

NZARE Mathematics Education Research SIG

Notes from the initial hui held in Wellington on 18 February 2019

Venue: NZCER hosting - Level 13 NZEI House

Time: 9.30am - 3pm

**Attendees and their research interests**

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| **Attendee** | **Organisation** | **Research interests**  |
| Linda Bonne | NZCER | Self-efficacy in Maths; NMSSA |
| Jonathan Fisher | NZCER | ARBS; NMSSA; TEC; NZQA work |
| Teresa Maguire | NZCER | ARB development; Developing in-depth items and reporting for NMSSA  |
| Julie Roberts | NZCER | Mathematics learning progressions within level 1 |
| Megan Clune | University of Auckland | Maths and digital technology  |
| Gillian Frankom-Burgess | University of Auckland | Maths anxiety |
| Gail Ledger | University of Auckland | Curious Minds funding - Augmented reality for students with cerebral palsy |
| Lisa Darragh  | University of Auckland | Identity in mathematics (learner, teacher etc); Writing a chapter about professional development (international handbook) |
| Bridget Wadham | University of Auckland/Fairburn School | Quality study on home-school partnership |
| Fiona Ell | University of Auckland | Using maths ed as a vehicle to look at preservice educators; professional learning - inquiry around equitable student learning (focused on students); next focus will come back to mathematics education |
| Pip Arnold | Karekare Education Limited | Statistics Education; Beeby Award - Deep understanding of curriculum levels 1 – 6; Integrating mathematics |
| Jill Pederson | University of Waikato  | Professional learning |
| Sue Wilson | University of Canterbury | How final year preservice teachers learn mathematics via planning |
| David Pomeroy | University of Canterbury | Equity within mathematics education, grouping of learners |
| Glenda Anthony | Massey University | Groupings in secondary schools (with David Pomeroy); DMIC project; ITE maths education (book chapter) |
| Pania Te Maro | Massey University | How maths education interrupts Te Kura whānau, the decision making that parents do and why they’ve chosen for their tamariki to go to te Kura |
| Jodie Hunter  | Massey University | DMIC project |
| Raewyn Eden | Massey University | Teacher learner and teacher preparation; Learning stories |
| Shelley Vaile | Karori West Normal School | Achievement of mathematics at primary levels; transitions; effective assess mathematics achievement |
| Karina Bird | NZEI Te Riu Roa | General interest in her Senior Professional Advisor role |
| Lauren Burr | Ministry of Education ELSA | Senior secondary subject matter expert (NCEA and achievement standards review) |
| Darryn Gray | Ministry of Education ELSA | Curriculum design team - responsible for mathematics |
| Adam Jang-Jones | Ministry of Education EDK | National Manager for PISA |
| Sashi Sharma | University of Waikato | Language culture in mathematics and statistics |
| Suzanne Allen  | Ministry of Education |  |
| Robin Averill (pm only) | Victoria University of Wellington |  |

## Apologies

Katrina McChesney, Maree Logan, Robin Lane, Brian Tweed, Nigel Calder, Robin Averill (for morning), Joanna Higgins, Michael Drake, Dayle Anderson, Judy Bailey, Karyn Saunders, Charles Darr, Robyn Caygill.

Notes from the day**[[1]](#footnote-1)**

After a welcome and introductions, **Fiona Ell spoke about “Hunting for treasure through mathematics education research”.**

The map is like a digest of maths education that highlight features for practitioners. Our choices as researchers shape what is found, and can inform maths teaching in NZ classrooms.

Maths connects to discourses, shown on the map as cities:

**City of wellbeing:** There can be a focus on achievement to the detriment of achievement. People may be surprised to find other connected discourses. For example a sense of wellbeing and having success in maths connects to maths anxiety, which connects to achievement.

**City of mindset and attitude**: There are some relationship between attitude and achievement, e.g., Mindset - Jo Boaler. There is a strong discourse in maths: mindset - like learning styles - has had penetration into classroom teaching.

**City of innovation and creativity:** This has a big impact on maths. Maths is also a great tool for innovations. Can use a creative approach in maths: students can be creative discoverers with maths. We face massive world problems where innovation and creative learning can contribute.

