Accounts of Primary Mathematics Leadership: Working With Teachers in Classrooms

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This paper reports three mathematics leaders' reflective accounts of leadership involving working with teachers in primary classrooms. A "nutshell" of each leader's interview is presented in sections: leading change, knowledge creation and relationship building. Similarities and differences in their leadership are described in terms of developing a shared purpose, building relationships, sharing knowledge and understanding change. Positive emotions engendered by leadership are acknowledged and the powerful potential of professional conversations is raised.

A key policy guiding the direction of mathematics education in Archdiocese Catholic schools in Victoria has been the *Get in2 Maths – Transforming Education in Numeracy, the 2021–2025 mathematics strategy*. This visionary strategy specified mathematics leadership that involved initiating, guiding and supporting improvements in mathematics teaching and learning. The strategy clearly placed responsibilities and expectations on leaders as the first two, of six aspirational goals, dealt with leadership. These goals stated:

> Every school has an appointed mathematics leader with adequate release to enact the school's mathematics action plan.
>
> The mathematics leader will support teachers in various ways such as analysing data in context, leading facilitated planning sessions, developing priorities for improvement and guiding the professional learning of teachers.
>
> Every school has a mathematics leadership team to drive the learning and teaching of mathematics at a classroom level.
>
> The mathematics leadership team will support the mathematics leader to develop, enact and embed the mathematics action plan. This team's responsibilities could include leading discussions during collaborative planning, and supporting and monitoring the learning and teaching of mathematics at a classroom level. (Melbourne Archdiocese Catholic Schools. 2020, p. 2)

The Melbourne Archdiocese Catholic Schools was the first sector in Victoria, as far as we can ascertain, to formally appoint a mathematics leader in every primary school with an adequate time allocation to fulfil the role. In the past mathematics leadership has often been under-resourced. Therefore, the initiative was widely hailed as important. The expectations that School Mathematics Leaders would "drive the learning and teaching of mathematics at a classroom level" implied the leaders would initiate teacher change through professional learning. The strategy is nearing the end of its specified timespan. We were interested to gather first-hand reflections of leaders on the nature of their work at a classroom level. The research question we sought to answer was: *What can we learn from leaders about the classroom leadership of primary school mathematics?*

Research Literature

Teachers' learning occurs in various contexts, formally and informally (Munson & Dyer, 2023). Researchers have emphasised the importance of improving teachers' knowledge of mathematics (e.g., Ball et al., 2008). Teachers have been shown to value support from mathematics leaders, especially in their classrooms (Clarke et al., 2013). Driscoll (2021) found that leaders could support teachers' development by teaching "alongside" them in their classrooms: demonstrating lessons, modelling pedagogical approaches, and providing informal feedback in an environment where teachers felt confident to take risks. As Timperley (2008)

(2025). In S. M. Patahuddin, L. Gaunt, D. Harris & K. Tripet (Eds.), *Unlocking minds in mathematics education. Proceedings of the 47th annual conference of the Mathematics Education Research Group of Australasia* (pp. 117–124). Canberra: MERGA.

noted, all professional learning involves risks with a degree of challenge, and teachers need to trust that their efforts will be supported.

We consider the practice of leaders teaching alongside teachers in the classroom to be a potentially powerful opportunity to build teachers' mathematical knowledge for teaching (Kazemi et al., 2018; Munson et al., 2024). Similarly, Gibbons et al. (2021) suggested the key to supporting teacher learning is in practice-embedded contexts. Classroom support from a more knowledgeable colleague has been described variously by the listed scholars as: team-teaching; coaching; modelled instruction; observing lessons and providing feedback; and demonstrating teaching in instructional groups. Research suggests that jointly experiencing mathematics lessons can be an effective way for teachers and leaders to learn in practice (Driscoll, 2021). An implication of teaching alongside others in a classroom is that it requires leaders who: are knowledgeable teachers of mathematics; possess a high level of expertise; are flexible and adaptable; understand how adults learn; and have developed constructive relationships with teachers in their schools based on trust and respect (Driscoll, 2021).

