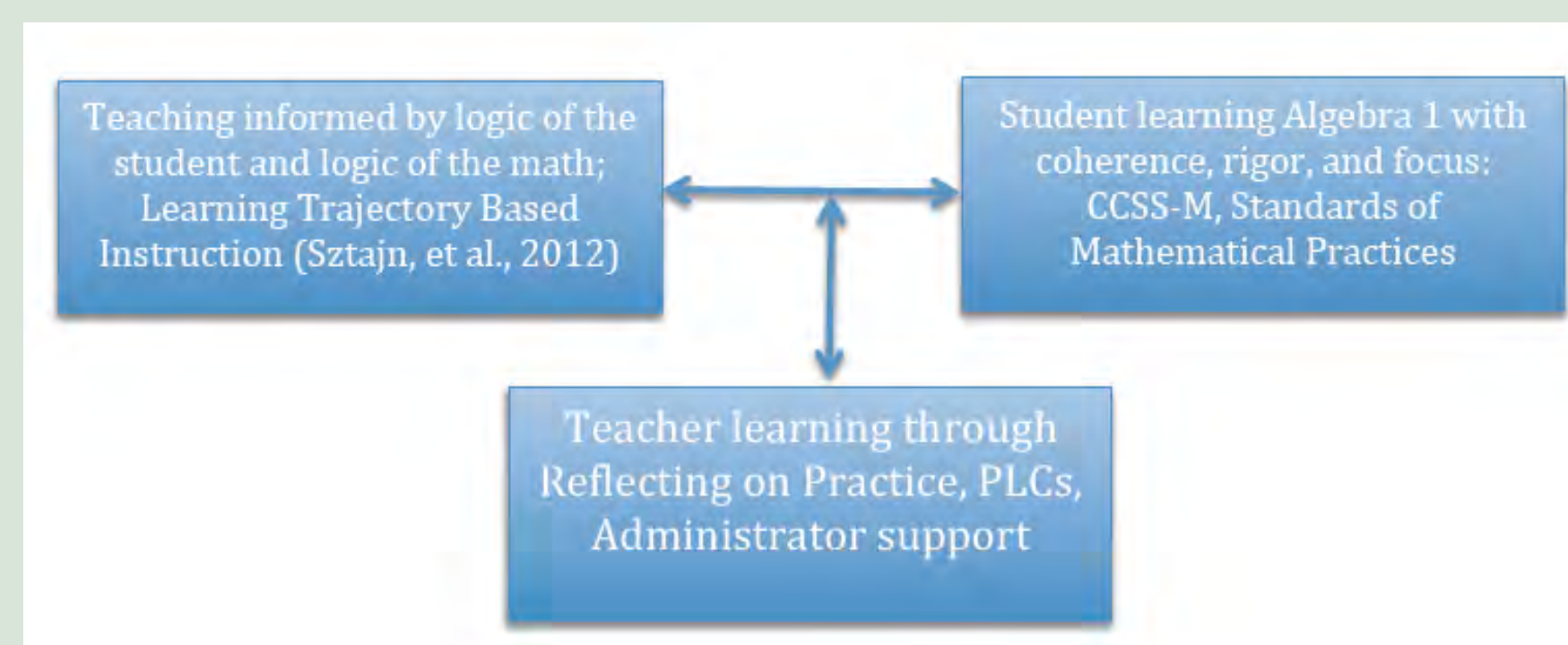
Partners

Eastern Washington University Dept. of Mathematics, Washington State University College of Education, Education Service District 101, Republic School District, Spokane Public Schools, Mead School District, West Valley School District, Central Valley School District, Cheney School District, Gonzaga Preparatory School

