EMC
EXAMINING
MATHEMATICS
COACHING

Examining Mathematics Coaching

Research Partners

MONTANA STATE UNIVERSITY

RMC RESEARCH

Funding By The National Science Foundation
Discovery Research K-12 Program (DR K-12),
Award No. 0918326

EXAMINING MATHEMATICS COACHING

Project Overview

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Description

- EMC is a 5-year research and development project examining the effects of a coach's "knowledge for coaching" on a diverse population of K-8 teachers.

- It addresses the DR K-12 challenge:

  How can the ability of teachers to provide Science, Technology, Engineering, and Mathematics (STEM) education be enhanced?

Personnel

Montana State University

- David Yopp, PI
- Beth Burroughs, CoPI
- Jennifer Luebeck
- Mark Greenwood

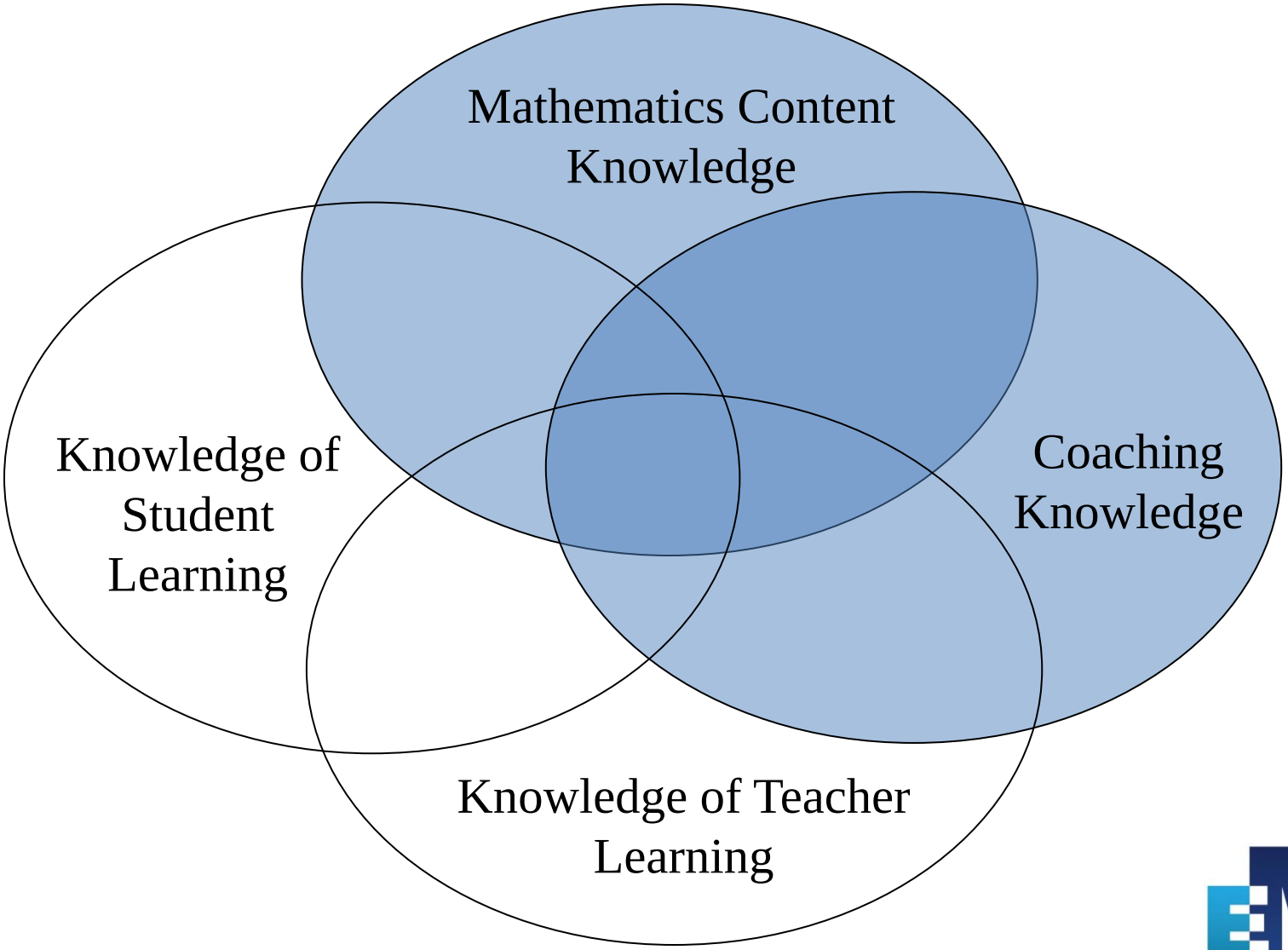
RMC Research

- John Sutton, CoPI
- Clare Heidema
- Arlene Mitchell
- Lyn Swackhamer

Project Director: James Burroughs

Site Coordinator: Insert Name

Knowledge Domains



Why Study This?

- Coaching is a promising model for enhancing K-8 mathematics teachers' abilities to provide quality mathematics education.
- Coaching can be implemented at any point in a teacher's career (as opposed to mentoring).
- The National Mathematics Panel (2008) reports that schools across the nation are using mathematics specialists, including mathematics coaches, yet there is limited research proving what makes it effective.

Why Study This?

There exist a number of small studies that suggest mathematics coaching could be effective, yet none demonstrates what types and depths of knowledge increase a coach's effectiveness.

EMC Goals

1. Determine the degree to which coaching knowledge contributes to coaching effectiveness.