Evidence suggests that teachers engage in learning as they enact and study practice in their own classrooms (Kazemi et al., 2018). It is through shared experiences with leaders that teachers plan, act and reflect on their work as they refine the focus of their pedagogical practice (see e.g., Ball & Bass, 2000). Interactions with leaders contribute to effective planning including goal setting and identifying teacher moves to advance student thinking (Stein et al., 2022). Typically, as teachers and leaders move fluidly and interact with one another and with students (Munson et al., 2024) they make in-the-moment decisions and respond to student thinking. As the teaching unfolds in real-time these shared experiences sharpen teacher noticing and afford teachers and leaders an opportunity to respond and act upon the impacts of their teaching on student learning (Eden, 2018).

Figure 1

A Framework for Leadership (Fullan, 2001, p. 4)

Seminal work by Michael Fullan (2001) described a framework of leadership as shown in Figure 1. This framework provides the theoretical underpinnings of our research. In our analysis and discussion of the actions of mathematics leaders we will make use of the components: moral purpose, understanding change, coherence building, knowledge creation, and relationship building. In addition, we will consider characteristics Fullan found in leaders of successful educational organisations: energy, enthusiasm and hope. and compare them to the reflections and actions of our interviewees.

Method

Following the ethics approval to conduct the research, we sought recommendations from colleagues to identify School Mathematics Leaders who were reputed to work alongside teachers in classrooms. Three School Mathematics Leaders agreed to a formal interview to help us to understand their current work of leading mathematics. Kerryn collected reflections from

each leader using a semi-structured interview. The questions were designed to collect background details, and to gain a description and examples of the leaders' classroom work. Each leader was asked to describe the ways in which they worked in classrooms, the benefits and any downsides to this approach, and why they decided to work this way. The leaders were asked what they thought needed to be in place before they worked with teachers in classrooms and any advice they would give teachers and mathematics leaders.

The interviews were conducted via Zoom over a period of three weeks during November 2024. Each interview was reviewed and analysed before the next interview was conducted to ensure the independence of each set of data. Video records and transcripts were produced automatically. However, video was not reviewed unless clarification of the audio was required. The transcripts were checked and edited to remove repetitions of speech and provided the data that are described and discussed here. Each researcher read the transcripts and summarised the main points made during each interview. These summaries were used to prepare "nutshell narratives" in which quotes were used to highlight in the interviewees' voices their accounts of their leadership. Themes based on Fullan's framework features - leading change, knowledge creation and sharing and relationship building structured the findings. Similarities and differences in the leaders' approaches were then collated, summarised and discussed to provide an overview of our findings. Our aim was to collect the reflections of mathematics leaders to provide a view of school mathematics leadership. The focus of the study was "classroom work".

Findings

The main findings of each interview will be written as "nutshell narratives" where the themes that interviewees raised are matched to quotes from the transcript. Pseudonyms are used.

Harriet

Harriet was an experienced School Mathematics Leader having worked at her current school for 6 years. Her enthusiasm for mathematics education was ignited by professional learning and subsequent university study. She worked across two schools consulting and leading mathematics improvement.

Leading Change

Harriet talked about her current role "purely working with the teachers, facilitating planning, modelling in classes, and running Professional Learning Teams." When working in classrooms she would often model lessons or team teach. According to Harriet teachers preferred to have her model lessons as opposed to being observed as they taught. When modelling lessons, she used a pro forma to focus the observing teacher and to use in debriefings to help support a consistent understanding of pedagogy. Harriet considered debriefing essential, but found it difficult to arrange, as she explained "we don't have a proper structure in place where … teachers can be released, where we can actually do a proper debrief … for me, that's very frustrating because I think that it's not valuing the process we're trying to do."

Harriet used planning sessions to support teachers to talk about the mathematics involved in using rich, challenging tasks which would engage students. Teachers were encouraged to set learning goals based on the assessed needs of students. Harriet often modelled tasks and the pedagogical approaches she advocated to show teachers how they could work. However, when leading change Harriet believed that, "if the maths leader is coming in [teaching], then there has to be a point where modelling stops … then maybe doing some team teaching together before doing an observation of the teacher teaching."