Year 1 Findings

Evaluation Design

- Quasi-experimental design with control group.
- Diagnostic Teacher Assessments in Mathematics and Science (Middle grades Algebraic Ideas).
- Adaptation of Horizon Research's 2005-06 Local Systemic Change Classroom Observation Protocol.
- Student achievement using the state Algebra 1 End of Course exam.
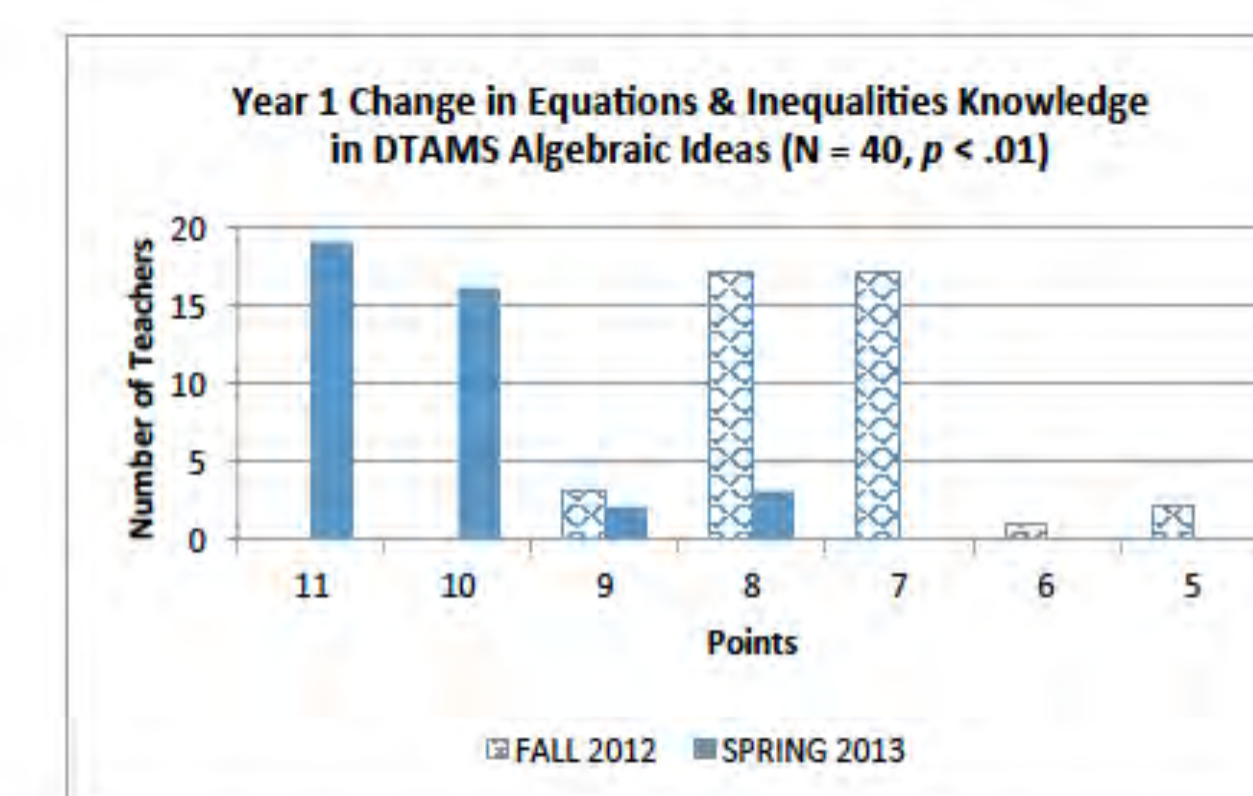- Student Survey adapted from TIMSS instrument.
- Qualitative data collection.

Figure 7. Change in participating teachers' knowledge of equations and inequalities from Fall 2012 to Spring 2013, as assessed by parallel versions of the *DTAMS Algebraic Ideas* instruments. Kennedy (2013)

Results

- Statistically and practically significant changes in teaching practices, especially measures of Classroom Culture.
- Significant improvement in Mathematical Knowledge for Teaching of participants.
- Some increase in Pedagogical Content Knowledge, but room for improvement.
- No increase in student motivation to learn mathematics.

Lessons Learned

- Teachers need time to work together.
- Leaders must attend to and support professional norms and PLC development.
- Administrators want and need PD for the CCSS and TPEP, but struggle with finding the time. They seek opportunities to talk with each other.
- Leadership team must collaborate more to develop a shared understanding of project goals and concepts.

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