



Recommendations from a Research Summary Prepared by the Mathematics Leadership Community of Practice

Quality Teaching

- ✓ Nowadays, teachers should take more risks, learn collaboratively, continuously develop professionally, and treat parents as partners (Hargreaves, 2003).
- ✓ Teachers should believe in their students' potential and be well connected with their colleagues (Ferguson & Danielson, 2014).

Teacher Leadership

- ✓ Cooper et al. (2016) suggest that teacher leaders should work towards establishing trust, and interacting both informally and formally with peers. Further, they need to be skilled in different collaborative practices for facilitating teacher learning, and in motivating the school community to develop, apply and monitor processes that lead towards a focused and intentional change.
- ✓ Cooper et al. further recommend that schools work on increasing the number of their capable teacher leaders in order to be powerful enough to steer the community towards change.
- ✓ Elementary school teachers need opportunities "to formally consider the similarities and differences between child or adolescent learners and adult learners" (Fennel, Kobett, & Wray, 2013, p. 174).
- ✓ Teacher leaders need to develop the skill of prompting their colleagues to explain and justify their mathematical reasoning—to be able to navigate the fine line between being a colleague and facilitating learning (Elliott et al., 2009).
- ✓ Jackson et al. (2015) suggest paying attention to mathematics leaders' assumptions about how teachers develop new practices and highlighting their role, in scaffolding development of teachers for whom they organize PD sessions.
- ✓ Borko et al. (2014), conjecture that leaders of mathematics PD utilize, the so called, Mathematical Knowledge for Professional Development (MKPD). Teacher leaders would benefit from developing "the specialized knowledge of mathematics needed to engage teachers in reasoning about similarities and differences among mathematical representations and solution strategies... [and] opportunities ... to rehearse [PD] workshops and receive feedback ... from their peers" (p. 164), and from practicing (through rehearsals, role-plays, and coaching), how to lead discussions that allow for deep analysis related to student reasoning and instructional practices.
- ✓ Knapp (2017) recommends that teacher leaders engage beyond their classrooms through: (1) Adopting an attitude of continuous learning; (2) enlisting colleagues and learning together; (3) partnering with principals; (4) finding their voice; and (5) understanding the process is not easy, but the learning of students and colleagues depends on that first step.
- ✓ Fairman and Mackenzie (2015) suggest that "in advancing the focus on school improvement and a shared accountability for the learning of all children, the term 'teacher leader' may be counterproductive" (p. 61).

School-based Leadership

- ✓ Stein and Nelson's (2003) suggest that administrators, as instructional leaders, should have expertise in one subject. Then they need to extend this subject content knowledge by conducting in-depth explorations of key, but limited topics in other subjects, including how they are learned and taught.
- ✓ Pollock, Wang and Hauseman (2014) suggest that principals "should specifically seek out [leadership skill set] training around four key areas: emotional intelligence/relationship-building; communication skills, knowledge of teaching and learning; and mental health and wellness" (p. 37).
- ✓ According to Cooper et al. (2016), principals may need specific training regarding aspects of team building and distributed leadership.

Professional Development

- ✓ Ferguson and Danielson (2014) suggest that PD planning should be data driven, its delivery differentiated based on teachers' needs, and teachers' autonomy as professionals should be honoured.
- ✓ Elliott et al. (2009) recommend that the PD facilitators focus on specific knowledge for teaching a topic, present examples of student errors, and explore with teachers how to utilize models and tools to reframe, differentiate, or extend the initial tasks.
- ✓ Educators in different leadership positions view their content leadership in different ways (Downton & Sexton, 2014). Their needed PCK should be further investigated so that they receive the most adequate PD.
- ✓ Special skills for working with mathematics teachers include knowing how to: tease out mathematical details that are evident or missing from the participants' discussions, dealing with participants' positioning towards the subject or the school system organization, and knowing how to tactfully approach eventual participants' misconceptions or lack of understanding of mathematical concepts (Elliott et al., 2009).
- ✓ Margolis and Doring (2012) suggest re-examination of the term 'modeling' (as in PD), by "*encouraging reflection on teaching* rather than *replication of teaching*". This would require an acknowledgment that any lesson is to some degree an experiment; and that even a 'best practice' will require much fine-tuning when manifested with particular students on a particular day in a particular classroom" (p. 878).

