Supporting the Leadership of Mathematics in Schools

Jill Cheeseman
Monash University
Jill.Cheeseman@monash.edu

This MERGA symposium addresses three aspects of the Numeracy Suite professional development program for leaders of mathematics in schools. The papers include: a description of online courses offered in the program and an analysis of their effectiveness, a report of action research projects conducted by leaders as short "teaching sprints", and an analysis of leaders' thinking about their role in improving mathematical outcomes for students stimulated by a one-day workshop.

The Numeracy Suite (2019–2022) was initiated by the Department of Education and Training in Victoria and implemented though the former Bastow Institute of Leadership now the Victorian Academy of Learning and Teaching. A team of mathematics educators from Monash University developed and delivered the program, which was designed to facilitate the professional learning of leaders of mathematics and numeracy in primary and secondary schools in Victoria. To establish leaders perceived professional development needs, a state-wide survey was conducted online, and the leaders' responses were analysed to inform the program design. The purpose of the Numeracy Suite was to challenge numeracy and mathematics leaders to develop a deeper understanding of themselves as leaders and teachers of mathematics and numeracy. The Numeracy Suite supported the leaders to create conditions for effective teacher professional learning and strategic planning for whole-school improvement in mathematics teaching and learning. It also supported the leaders to improve the learning experiences, mathematical dispositions, and achievement of all learners. In analysing the results of the professional learning our purpose was to understand the current practices, views and aspirations of leaders of mathematics and numeracy in primary and secondary schools and to evaluate the professional learning opportunities we offered to the leaders.

Chair & Discussant: Jill Cheeseman

Paper 1: *Online Courses for Leaders of Mathematics and Numeracy in Primary and Secondary Schools: Overview and Effectiveness*
[Ann Gervasoni, Aylie Davidson, Ann Downton, A., Sharyn Livy, & James Russo]

Paper 2: *Teaching Sprints: Action Research Led by School Mathematics Teacher Leaders*
[Colleen Vale & Carmel Delahunty]

Paper 3: *Ways in Which a Workshop Stimulated Leaders' Thinking*
[Jill Cheeseman, Penelope Kalogeropoulos, Marj Horne, & Michele Klooger]

Teaching Sprints: Action Research Led by School Mathematics Teacher Leaders

<u>Colleen Vale</u>
Monash University
colleen.vale@monash.edu

Carmel Delahunty
Monash University
carmel.delahunty25@gmail.com

Action research is a means for teachers and researchers to develop evidence-based practices. This paper reports the process and outcomes of *teaching sprints*, an approach to action research, conducted by secondary school mathematics leaders as part of a professional learning program. Mathematics leaders consistently reported the value of developing collaborative practices throughout the planning, enacting and reflection of the teaching sprint.

The roles of school mathematics leaders are varied and depend on the school and individual context (Driscoll, 2017; Grootenboer et al., 2015). Kemmis et al. (2014) described mathematics leaders as middle leaders, whose responsibilities sit between the classroom and the school principal. They are often engaged in complex interactions with students, teachers, and the school leadership team. Middle leaders are likely to have the greatest impact on student achievement when they focus their role on improving teacher practice (Robinson et al., 2008; York-Barr & Duke 2004). Grootenboer et al. (2020) reported action-orientated professional learning where middle leaders worked collegially with small teams of colleagues in an "… ongoing and sustainable way to develop educational practice collaboratively in response to local needs and conditions based on evidence. It is a way of developing pedagogy and curriculum *from the classroom out*" (p. 39). They did not, however, provide examples of mathematics leaders' action-oriented projects. In this paper, we report on a qualitative study of *teaching sprints* (Breakspear & Jones, 2020), that is, short, targeted action research projects conducted by secondary school mathematics leaders as part of an online professional learning course entitled, *Leading Mathematics for Improvement in Teaching and Learning*.

Action research is a form of practitioner research. Kemmis and McTaggert (1988) described it as both a process and practice used by teachers, often collaborating with other teachers that involves a cycle of planning, observing, reflecting, revising the plan, and continuing the spiral of investigation. More recently, Kemmis (2008) defined action research as "a practice that … transforms the sayings, doings and relating that compose those other practices" (p. 463). The sayings (what is said), doings (activities and work) and relating (ways of relating or interacting) of mathematics leaders are part of the framework of "practice architectures" of middle leadership (Kemmis et al., 2014, p. 31).

