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The Top-Ten List for Mathematics Coaching Programs

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- Think, Pair, Share
- A Review of the Research
- Top-Ten List

Think, Pair, Share

- What are the three most important components of a mathematics coaching program?
- Turn to your neighbor and share your thoughts.

- Current coaching bibliography: 325 articles (since 1990; all content areas)
- 29 are research studies (published studies or paper presentations)
 - Qualitative & quantitative
- 9 research studies focus on mathematics specialists or coaches

Clarifying the Terminology

- Mathematics *Specialist* vs. Mathematics *Coach*

- Teacher Leader for a grade level

- specialist, lead teacher

- **Teacher Leader in a school**

- **specialist, lead teacher, coach, liaison**

- District Teacher Leader

- specialist, lead teacher, coach, liaison

} students

} teachers

Mathematics Specialists: The Research

- There were no significant differences in student achievement in departmentalized mathematics at the elementary level (McGrath & Rust, 2002).
- Using mathematics specialists allowed teachers more time to focus their professional development and effectively plan lessons. Teachers reported gains in student achievement. (Gerretson, Bosnick, and Schofield, 2008).

Mathematics Coaching: The Research

- Seven studies on mathematics coaching
 - Instructional Practice
 - Coaching Program Design
 - Student Achievement

Mathematics Coaching: The Research

- **Instructional Practice: Coaches/PD Project**
 - Forty percent of the teachers significantly changed their instructional practice by actively engaging students in order to build conceptual understandings of mathematics (Campbell, 1996).
 - **Participating teachers increased the frequency of best practices and used a greater variety of instructional formats (e.g., activity-based lessons, investigations, and discussions) (Race, Ho, & Bower, 2001).**

Mathematics Coaching: The Research

- **Instructional Practice: Coaches**
 - Teachers focused more on the “big ideas” of mathematics and emphasized problem-solving over skill-based instruction (Becker, 2001).
 - **Positive changes included using students’ thinking to inform instruction and allowing students’ to think for themselves (McGatha, 2008).**

Mathematics Coaching: The Research

- Program design elements that offer clear advantages include:
 - coaches working in one subject area and in one school.
 - broad communication about the role of the coach (Mangin, 2005).

Mathematics Coaching: The Research

- **Student Achievement**
 - Student achievement gains were not immediate but once established were maintained (Campbell, 1996).
 - **Coaching program led to modest gains in student mathematics content knowledge (Erchick et al., 2007).**
 - Impact of coaches seemed to emerge first in lower grades (Campbell, 2007).

- **Student Achievement**
 - As coaches gained experience, there was a significant impact on student achievement in grades 3 and 5.
 - In grade 4, the positive impact only occurred in classrooms of teachers who had high engagement with a coach.
 - Impact on student achievement took 2-3 years (Campbell, 2009).

Things to remember...

- Mathematics specialists and coaches do not work in isolation.
- Isolating the impacts of coaches is challenging; but, the preliminary results, although not strong, are encouraging.
- There are several research projects on mathematics specialists and coaches being conducted across the country which should produce some much-needed research evidence.

Things to consider...

- There is anecdotal evidence about mathematics coaching that is very useful data.
- There is research and anecdotal evidence about coaching in other content areas that can be useful to the mathematics education community.

Top-Ten List

- Unlike Dave's Top-Ten List, my list is not organized by importance.
- Deciding the importance or significance of each idea is left to individual schools or districts.

Top-Ten List

1. Coaches should have well-specified roles and responsibilities that are clear to all of the district's educators.

- Brown et al., 2007; Cress, 2004; Foster, 2007; Galm & Perry, 2004; Griffin et al., 2001; Hayes et al., 1999; Knight, 2009; Mangin, 2005; Neufeld, & Roper, 2003; Poglinco et al., 2003; Richard, 2003; Schen et al., 2005

2. Coaches' roles should be honored and their time not diverted to other school needs.

- Cameron, 2005; Coskie et al., 2005; Cress, 2004; Foster, 2007; Galm & Perry, 2004; Hayes, 2006; Hayes et al., 1999; Holton, 2007; Knight, 2006; Neufeld, & Roper, 2003; Richard, 2003

3. Coaches should have clear, explicit, and continuing support (superintendent, principals, central office staff, teachers, etc.)