Knowledge Creation and Sharing

When working with teachers Harriet chose to work intensively with a team that was not cohesive. She attended this team's weekly planning meetings and supported teachers to choose engaging mathematics tasks. Harriet explained, "when you're directly planning with them and you're having discussions about the mathematics, you can see who's understanding and who's not." When teachers were unsure of how the tasks would work, she offered to teach the task in their classrooms. Harriet also talked about "feedback from teachers, particularly when they talked about their own content knowledge about how that had improved through the facilitated planning." She saw her role as supporting "teachers to understand the content and effective pedagogies to implement the content" so "children start to enjoy maths and see a value in it." Harriet believed one of the benefits of her work was seeing student's responses "first and foremost" and when teaching alongside, Harriet would often point out student thinking and say, "Did you notice this?" or "What do you think about this?" and "We will have those informal discussions throughout the lessons."

Relationship Building

Harriet's advice to leaders wanting to work alongside their teachers is about knowing your goals and knowing what you want to focus on … and "of course, it comes back to relationships … you can't have someone in your room if you don't have a relationship with them. I think that's the most important thing to build." When supporting teacher learning Harriet believed that communicating your aims and making them relevant was important "as a way of bringing it back to the children's learning, so it's not threatening in the sense of we're looking specifically at the teacher. But it might be something specifically focused on the learning or engagement around the students."

Jen

Jen had nearly 20 years' experience as a School Mathematics Leader. It was her tenth year at her present school where she was also leader of learning and teaching. She had a part-time role as mathematics leader and no classroom responsibilities.

Leading Change

When suggesting how teachers could improve their practice Jen's advice was to set a goal and seek "ongoing coaching." She felt rather than a "one-off lesson" it was "more beneficial because then you can move from … modelling to team teaching to observation." Jen believed that if teachers begin this way, as they gradually build their confidence, they are more willing to be observed and seek feedback. There was no formal process for debriefing teachers after an observation; so much of the feedback that Jen provided was during the lesson, or in a "catch up for 10 minutes at the end of the day." As Jen explained, "it's more of a working conversation." Jen would give teachers "on the spot suggestions and feedback as the lesson goes on … and where to go next with the lesson during the lesson, rather than later on."

Knowledge Creation and Sharing

A lot of Jen's work involved facilitated planning meetings, spending 90 minutes a fortnight with each team. She explained, the facilitated planning is very much professional learning for the newer teachers as this was when "the actual content knowledge developed around what they should be teaching the kids and how to teach it." At this time Jen was able to see "if there's the need for me to be in the classrooms with the teachers to be modelling or team teaching. It sort of comes from what we plan and where the needs are." At times Jen also observed lessons and provided feedback and modelled the Launch, Explore, Summarise instructional model. When describing how she modelled lessons Jen explained that the teachers, "would probably watch

me do the launch of the lesson and then … watch what I'm doing but walking by my side." She illustrated her approach saying:

> I'd often say to a teacher, Oh! Come over and have a look at what this child's doing. This would be really good to spotlight. … Even if I'm not the one modelling to sort of walk around and say have you seen what they're doing? … sort of just having that conversation throughout the lesson.

Relationship Building

Jen described her non-confrontational approach when working in classrooms saying things like, "Oh [I'm] just popping in to see what the kids are doing" then she would "sit down and work with them and try and show the kids that I'm there to help them as well." She explained, "that works quite nicely without putting pressure on the teachers." She found that having those "on the spot conversations" and regular classroom visits made a difference when implementing new programs. She commented, "this comes back to that relational trust and that sort of thing, which I guess I've developed, you know, having been there for quite a few years." It was apparent that Jen had developed close collegial relationships focused on the children's learning as well as the implementation of effective pedagogies.

Sara

Sara had worked as a mathematics leader and intervention teacher for the past 8 years.

Leading Change

Sara worked with teams in facilitated planning once a fortnight, which involved unpacking data, thinking about team goals and how she might support teachers "in the classroom given the opportunity." Finding time to get into classrooms, according to Sara was difficult, as she was also teaching intervention. Consequently, she made some adjustments to her time to allow this to happen. "That was one of those missing links of me, supporting teachers … I knew it was something I always wanted to do." Reflecting on this point Sara said, "I think [working in classrooms] just helps to build the confidence of teachers. If you get it right, I think it can definitely work."

