

REFLECTIONS ON A NUMERACY JOURNEY IN A QUEENSLAND SCHOOL

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I sell a product to a market that doesn't want it, but it is forced by law to buy it.

DR DAN MEYER, *Mathematics Teacher*, 2010

In my work as a primary classroom teacher and now part of the leadership team at my school, I have generally witnessed a strong correlation between students' mathematics disposition and their aptitude for the subject. As implied in the quote above from Dr Dan Meyer (2010), students often struggle during numeracy lessons because they see no sense in them, and educators are faced with dual concerns: rectifying misconceptions students may have, and improving student disposition to enable them to utilize this mathematical knowledge to solve problems in real-life contexts (Askew, 2012).

In the presentation given at the MANSW 'New Horizons' conference in September 2018, entitled 'Mathematical pedagogy shift in teachers: pursuing high-yield practices in a Queensland school', I unpacked our school's journey as a pedagogical team as we fronted these dual concerns.

The school I reference is a P–6 primary school with an ICSEA ranking of 960 (27th percentile) and roughly 700 students. Before my appointment as Numeracy Coach (then Master Teacher—Numeracy) in Semester 2, 2014, there was an over-reliance on explicit teaching, with little to no pre-testing to determine a student's instructional level and areas of interest. NAPLAN data were in the red, but with a supporting administrative team and a stable teaching population the challenge to improve was met, with the 'School Improvement Hierarchy' (Fig. 1) later used as a tool to aid conversations.

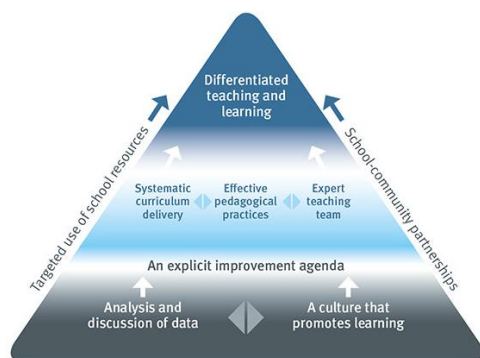


FIG. 1. SCHOOL IMPROVEMENT HIERARCHY
(EDUCATION QUEENSLAND 2018)

From this junction teachers were released at a Year level on alternate fortnights to diagnose and plan

responses to student mathematical misconceptions, with me in the role of a mathematics coach throughout the rest of the week. The focus, at least initially, was on mathematical 'activators' designed to get students rolling dice, using playing-cards, and re-engaging with mathematics. There was also a focus on student reasoning and an increase in teacher questioning and expectations.

The Grattan Report of July 2015 established that although schools are not short of data, teachers might not be gathering this at the right time nor making the best use of the information (Goss & Hunter, 2015). In addition to mandated data collection methods (whose results may be misunderstood or underused), teachers used purpose-designed diagnostics to determine student misconceptions and take back ownership of the curriculum, investing time on activities students required for developmental understanding.

Vygotsky claimed that children need experiences within their zones of proximal development (ZPD); that is, experiences they cannot do without guidance, but can do with guidance (Berk & Winsler, 1995). Hattie (2009) found that this Piagetian stage of learning has the second highest influence on student learning, with a factor size of 1.28. Our pedagogical doctrine became 'Teaching Primary Mathematics' (Booker et al., 2014), a comprehensive developmental understanding of mathematics. We also relied on 'Practices for Orchestrating Mathematical Discussions' (Stein & Smith, 2011), which promotes the view that teachers anticipate, monitor, select, sequence, and connect mathematical ideas during a mathematical task.

With an increase in teacher knowledge, our school created schoolwide planners that respond to 'Five Questions for Teachers':

- What am I teaching?
- Why am I teaching it?
- How will I teach it?
- How will I know when all students have learned it?
- What's next?

(Sharratt & Fullan, 2012).

These planners ensure Year-level consistency, and result in all teachers responding to students' current abilities. The aim is for the school's aspirational target of 'achieving a year's growth for

a year's input of teaching' being met for all students.

Throughout 2016, we took heed of Dan Meyer's call to action, and began using more multimedia and letting students build the problems. A key learning for teachers was to 'be less helpful' (Meyer, 2010).

The classrooms in which our teachers now teach see more student intuition and reasoning, more teacher confidence and flexibility within the curriculum, as well as teachers' relying on high-yield proved strategies such as concrete materials, Number Talks, and Open-Ended Mathematics activities. These tasks are inclusive and enable all students to enter with possibilities of extension.

Key success points from a data point of view include significant reduction in the number of students in the bottom bands of NAPLAN, a Year 3 Mean Scale Score that is significantly higher than the national average (Table 1), and high retention rates for students getting Upper Two Banding in Year 5 from Year 3. Anecdotally, student and teacher disposition has improved as has our A–E data and NAPLAN alignment with this.

TABLE 1. NAPLAN SCHOOL MSS V. NATIONAL MSS

	<i>School Mean Year 3</i>	<i>National Mean Year 3</i>	<i>School Mean Year 5</i>	<i>National Mean Year 5</i>
2010	374.1	395	465.7	487
2011	393.6	398	469.0	488
2012	381.0	396	465.3	489
2013	398.6	397	471.0	486
2014	381.0	402	465.7	488
2015	398.6	398	492.5	493
2016	395.0	402	478.0	493
2017	423.7	409	491.1	494

Reflections at this point involve the realization that administrative support (both time and financial) is paramount to success (we were fortunate in this respect). Ensuring the right people are in the right place, pursuing a growth mindset, and having a clear succession plan in place proved pertinent.

I was fortunate to work in a high-functioning team and personally experienced considerable professional growth, both in terms of mathematical pedagogy and in my leadership role within the school. I encourage anyone with a similar task to network widely, as someone may already hold at least some of 'the answer'. In summation, this is a major bonus of attending conferences, and none more so than the recently held MANSW 'New Horizons' Conference. It was a privilege to travel and present from interstate and to connect with so many fabulous educators. After all, 'teaching is a team sport'.

References

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