- Cress, 2004; Galm & Perry, 2004; Knight 2004a; Knight 2006; Knight, 2009; McComb & Marsh, 2009; Neufeld, & Roper, 2003; Poglinco et al., 2003

4. Coaches should receive ongoing professional development. (content, adult learning, coaching process)

- Brown et al., 2007; Coskie et al., 2005; Cress, 2004; Feger et al., 2004; Foster, 2007; Galm & Perry, 2004; Hayes, 2006; Hayes et al., 1999; Knight 2006; Knight, 2009; McCombs & Marsh, 2009; Neufeld, & Roper, 2003; O'Conner & Ertmer, 2003; Poglinco et al., 2003; Richard, 2003
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5. Coaches should have adequate time to coach.

- Brown et al., 2007; Knight, 2004b; Knight 2006; Knight 2009; Mangin, 2005; McCombs & Marsh, 2009; Neufeld, & Roper, 2003; Poglinco et al., 2003; Richard, 2003; Schen et al., 2005

6. Coaching needs to be a long-term investment in order to be effective.

- Campbell, 2009; Knight, 2009; McCombs & Marsh, 2009; PSEA, 2007

7. Coaching should be viewed as professional development and not evaluation.

- Cameron, 2005; Coskie et al., 2005; Cress, 2004; Foster, 2007; Galm & Perry, 2004; Hayes, 2006; Hayes et al., 1999; Holton, 2007; Knight, 2006; Knight, 2009; Neufeld, & Roper, 2003; PSEA, 2007; Richard, 2003

8. The coaching program should be integral to the overall school improvement plan.

- Darling-Hammond & McLaughlin, 1995; Feldman & Tung, 2002; Knight, 2009

9. The process of selecting coaches should be rigorous, fair, and take into consideration the multifaceted demands of the job.

- Good teachers are not automatically good coaches.
 - Galm & Perry, 2004; Hayes, 2006; Hayes et al., 1999; Neufeld, & Roper, 2003; Knight, 2004a; Knight, 2004b; McCombs & Marsh, 2009; Poglinco et al., 2003; Richard, 2003
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10. Schools/districts should have a plan in place to systematically assess the impact of the coaching program.

- Knight, 2006; Neufeld, & Roper, 2003; Richard, 2003; Schen et al., 2005

- Webpage with resources for mathematics coaches/specialists. Updated monthly.
 - <http://louisville.edu/education/mcr.url>
 - NCTM Research Brief on Mathematics Coaches/Specialists
 - <http://www.nctm.org/clipsandbriefs.aspx>

Mathematics Coaching & Specialist Resources

Mathematics Coaching/Specialist Resources (MCR)

- [Coaching/Specialist Literature](#)
- [Presentations](#)
- [Coaching/Specialist Resources](#)
- [Math Resources: Student](#)
- [Math Resources: Teacher](#)

The **purpose** of the Mathematics Coaching/Specialist Resources webpage is to provide coaching and mathematics resources along with opportunities for networking for those engaged in instructional coaching in mathematics.



Coaching/Specialist Literature

[Coaching Bibliography \[PDF\]](#)

Updated April 2009

[NCTM Research Brief on Mathematics Specialists & Coaches](#)



Presentations

[Mathematics Coaching Top-Ten List \(NCTM, 2009\) \[PDF\]](#)

[What Does the Research Say? \(AMTE, 2009\) \[PDF\]](#)



Coaching/Specialist Resources

[Elementary Mathematics Specialists and Teacher Leader Project](#)

[The Center for Cognitive Coaching](#)

[Kentucky Mathematics Coaching](#)

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