Knowledge Creation and Sharing

Sara described her classroom work as looking different depending on who she was working with and often involved modelling, parallel teaching, observing students, providing extension, giving feedback or it "could just be an extra pair of hands." Sara also chose to work with some of the newer teachers who were unfamiliar with a "structured inquiry approach." While Sara pointed out that there were a "lot of challenges around teacher confidence in mathematics" at her school. She felt that by working in the classroom she was supporting teachers and building their confidence as they observed her modelling or when she provided feedback. Interestingly Sara, was often asked to model "the summarise phase" of the lesson as teachers at her school found that the "hardest part." Sara explained that for "the majority of lesson, the teacher would be teaching" but "during the explore phase we'd be roaming around the classroom together, maybe highlighting a piece of work or noting work samples." Then for the summarise phase she "would take ownership of that part of the lesson and model how to make connections with the mathematics learning. Sara expressed the view that teachers "have particular trouble in tying it all together and knowing how to recognize the main [ideas] or concepts that they're trying to get the students to learn and draw together."

Relationship Building

Sara spoke of the importance of developing good relationships with teachers. Her advice to leaders was to "build relational trust first. I think that you have to have conversations around why, what's the purpose of being there because … they might feel the pressure of someone

coming in to watch them." Sara noted that while some teachers embrace this idea there can be a "bit of pushback or resistance." She explained that "it's providing that safe learning space where we're working side by side and shoulder to shoulder. It's not me saying this is how it has to be. It's working collaboratively and collegially together that I think has the biggest impact."

Summary and Discussion

To summarise and discuss our findings, we will examine the similarities and differences in the leaders' interview responses. Each of the leaders gave accounts of their classroom leadership that differed. The transcripts of interview were analysed with answers to common questions coded and compared. The differences are largely explained by several relevant characteristics of each environment: the school size, mathematical strengths and interests of teachers, mathematical needs and priorities of students, and each leader and their personal approach to their leadership responsibilities. Each of the characteristics will be presented in turn with illustrative examples from each leader's transcript.

Size of the School Population and the Number of Classrooms and Staff

In larger schools a leader may need to choose to focus on leading teachers at certain year levels or certain times. **Harriet** revealed that "it'll be five weeks with a team of teachers like the Prep teachers … I'll go in for an hour and model a lesson then … the next hour and a half … we debrief about the lesson then we plan for the rest of the week." **Jen** pointed out "it's hard because you can't be everywhere we've got 22 classrooms". **Sara** stated that "there's 21 classrooms in my school … my load was quite heavy with intervention and facilitated planning. So, I … cut back in those spaces which allowed more time for me to get into the classrooms".

Different Mathematical Strengths and Interests of Teachers

The clarity of teachers' goals, their attitudes to change, and different levels of mathematical confidence were acknowledged by the leaders. **Harriet** talked about teachers' developing goals, "The Year 3/4 [team members] were trying to do goal setting around addition and subtraction strategies". **Jen** advised, "start with the people who are open and then let the good news spread". **Sara** said, "in particular there are a lot of challenges around teacher confidence in maths".

Mathematical Needs and Interests of Students Create Different Priorities

Teachers needed different forms of support to improve students' mathematics. **Harriet** spoke of the emotional needs of the teachers, saying, "I think some teachers find the way that I implement things is challenging because I go quite deep with the learning … and sometimes it's frustrating for them … so I will go in and model". **Jen** surveyed teachers' needs, "to start with 95% wanted me to go in and do a modelled lesson. But that evolved over time. I asked what is it that you actually want"? **Sara** explained her work "can look different depending what the classroom teacher is requiring" and that "it's relevant to the teachers' needs at the time".

The Individual and Personal Approach of Each Leader to Their Responsibilities

Each leader expressed a preference for how to work with teachers in their classrooms. **Harriet** described her actions in a classroom saying, "I don't just sit at the back of the room either. If I'm observing a teacher, I'll walk around and talk to the children. So, it's kind of less threatening and doesn't look like I'm making all these notes". **Jen** preferred to focus "on the people who you can make a difference with" by "having a clear direction and then … picking people who are open, who you can see the potential for it being more than just a one-off lesson, who you can work with and help to improve". **Sara** perceived some of her teachers as, "very much used to maybe a direct instruction approach or explicit instruction where they're used to giving all the answers. So, I have supported teachers in coming in and exploring what a

structured inquiry type approach looks like in the classroom and just sort of holding back from telling everything. … but giving lots of steps [hints and support] to their students".