**City of the basics:** There are notable references to PISA results (drop). Teachers still have questions about the basics, but need to move on. About the students - this is still not getting through. About shifting ideas from psychological to socio-cultural (tension). Evidence for what to do? How to problem solve some of these interesting hang-ups that children have with learning (maths).

These are the landscape features shown on the map:

**The torrent of digital technologies:** These can be used to enhance or model versus ipad and motivator. We’re rushing so fast that good research is left in the wake, before everything is implemented.

**The pond of computational thinking:** Where is Computational Thinking – in the Technology curriculum or Maths curriculum?

**Glacier of community perceptions:** Parents have learnt maths differently from how maths is taught now. There are new generations of parents bringing different ideas, e.g., losing rote learning. The discourse will shift as the new parents come through. Media tends to focus on decline, internationally.

**Quicksands of culturally sustaining practice:** People may tend to walk around this rather than through it.  Need to ask how to help people understand what this is.

**Den of inequity:** In NZ this needs to be considered/addressed in our work.

**Peak of success:** conceptual understanding and unfettered participation in maths. Research findings shed light on different aspects of this.

**Sign posts** give teachers direction/guidance. We can encourage them to unlock what they know: Talk matters; Big ideas matter; Collaboration matters and Meta-cognition matters.

**Compass for maths & statistics researchers:**

* Speak to NZ challenges and aspirations
* Connect  our practice communities
* Communicate when we should
* Attend to the politics and power
* Hunt locally, impact globally
* Articulate theoretical frames used to find the treasure
1. **How are we sifting through what is worthwhile and not?**
2. **Big ideas? How we report about big ideas.**
3. **In mathematics research there is a lot of theoretical pluralism.**

## Questions and comments at the end Fiona Ell’s korero

* The map shows the complexities that teachers live with. Think about things that we pull into our own kete; teachers are doing this, and there is so much going on in primary and secondary schools (still complex with assessment regime/coverage).
* Great to have the sign posting of the focus ideas. It is only recently that maths has been connected to wellbeing. Can think of researchers as change agents rather than from purely a maths perspective. This can influence how and where we work.
* What’s missing? What could we be researching in maths education in NZ?
* Must consider priorities for what to research: For example, without support maths isn’t going to die, kaupapa Māori could die.
* We could ask: What would we like on the map? The landscape takes so long to change, evolving (e.g., Singapore 20 years ago - thinking school), but we could have influence on that. What is in the treasure box under the rainbow is what we (collectively) put in for others to draw on. Our decisions about what we research frames what’s there to be found.
* Describing strategies, get down to the ideas underneath? Underlying current ideas?
* Importing from overseas doesn’t always work. We can look and learn from them, but must be careful about imports from mono-cultural landscapes.
* Our voice: Get out and communicate it. Don’t let wrong information sit unopposed, if you know otherwise. As researchers we know a lot; communicate it.
* Who’s navigating the landscape? Where is student voice? How do we promote student agency outside of maths and inside of maths?

