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What Does the Research Say About Mathematics Specialists & Coaches?

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- Clarifying the Terminology
- Historical Perspective
- The Research

- Turn to your neighbor and discuss the difference between a mathematics specialist and a mathematics coach.

- 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

- For our purposes today
 - A *mathematics specialist* is one who works primarily with students
 - A *mathematics coach* is one who works primarily with teachers

- Turn to your neighbor and discuss
 - When you first heard of mathematics specialists or coaches and in what context.
 - How old or new is this idea?

- 1981, NCTM Board recommends mathematics specialist endorsements on teaching credentials. (S)
- 1983, National Science Board Commission recommends mathematics specialists in grades 4-6. (S)
- 1984, *Arithmetic Teacher* – John Dossey, *Elementary School Mathematics Specialists: Where are they?* (S/C)
- 1989, *Everybody Counts*, National Research Council (S/C)

- 2000, *Principles & Standards for School Mathematics* (S/C)
- 2001, *Adding It Up*, National Research Council (S/C)
- 2001, *Mathematical Education of Teachers*, CBMS (S)
- 2003, Johnny Lot's NCTM Presidential Message (S)

- 2003, *TCM*, Reys & Fennell, *Who Should Lead Mathematics Instruction at the Elementary School Level? A Case for Mathematics Specialists (S/C)*
- 2003, NCTM/NCATE Program Standards for Elementary Mathematics Specialists (S)
- 2006, Skip Fennell's NCTM Presidential Message (S/C)
- 2008, National Mathematics Advisory Panel (S/C)

- The mathematics education community has been talking about specialists/coaches for 27 years!
- Currently, many district- and state-wide initiatives across the US involving mathematics specialists/coaches.
- A few states (<10) now have a mathematics specialist endorsement or certificate.
- There is very little research!

- Turn to your neighbor and discuss the latest research you have read about mathematics specialists or coaches.

- Current coaching bibliography: 308 articles (since 1990; all content areas)
- 28 are research studies (published studies or paper presentations)
 - Qualitative & quantitative
- 9 research studies focus on mathematics specialists or coaches

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

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

- **Coaches/PD Project**
 - Campbell (1996) reported that 40% of the teachers significantly changed their instructional practice by actively engaging students in order to build conceptual understandings of mathematics.
 - **Race, Ho, and Bower (2001) found participating teachers increased the frequency of best practices and used a greater variety of instructional formats (e.g., activity-based lessons, investigations, and discussions).**

- 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).

- 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)

- 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)

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.

- Webpage with resources for mathematics coaches. Updated monthly.
- <http://louisville.edu/education/mcr.url>
 - Coaching bibliography
 - **Websites for coaches**
 - Websites for mathematics teachers & students

- March 2009-NCTM Research Brief on Mathematics Coaching/Specialists
- <http://www.nctm.org/clipsandbriefs.aspx>
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