2. Determine the degree to which mathematics content knowledge contributes to coaching effectiveness.
3. Contribute to research on knowledge for coaching through an experimental design studying the impacts of coaching knowledge and mathematics content knowledge on teachers' knowledge, attitudes, and classroom practices.

Potential Impacts of EMC

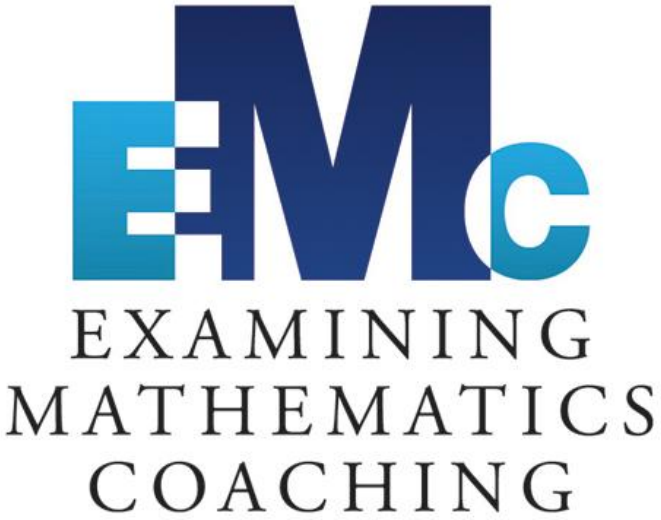
- Understanding of knowledge needed for effective mathematics coaching
- Understanding of what contributes to effective mathematics coaching
- Understanding of coaching best practices
- Understanding of factors influencing coaching effectiveness
- Instruments to evaluate and monitor mathematics coaching

Research Design

	Group 1	Group 2
Year 1 2009-10	Provide orientation to EMC coaching model.	
Year 2 2010-11	Provide PD on Mathematics Content Knowledge. Summer 2010 Web-based PD School Year	Web-based PD School Year 2010-11
Year 3 2011-12	Web-based PD School Year 2011-12	Provide PD on Coaching Knowledge. Summer 2011 Web-based PD School Year
Year 4 2012-13	Provide PD on Coaching Knowledge Summer 2012 Web-based PD School Year	Web-based PD School year 2012-13
Year 5 2013-14	Web-based PD School Year 2013-14	Provide PD on Mathematics Content Knowledge. Summer 2013 Web-based PD School Year

EMC Participants

- Each coach works closely with at least three K-8 teachers.
- Coaches conduct at least eight mathematics coaching sessions per teacher per year.
- Coaches follow the EMC Coaching Model.
- Coaches and their teachers complete various research tools at the end or beginning of each school year.
- Teachers are observed in their classrooms once each spring by the site coordinator.
- School districts provide access to student achievement data.



