

Developing a Positive Error-Climate: Action Steps from Research and Practice

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Getting to know each other!

Raise your hand if...

- You are a teacher
- You are an administrator
- You work at a college or university
- You have another role!
- You focus on K-5
- You focus on 6-8
- You focus on 9-12
- You focus on higher education
- You have done some sort of research before
- You love being in San Diego right now
- You love MATH!

Goals

- Compare and contrast practitioners' and researchers' perspectives on Error Climate
- Consider students' experiences and perceptions of using errors for learning
- Identify actions steps to develop a positive error climate in your school

Errors in math classrooms...

“... are aspects of learning in which research and practice are severely misaligned.”

-Jo Boaler, in 2013

What has changed? What has stayed the same?

The Role of Leaders

Research is incapable of providing “recipes that can be blindly applied to practice” (Levin, 2013).

Authentic change comes from teachers, leaders, and researchers working together to understand classroom phenomena and co-design solutions to common challenges.

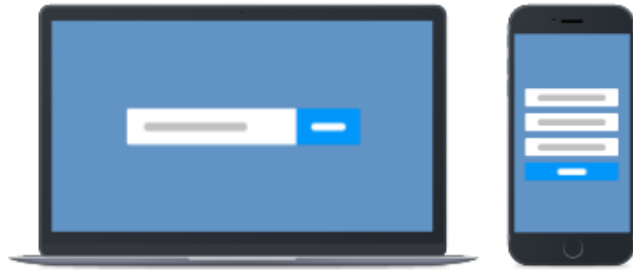
Your task today?

→ Engage with each other to better understand how to develop productive error climates and create actions steps to help others.

How have you seen errors used for learning in a math classroom?

How to join

Web



- 1 Go to **PollEv.com**
- 2 Enter **KARINLANGE915**
- 3 Respond to activity

Text



- 1 Text **KARINLANGE915** to **37607**
- 2 Text in your message

Total Results: 0

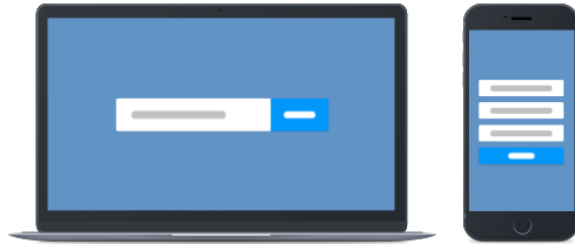
Having students explain errors...

- **Leads to more learning** (Grosse & Renkl, 2007; Siegler, 2002; Siegler & Chen, 2008)
- **Helps them construct correct knowledge** (Adams et al., 2014; Booth, Cooper, et al., 2015; Booth, Oyer, et al. 2015; McLaren, Adams, & Mayer, 2015)
- **Helps them address misconceptions** (Borasi, 1994; Durkin & Rittle-Johnson, 2012; Henderson & Harper, 2009; Ohlsson, 1996; Yerushalmi & Polingher, 2006)
- **Improves procedural skills** (Booth, Cooper, et al., 2015; Booth, Oyer, et al., 2015)
- **Develops their conceptual understanding** (Booth, Lange, Koedinger, & Newton, 2013)
- **Is especially beneficial for students who struggle to learn math** (Barbieri & Booth, 2016)
- **Increases sense of belonging in mathematics community** (Barbieri & Booth, 2014)

What does a "Positive Error Climate" mean to you?

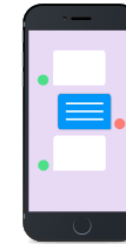
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Positive Error Climate – Our Definition Today

“The perception, evaluation, and utilization of errors as integral elements of the learning process within the social context of the classroom.”

-Steuer & Dresel, 2015

Share Out

What influences the error climate in a classroom?

Teacher Perspectives on Error Climate

Teachers should:

- Emphasize a positive view of mathematics
- Communicate the value of mistakes
 - Grade mistakes positively
 - Make positive comments about mistakes
- Show mistakes to all students
- Present work of unknown student
- Plan for tasks and discussions strategically
- Set norms for discussions
- Create a community of learners

From Practitioner Journals: Barlow, Watson, Tessema, Lischka, & Strayer, 2018; Boaler, 2013; Bray, 2013; Lannin, Arbaugh, Barker, & Townsend, 2006; Lischka, Gerstenschlager, Stephens, Strayer, & Barlow, 2018; Willingham, Strayer, Barlow, & Lischka, 2018

Researcher Perspectives on Error Climate

Teachers need:

- Deep mathematical knowledge for teaching (MKT)
- To believe that discussing errors helps students construct more robust mathematical knowledge
- To change discourse patterns and practices towards student-centered discussions

Turn & Talk

What are the similarities in how practitioners and researchers talk about Error Climate?