Investigating teaching practices to improve student learning is promoted by the Department of Education and Training in Victoria (2010); however, there is no specific advice for leading action research within schools. Breakspear and Jones (2020) proposed three phases for action research: prepare, teaching sprint, and review. In the prepare phase, they emphasised collaborating with the teaching team to identify the focus of practice for improvement. McNiff (2010) recommended this phase should identify a question for investigation, and the gathering and collaborative analysis of data. Findings and implications of the data analysis are used to identify a goal for changing practice that they then enact as a "teaching sprint." The teaching sprint is enacted in a short period of time, such as 2–3 weeks. Further data, including observations, are collected and used in the final phase of review to reflect on the effectiveness of the teaching sprint and determine the implications for future practice. In this paper, we report on a qualitative study of teaching sprints conducted by secondary mathematics leaders (MLs) to identify the influence of these teaching sprints on the sayings, doings and relating of the MLs and their understanding of evidence-based practice.

The Study

The *Leading Mathematics for Improvement in Teaching and Learning* course was designed for primary and secondary mathematics leaders (MLs). It was conducted over 15 weeks and involved five cycles, including an online virtual workshop and school investigations for each cycle. The themes for each cycle were: (1) The role of mathematics leaders; (2) Developing trusting relationships; (3) Effective practices in mathematics professional learning; (4) Enacting an action research cycle–Teaching Sprint. Having conducted other school-based activities to learn about their teachers and students and to trial leading various professional learning activities in their school, the final cycle involved the leaders completing a co-constructed action research project over 4 weeks with the teacher(s). This involved: choosing an aspect of teaching mathematics (Week 10); formulating a question and collecting data about their question (Week 11); co-constructing implication statements from the data analysis (Week 12); designing and conducting a teaching sprint around one implication statement (Weeks 13 & 14); sharing the teaching sprint with the group and critiquing a colleague's teaching sprint (Week 14).

Both primary and secondary mathematics leaders participated in the Leading Improvement in Mathematics Teaching course in 2020 or 2021. Fifteen secondary MLs and 45 primary MLs completed the reports for their teaching sprint. For this paper we collected the written reports of the teaching sprints that the secondary MLs shared with other participants in Week 14 and conducted a qualitative analysis of these teaching sprint reports. These secondary MLs were from metropolitan, regional, and rural schools. Thematic analysis (Bryman, 2016) of these reports was organised according to the sayings, doings, and relating (Kemmis et al., 2014) that occurred during each stage of their Teaching Sprint. Pseudonyms are used when quoting from the teaching sprint reports of the secondary MLs.

Findings

Focus of the Action Research

Sayings. There were a range of foci, or areas of practice to make sense of and improve identified in the initial step. These included: student engagement, student achievement, teachers' pedagogical content knowledge, problem solving, reasoning, student disposition, and differentiated learning.

> I had noticed in my year 10 students were eager to learn ... but really struggled to explain their thinking ... I had also ... heard other staff's frustrations at student's poor results on our tiered ALTS (Assessed Learning Tasks) [with] three exit points … (Bec)

> … Can we improve our students' disposition to Maths? (Chris)

> The class teacher is primary trained and finding it difficult to manage the Year 8 class and to explain mathematical concepts to the students … Year 8 students ... were disengaged and behaviour was poor. (Faye)

> How do we assess student understanding throughout a lesson? (Indira)

> … recent data suggests that many of our students are "cruising" .... How can we change our practice to enhance every student's opportunities to achieve at least one year's worth of growth in a year? (Narelle)

Relating. When analysing their reports, we found that all but four of the secondary MLs identified the focus for the teaching sprint without consulting their staff. These four MLs used a team meeting or meeting with one other teacher to identify the focus.

Data Analysis and Planning the Teaching Sprint

Doings. MLs reported using a range of data to analyse, identify, and set the goal for their teaching sprint. The data that the MLs collected and analysed included NAPLAN (https://www.nap.edu.au/) and other assessment data, formal and informal surveys of students or teachers, feedback from students, interviews of teachers, observation of lessons and teacher team meetings, which were used to discuss the focus issue.

> We conducted a Learning Design walk. Whilst the teacher explained .... We observed when the students talked to peers, looked around the room, or opened games on their laptops and calculated an approximate time that they were engaged. (Andy)

> In one of my PLCs, I placed the word "mathematical thinking" onto a Padlet and asked staff to write down their thoughts on how we were currently approaching teaching this and how they thought our students were at doing it. (Bec)

> Staff Opinion Survey shows that 47% of staff are not confident in using data to inform practice. (Jackie)

> I grabbed these [NAPLAN] questions [with low scores] and presented these to a small team of Year 8 teachers. We discussed the features of these questions to see if there were any commonalities. (Narelle)

At each school the teachers gathered, and analysed data collected during the teaching sprint.