End of Part 1: Overview

Questions? Concerns?

EXAMINING MATHEMATICS COACHING

Introduction to Coaching in EMC

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Welcome!

We're here to help you launch your EMC coaching experience. In this session, you will learn about:

- the role of an instructional coach;
- the instructional coaching cycle;
- what it means to be part of EMC; and
- how to maximize your benefit from these!

Coaches have many names…

- Coach
- Facilitator
- Specialist
- Coordinator
- Teacher leader
- Teacher on special assignment

…and many responsibilities.

Underneath the titles and tasks, there are certain characteristics that are shared by all good coaches.

Characteristics of a Coach

What images and phrases come to mind when you think of a **coach**?

Reflect for a few minutes…list your ideas… then we'll share thoughts as a group.

Characteristics of a Coach

- Stands alongside you.
- Doesn’t do the work for you.
- Supports your efforts, even if he/she is not necessarily an “expert.”
- Has knowledge of your situation, its challenges and how to overcome them.

Survey results: what teachers **appreciate** about coaches

- Oversight of curriculum fidelity and pacing
- Gathering, analyzing, and sharing data
- Finding resources and answering questions
- Team building and facilitating discussion
- Helping with parents, resources, administration
- Reducing the workload

Survey results: what teachers **desire** from coaches

- One-on-one work
- Observation and feedback
- More observation and feedback
- Modeling lessons and strategies
- Help with: differentiation, cultural relevance, student engagement, assessment

Mathematics Coach: EMC Definition

A mathematics coach is an on-site professional developer who enhances teacher quality through collaboration, focusing on research-based, reform-based, and standards-based instructional strategies and mathematics content that includes the why, what, and how of teaching mathematics.

Mathematics Coach: EMC Definition

A mathematics coach is…

an on-site professional developer

Mathematics Coach: EMC Definition

A mathematics coach…

enhances teacher quality through collaboration

Mathematics Coach: EMC Definition

A mathematics coach focuses on…

research-based, reform-based, and standards-based instructional strategies

Mathematics Coach: EMC Definition

A mathematics coach focuses on…

mathematics content that includes the why, what, and how of teaching mathematics

What do you appreciate? What do you desire?

- You have an incredible resource available - make the most of it!

- We want to help you become a good **“consumer of coaching.”**

Consumers of coaching are able to…

- …assess their own needs;
- …assess their performance;
- …ask for help from others;
- …provide context as needed;
- …listen to and hear ideas; and
- …overcome anxious feelings.

To make the most of coaching…

- …focus on instructional issues.
- …focus on mathematics content.
- …follow a coaching framework.
- …follow a coaching schedule.
- …work collaboratively with your coach.

We are asking you to do this with your coach as participants in EMC coaching research.

EMC Coaching Model

Instructional coaching occurs in a cycle:

- Pre-lesson conference
- Lesson observation
- Post-lesson conference

This sequence of sessions will occur eight times during each full year of the EMC project.

It will occur four times from February to May 2010.