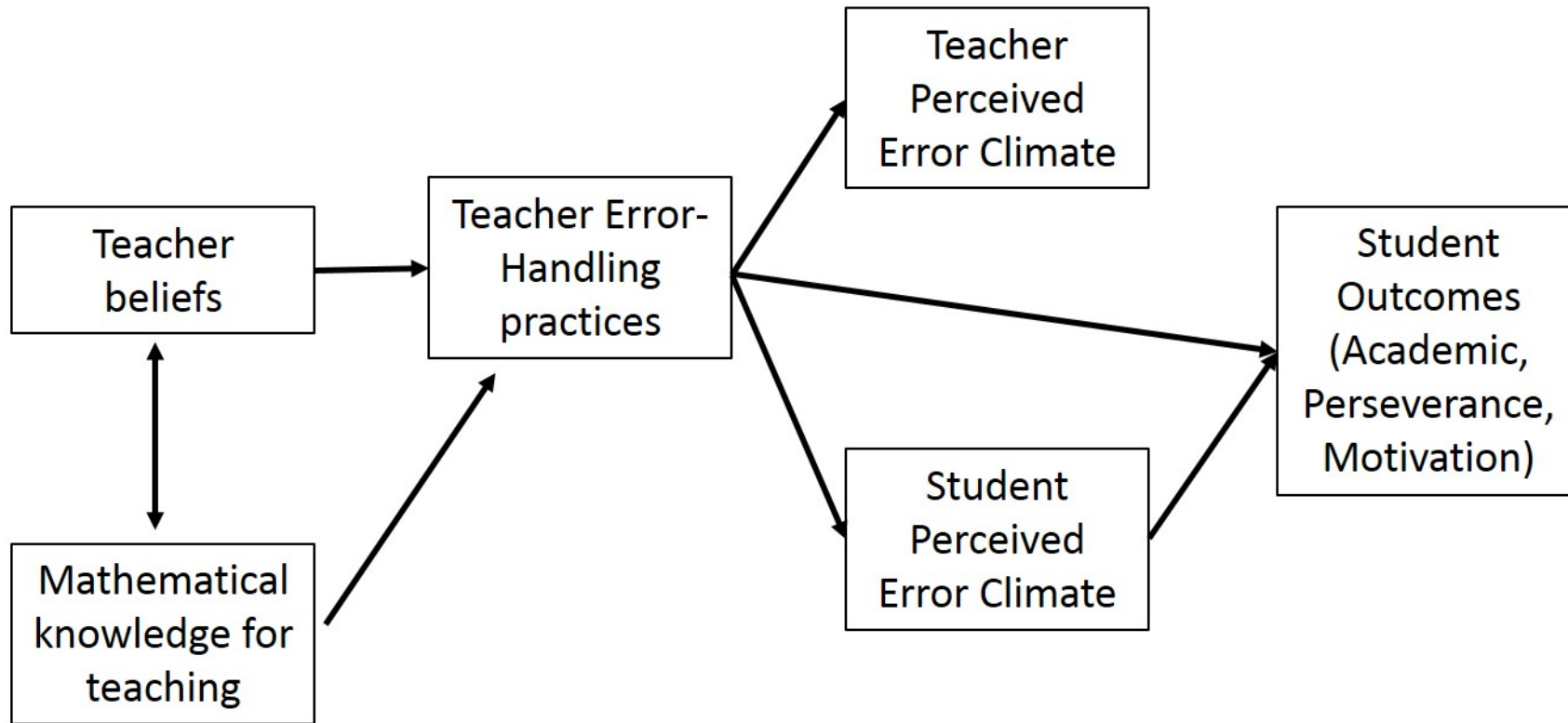
What are the major differences in how practitioners and researchers talk about Error Climate?

Consider...

Perceived Error Climate varies both between AND within classrooms... (Steuer et al., 2013)

This suggests that the perceptions of error climate may be even more important than observed error-handling practices.

Model of Error Climate



Booth, Fukawa-Connelly, Barbieri, & Lange (2019)