> Throughout the sprint teachers collected anecdotal evidence from their classes and I observed some classes. (Bec)

> We surveyed students before and after the 'teaching sprint' to determine the students' dispositions to Maths. (Chris)

> Students were given the same survey post the mathematics experience as a means of assessing their "soft skill" development. Teacher observation of the development of student's team working skills also formed part of this assessment. (Faye)

> We developed a range of tasks that involved some form of reasoning …. Finally, the process of moderation would be used to develop our ability to make consistent judgements on progress and growth. (Narelle)

Relating. In the majority of the cases, the MLs collected and analysed the data. They then held a team meeting to analyse or discuss the findings of the data analysis. In almost all cases the teaching sprint was co-planned by the MLs with the other teacher(s) at that the year level(s) to be involved.

Reflecting on the Teaching Sprint

Sayings. The MLs reported on the mathematics teachers' new understandings of their students, pedagogical practices such as strategies for developing a growth mindset or student responsibility and engagement, planning to address student learning needs and teacher questioning.

> … with us continually modelling mathematical thinking but by the end of the two weeks cycle, we had most students being able to explain why they thought something didn't belong .... Mathematical thinking is something that the team is now seeing as important and something that we need to explicitly teach. (Bec)

> … both the teacher and the Learning Specialist noted that students were more willing to work in their teams and were more willing to persist when challenges arose .... The classroom teacher was challenged … with the questioning needed to direct student thinking .... (Faye)

> All staff have access to PAT-M Data and know how to interpret Group reports …. Maths teachers can identify misconceptions and address these. (Jackie)

> The moderation process allowed us to share ideas as to what we were looking for in the work to represent each level on the rubric. This … also gave us the opportunity to think about what specific skills, ideas, and concepts we should focus on with our students. (Narelle)

Relating. Following the teaching sprint, the MLs reflected on their relationship with colleagues and their collaborative practices:

> Collection of data and sharing of data was super important at getting the team on board to change practice. It is important that I value all of the team's opinions and that I listen and reflect on their opinions. (Bec)

> … I need to encourage and remind teachers to develop these skills in students. (Chris)

> Year 8 Mathematics team meetings will focus on developing the teacher's capacity to plan and deliver rich tasks. (Faye)

> We wanted to celebrate the growth that had been achieved in this area. (Narelle)

When reflecting on the teaching sprint, some of the MLs explicitly identified the value of continuing to promote and provide opportunity to collaborate, collect and analyse various data, plan lessons, and reflect on student students' proficiencies and engagement. Other leaders commented that they need to lead the professional learning of their colleagues.

Conclusion

The teaching sprints provided MLs with a collaboration and consultation process that supported them to relate with teams of teachers to explore teaching practices to improve student learning, engagement, and dispositions. Whilst MLs attempted to keep the focus small, their reports showed that they tackled significant curriculum and pedagogical challenges. Similar to that noted by Grootenboer et al. (2020), the small-scale action research projects (teaching sprints) reported in this paper provided the MLs with evidence of practices that were effective for their students and worthy of both celebrating and continuing.

References

Breakspear, S., & Jones, B. R. (2020). *Teaching sprints: How overloaded teachers can keep getting better*. Corwin, SAGE Publishing.

Bryman, A. (2016). *Social research methods* (5th Edition). Oxford University Press.

Department of Education and Training Victoria. (2021). Principle 7: Evidence-based strategies drive professional practice improvement. *Practice principles for excellence in teaching and learning*. https://www.education.vic.gov.au/school/teachers/teachingresources/practice/improve/Pages/principlesexcellence.aspx

Driscoll, K. (2017). Primary school mathematics leaders' views of their mathematics leadership role. In A. Downton, S. Livy, & J. Hall (Eds.), *40 years on: We are still learning!* (Proceedings of the 40th Annual MERGA Conference), pp. 213–220. Melbourne: MERGA.

Grootenboer, P., Edwards-Groves, C., & Groneman, K. (2015). Leading practice development: Voices from the middle. *Professional Development in Education*, *41*(3), 508–526.

Grootenboer, P., Edwards-Groves, C., & Rönnerman, K. (2020). *Middle leadership in schools: A practical guide for leading learning*. Routledge.

Kemmis, S. (2009). Action research as a practice-based practice. *Educational Action Research*, *17*(3), 463–474. https://doi.org/10.1080/09650790903093284

Kemmis, S., & McTaggart, R. (1988). *The action research planner* (3rd ed.). Deakin University.

Kemmis S., Wilkinson, J., Edwards-Groves, C., Hardy, I., Grootenboer, P., & Bristol, L. (2014). *Changing practices, changing education*. Springer.

McNiff, J. (2010). *Action research for professional development: Concise advice for new and experienced researchers*. September Books.