Pre-lesson conference

Purpose: to develop a shared view of the upcoming lesson

Logistics

- Allow at least 15 minutes for the pre-lesson conference
- Face to face meetings are best
- Agree on goals and expectations for the coaching session

Lesson observation

Remember that the observation is:

- Structured--you've set goals.
- Intended to span the entire lesson.
- Not for purposes of evaluation.
- Confidential between you and your coach.
- Focused on instruction and content--it's about the **teaching**, not the **teacher.**

Post-lesson conference

Purpose: to debrief the lesson relative to the goal of the observation

Logistics

- Allow at least 30 minutes for the post-lesson conference.
- Face to face meetings are best.
- Ideally, meet immediately following the lesson; if necessary, schedule for as soon as possible.
- This is where coaching takes place—an essential phase of the coaching cycle.

Scheduling Suggestions

- If possible, schedule all three parts of the cycle at the same time.
- Check ahead to assure a good day and a good lesson to work on specific goals.
- Spread the eight sessions evenly over the academic year.

Administrator Support

Coaches and teachers need to keep administrators informed of your activities and help them identify ways to support you

How can administrators (and other school personnel) support your participation in the EMC project?

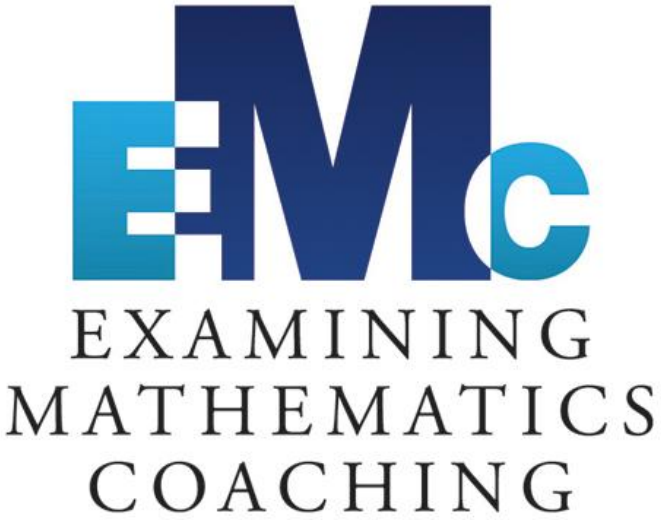
Administrator Support

Administrators can:

- Support your time commitment to the project.
- Acknowledge the significance and value of coaching to improved practice and student learning.
- Ask you about your progress and what you're learning from the experience.
- Be an advocate to the community for coaching as a professional learning model.

Commitments to EMC

- Each coach will work consistently with three K-8 teachers for the duration of the EMC study.
- For the project, participating coaches will conduct eight mathematics coaching sessions with each teacher per school year, at least four of which will be in the area of number sense and operations.
- Participating coaches will use the EMC Coaching Model (~15-minute pre-lesson conference, lesson observation, ~30-minute post-lesson conference).
- Participating coaches and their teachers will complete a series of project research tools annually.



End of Part 2: Introduction to Coaching in EMC

Questions? Concerns?

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Research Tools

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Research Questions

- *To what extent does the depth of a coach's knowledge in two primary domains (**coaching knowledge** and **mathematics content knowledge**) influence his or her coaching effectiveness?*
- *To what extent does **professional development** for coaches in these two areas improve their coaching effectiveness?*
- *To what extent are the effects of targeted professional development on coaching effectiveness explained by increases in coaching knowledge and mathematics content knowledge?*