Missing Piece: Student Perceptions

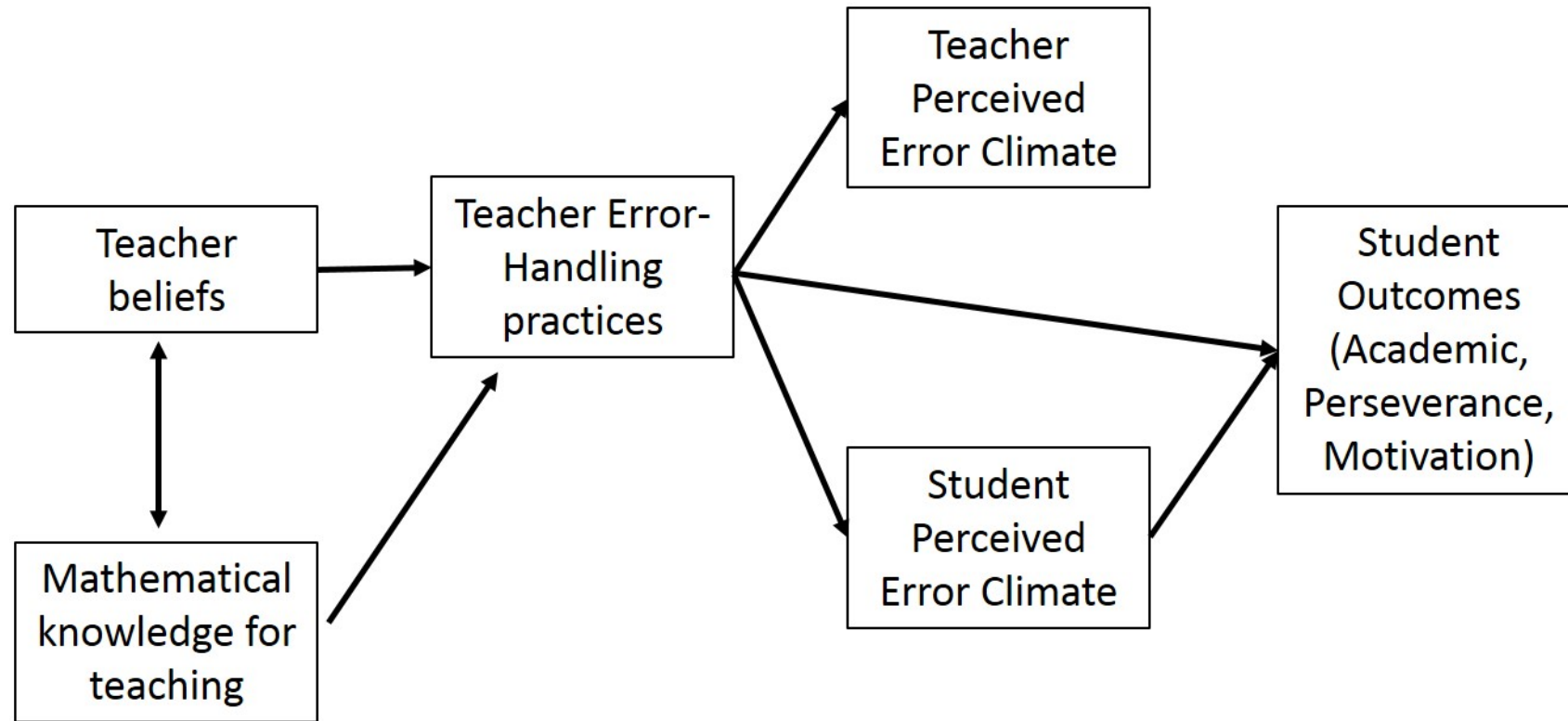
Students' perceptions of the error climate may be the most impactful on student achievement, motivation, and persistence!

Action Planning

How can we support teachers in developing a positive Error Climate?

- Work with a partner or small group.
- Describe the context of your schools.
- Identify a goal related to developing a positive error climate.
- List 2-4 steps YOU can take to promote a positive error-climate in mathematics classrooms.

Evaluate: Where do your action steps fit in this proposed Model of Error Climate?



Booth, Fukawa-Connelly, Barbieri, & Lange (2019)

Any Questions?

Karin Lange, Ed.D.

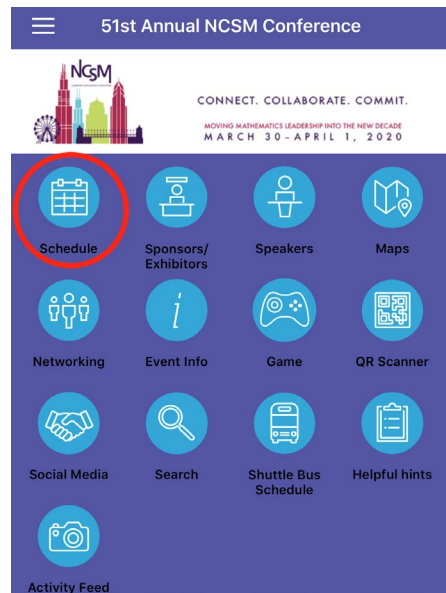
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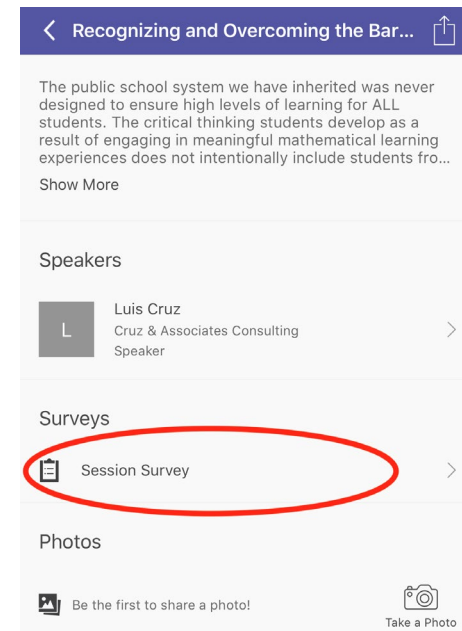
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Thank you!