School Boards

- ✓ School boards should require principals to schedule time during the school day for mathematics teachers to collaboratively work together (Jackson, Cobb, Wilson, Webster, Dunlap, & Appelgate, 2015).
- ✓ Margolis and Doring (2012) recommend re-acculturation of teaching by: "using data to improve rather prove ..., drawing from classroom observations to learn rather than evaluate, and rewarding teachers for reflection rather than perfection" (p. 878).
- ✓ Knapp (2017) suggests: supporting teachers within a context of a community of practice, creating a clear and open path to teacher leadership within schools, and creating a safe environment at the board and school levels, in which the fears of emergent teacher leaders would be recognized and proactively handled by both teachers and administrators.
- ✓ Science and mathematics leaders should be given dedicated leadership time and an increased budget to effectively support instruction in their schools (Wellcome Trust, 2013).

Researchers

- ✓ Depaepe et al. (2013) suggest that researchers “clearly state their position in the conceptualization and operationalization of PCK” and “triangulate classroom observations with, for instance ... stimulated recall in which teachers can document their choices and justifications” (p. 23).
- ✓ Borko et al. (2014) invite researchers to answer the following questions: “Can PD leaders develop their knowledge in particular domains of MKPD earlier and with greater ease than in other domains? Are certain leadership-preparation and -support activities better suited to promoting facilitators’ MKPD focused on specialized content knowledge, whereas other types of activities are better suited to promoting MKPD focused on pedagogical content knowledge? What factors differentiate PD leaders and their ability to develop MKPD?” (p. 165).
- ✓ “Research on teaching will need to more strongly make the case that documenting and analyzing mistakes (as well as successes) more strongly correlates with teacher and student learning than the importation and transmitting of ‘best practices.’” (Margolis & Doring, 2009)

Positioning Mathematics Leaders: An Emerging Model of Educators’ Mathematics Leadership

Lambert (2003) posits that “how we define leadership defines how we participate in it” (p. 4). In an attempt to create a holistic model of mathematics educator leadership, we explored mathematics education and leadership literature.

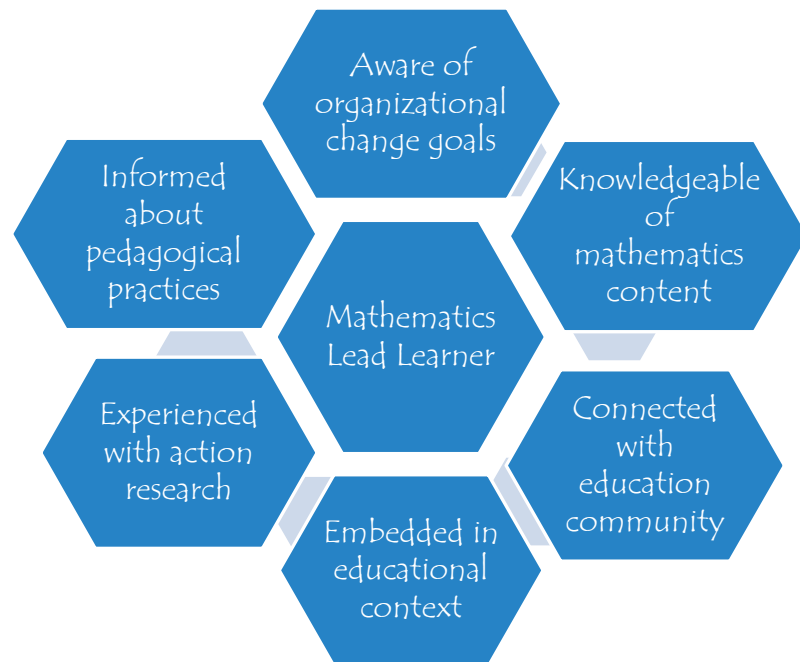


Figure 1. An emerging model of mathematics lead learner--working with adults to benefit students.

Based on her experience as a middle school teacher who was selected and educated to be a leader, Knapp (2017) emphasizes that a lead-by-example and lead-learner stance supported her work with colleagues. She further lists factors that supported teacher leadership: (a) maintaining a disposition of continuous learning, (b) developing a community of practice with colleagues, and (c) developing a system view and focusing on “big picture”; as well as factors that hindered the process of becoming a teacher leader: (a) confusion about leadership role, (b) navigating the middle ground between colleague and leader, and (c) lack of effective communication with administration.

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