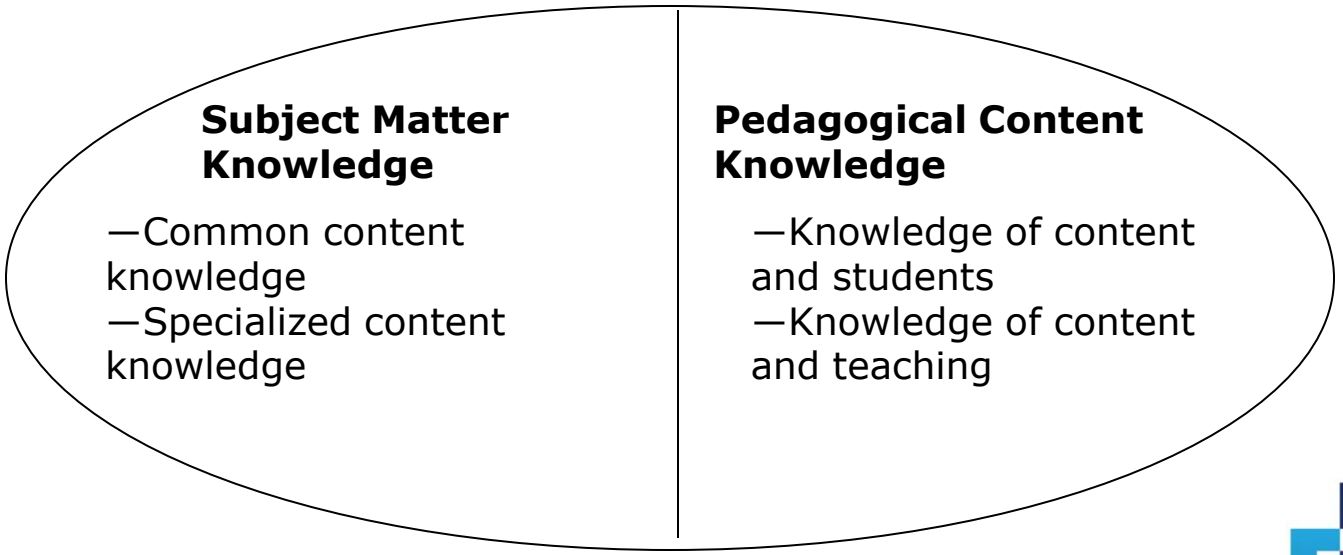
Coach & Teacher Research Tools

Tool	Who	Purpose	When
Mathematics Knowledge for Teaching (MKT)	Coach Teacher	Document changes in mathematics content knowledge needed for teaching.	Early 2010, then yearly in May 2010-14 for teachers; yearly in September 2010-13 for coaches
Coach and Teacher Reflections (CTRI)	Coach Teacher	Document the quality, content, and details of coaching sessions. Examine perception of coaching impact on instruction.	Using a coach log; submit a summary each year in May 2010-14

Mathematics Knowledge for Teaching

Study of Instructional Improvement / Learning Mathematics for Teaching Project at the University of Michigan

Instrument to assess mathematics content knowledge for teaching



Mathematics Knowledge for Teaching (MKT)

- This is not an assessment of individual teacher's knowledge or skill – it is a tool for evaluating the coaching model and the EMC design.
- Data from MKT will be used to help understand how coaching affects teaching mathematics.
- The items on the MKT are challenging – they are designed to be that way.

Mathematics Knowledge for Teaching

Design questions (e.g., quiz)

Which of these lists would be best for assessing whether students understand ordering decimal numbers.

a. 0.5 7 0.01 11.4

b. 0.60 2.53 3.12 0.45

c. 0.6 4.25 0.565 2.5

d. These lists are all equally good for assessing whether students understand how to order decimal numbers.

Coach and Teacher Reflections

Coach

- Time spent and type of interaction
  - Pre-lesson conference
  - Lesson observation
  - Post-lesson conference
- Reflection on coaching sessions
  - Coaching relationship
  - Topics discussed
  - Impact

Teacher

- Number of visits
- Reflection on coaching sessions
  - Coaching relationship
  - Topics discussed
  - Impact

Coach and Teacher Reflections

My coach and I discussed significant and worthwhile mathematical content.

Not at all				To a great extent
1	2	3	4	5

Coach Research Tools

Tool	Who	Purpose	When
Coaching Knowledge Survey (CKS)	Coach	Assess coaching knowledge.	May 2010, then yearly in September 2010-13
Coaching Skills Inventory (CSI)	Coach	Self-assess coaching skills.	Jan./Feb. and May 2010, then yearly in September 2010-13

Coaching Knowledge Survey

	Reflective of my coaching							
	Not at all	Somewhat						Very much
	1	2	3	4	5	6	7	8
I coach newer teachers more than the experienced teachers.								