Similarities

Despite these differences, the leaders' interviews also revealed common aspects of their classroom leadership. These attributes are found in the literature. Each leader:

- placed importance on building relationships with teachers; (Timperley, 2008)
- expressed a vision of effective mathematics teaching; (Timperley, 2008; Fullan, 2001)
- had specific goals for improved student outcomes; (Stein et al., 2022)
- believed planning with quality tasks key to changing practice; (Stein et al., 2022)
- used planning sessions to trial tasks and model pedagogies; (Stein et al., 2022)
- analysed tasks to discuss mathematical content knowledge; (Stein et al., 2022)
- encouraged teachers to anticipate students' responses to tasks; (Stein et al., 2022)
- taught side by side to support teacher learning (Munson & Dyer, 2023)
- modelled teaching approaches if asked to do so; (Clarke et al., 2013)
- engaged in professional conversations (Eden, 2018; Fullan, 2001); and
- consciously led teacher learning in mathematics education (Gibbons et al., 2021).

This list of features of classroom leadership can possibly be attributed to the complex forms of knowledge for teaching (Ball & Bass, 2000) developed by the interviewees during their M.Ed. degrees. However, their confidence in the productive pedagogies they were advocating was notable. These leaders possessed an assuredness that was based on their understanding of the research that underpinned the professional learning they were fostering in their teachers.

In Conclusion

In concluding we return to the research question at the centre of this study: *What can we learn from leaders about the classroom leadership of primary school mathematics?* Much of what we learned from the accounts of the classroom leadership undertaken by our interviewees had echoes in the research of earlier scholars (e.g., Fullan, 2001; Gibbons et al., 2021; Eden, 2018). Such authors wrote of developing a shared purpose, building relationships, developing coherence, creating and sharing knowledge and understanding change (Fullan, 2001) which are common characteristics listed above as attributes of classroom leadership.

In addition, the leaders we interviewed reminded us of two important aspects of their leadership work. They spoke with great enthusiasm and emotion about their teachers' and students' mathematical achievements. They also drew our attention to the powerful conversations they had with teachers where shared experiences led to insights.

Positive and Motivating Emotions

We found the enthusiasm, energy and hope in Fullan's leadership framework. Harriet said, "the joy that I get from the teachers - just in passing in the corridor … [one teacher said], "Oh, quick! Come into my room." … She was just so happy to talk about [what the children had done] the progress from when we first started. That's what brings me joy." She had a sense of fulfilment from the lasting improvements she could see in mathematics teaching and learning. The effects of working in classrooms with children were seen by Harriet who said, "a year or two later they'll keep talking to me about their maths, which is lovely." These comments reflect the sense of achievement these leaders felt as they reflected on their classroom leadership.

The Power of Professional Conversations

Another common feature of the classroom leadership was particularly noteworthy. Leaders described the importance of professional conversations conducted about mathematics teaching

and learning. These practical and highly relevant conversations created opportunities for sharing ideas, insights and knowledge. Leaders described these exchanges involving analysis and discussion of events. Conversations were reported as: happening prior to teaching while trialling a task, during a mathematics lesson, and in a debriefing after a lesson. Each leader reflected on the power of conversations that happened 'in the moment' where an action of a student or an event could be discussed in real time. For example, Jen described a team-teaching moment where it was "me walking side by side with her … to have an on-the-go conversation about what we were noticing" and "just having that conversation throughout the lesson … that on-the-spot discussion rather than following it up later … sometimes the moment's lost then you lose that impact that you can have within the lesson." It was clear from the interviews that the leaders encouraged professional conversations about the teaching and learning of mathematics as a deliberate part of their classroom leadership. Such conversations provided powerful opportunities for professional learning to occur. These conversations may prove to be a valuable source of data for future investigations.

Acknowledgement

Monash University gave ethics approval (ID 44539) principals and teachers gave informed consent.

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