Coaching Skills Inventory

How confident do you feel coaching teachers on encouraging student participation?

Not at all confident				Very confident
1	2	3	4	5

Teacher Research Tools

Tool	Who	Purpose	When
Teacher Needs Inventory (TNI)	Teacher	Planning tool to provide focus for coaching sessions.	Early 2010, then yearly in May 2010-14
Teacher Survey (TS)	Teacher	Examine teacher attitudes, beliefs, and perceptions about mathematics teaching.	Early 2010, then yearly in May 2010-14
Classroom Observation	Teacher	Document classroom practice	Early 2010, then yearly in May 2010-14

Teacher Needs Inventory

How confident do you feel using cooperative learning?

Not at all confident — Very confident

1 2 3 4 5

I would not like to partner with coach on this topic.	Not sure if I would like to partner with coach on this topic.	I would like to partner with coach on this topic.
[ ]	[ ]	[ ]

Teacher Survey

During the last 12 months, how often did you engage in each of the following activities <u>related specifically to the teaching and learning of mathematics</u>?

e. Observed demonstrations of teaching techniques.

Never	**Very seldom**	**Some**	**Frequently**	**A lot**
Not at all	Once or twice per year	Once or twice per month	Once or twice per week	Almost daily

Observation

Observer gives a brief description of the day's lesson, the classroom setting in which the lesson took place (space, seating arrangement, etc.), and relevant details about the students and teacher. Short-answer items examine:

- Lesson Design and Implementation
- Content
- Classroom Culture

Summary

- Ongoing: coach and teacher reflections (CTRI)
- End or beginning of each school year: three online research tools

Coaches

- MKT- Mathematics Knowledge for Teaching
- CKS-Coaching Knowledge Survey
- CSI-Coaching Skills Inventory

Teachers

- MKT- Mathematics Knowledge for Teaching
- TNI-Teacher Needs Inventory
- TS-Teacher Survey

- End of each year: Classroom observation

Procedures for completion of research tools

- Online tools will be completed using Survey Monkey.
- You will be assigned a 3-digit ID code.
- MKT is a separate system – you will create an account using your own email address.
- Prompt responses and an accurate ID are important.

Procedures for completion of research tools

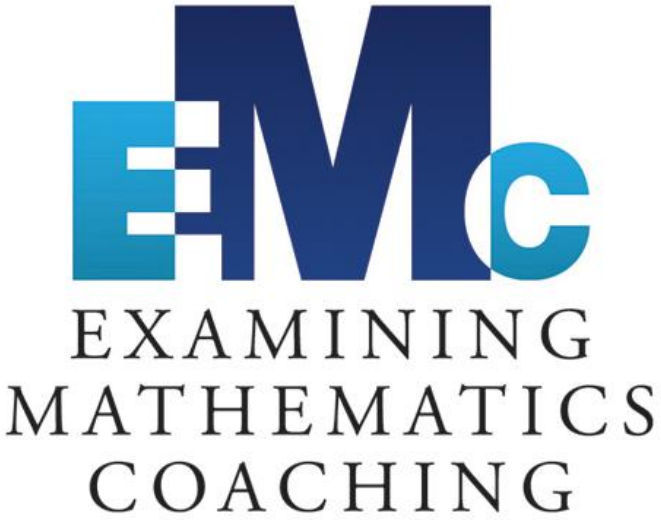
- Please decide when you do your best work, and maintain these conditions every time you take an assessment.
- Always complete the tools individually.
- Stipends paid yearly following completion of all appropriate research tools.

Thank You!

Have we answered your questions about:

- The EMC project?
- The EMC coaching model?
- EMC research tools and expectations?
- How you will benefit from participating?

We look forward to working with you over the next five years!



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