## Feedback from groups’ discussions

* We need to talk about the issues, not only in maths learning, but the wider educational and societal landscape. Equity is a case in point.
* NZ is a small country and the can be dominated by a small number of big voices in the landscape.
* Educational practice can shift from one bandwagon to the next bandwagon. This could be due to shallow policy environment - e.g., National Standards narrowed the focus
* Some of the risks are that there is much conversation *what* and *how, and* we need to get into more robust conversations/discussions with more depth, and about *why -* what sits behind this?
* To address the lack of maths (and other educational) research, we could look at more support for practising teachers into post-graduate study: where they can achieve success in study, growth of their educational ideas, and influence on their practise, as well as contribute to further research. How do we support that? What partnerships can be formed (between researchers and teachers)?
* Perhaps there is a lack of research because there’s a lack research funding. If the MOE want to see a programme of research, they could provide more funding. EDK research happening in this space at moment (retrospective)
* Can we empower change agents? How academics support this?
* There is a tension inherent in maths education: a big issue of inequity, and it is not necessarily solvable by maths education alone. Also needs to be tackled at the societal level.
* Ask what the impact of maths research is on teacher wellbeing.
* We could trust the teachers (teachers’ professionalism) more to teach.
* Provide teachers with accessible research articles/blogs/etc. Currently we may publish in academic journals which would cost teachers and schools. Perhaps researchers could write a partner article for a practitioner audience, for each academic journal article we write, with free access for teachers.
* What is the role of maths researchers in relation to the education hubs?
* How to develop disciplinary knowledge: ITE, but also when teachers are out in schools. Compare the 5-year preparation degree (some overseas) versus our 3-year qualification.
* Gap in research: there are still 5-6 year olds who are not counting.
* Thinking differently: what does a third wave in maths look like?
* Understanding of Digital technologies curriculum. Where are the support tools for NZ teachers and students? Google designing an app + many resources around Computational thinking.
* Equity for all stakeholders from students, to teachers, etc.
* It is important to look at the relationship between wellbeing and achievement.
* Look at ILEs/MLEs and the difficulties they are causing teachers.
* A question about how decisions are made for educational policy (from EDK). Is research sufficiently involved or included in this? E.g., currently MOE research into MLE and learning; is it including student voice? Parent voice?
* Is part of the role of this group to inform government policy, and give a voice to maths (and statistics) research?
* NZ is a small country in the wider landscape, with a small number of big voices. We tend to shift from one bandwagon to the next. Shallow policy environment where landscape shifts quickly. Risk or issue - conversation being centered on the ‘what’ and ‘how’ but what about the depth coming from ‘WHY’?
* Why - shifting landscape having to deal with (Kahui Ako, BOTS, schools, MLE). How can we support teachers into post grad study? What’s our part to play? What partnerships can be formed? How can we empower?
* Tensions inherent in maths education and there are other outside influences that impact
* Lack of understanding of what a curriculum level look like. Particularly in secondary statistics.
* Disciplinary knowledge: how do we support trainee teachers and teachers to improve their own content matter knowledge?

## SIG planning

***SIG goals and rationale***

One-third of attendees are NZARE members, and two-thirds are not yet members. Any ideas suggested this afternoon will need to be circulated to NZARE SIG members for their input, before being adopted.

The SIG’s aims and rationale were discussed. Suggestions were made for improving what is currently on the SIG’s webpage. Suggestions to consider included:

* Modifying SIG’s tile to Maths and Statistics / Pāngarau Education.
* Including more NZ flavour – particular mention of Māori in the culturally sustaining area of research interest.
* Incorporating the SIG’s potential impact – informing policy/advocating for change
* Participation - foster, support, participate in…
* Add teachers and policymakers to list of who is included. Change lecturers to educators.
* Add to research interest areas: Teacher learning, Policy.

Suggested re-framing for the webpage: Why, How, then What.

Linda will send out modified wording to SIG members and attendees.

***Possible SIG event***

Maths & Statistics/Pāngarau education events already on the horizon, e.g. MERGA(June-July) and NZAMT (Oct), with Mathematics & Statistics Education Research Day the day before NZAMT (30 Sept).

People were strongly encouraged to submit abstracts for NZARE (18-20 November, in Christchurch) so that we can have our own strand of presentations.

Auckland Uni, Massey, and AUT combining to hold an event to help PG students develop papers to present at NZARE. Can NZARE help support this? Linda will follow up with Jodie Hunter about how NZARE and the SIG can support this day.

Robin Averill – the day before NZAMT, NZCER and VUW are putting on a one-day maths research day, subsidised by NZCER and VUW. There will be focus speakers, as well as two types of presentations: 5 minutes (3 slides), short and sweet OR 20 minutes (8 slides). September 30th 2019. Abstracts - title and 60 word brief. Will send out the link and flyer with minutes and other notes.

**Please consider registering for the maths research day on 30 September via the flier (separate document) and submitting abstracts for presentations.**

***SIG convenor/co-convenors***

Key responsibilities are convening SIG events, co-ordinating the review of SIG-related abstracts for NZARE conference, writing short SIG updates 3 times a year for the NZARE newsletter, leading the SIG’s AGM at conference.

**Please email Linda if you are interested in co-convening the SIG:** **linda.bonne@nzcer.org.nz**

## Further discussions

* Policy and Voice - how do we make ourselves heard?  Being a collective voice - strengthening our voice that drives or helps create policy.
* What are current maths education-specific policies? – ALIM/MST.
* Limited sources of funding available.
* Is maths curriculum due for review?  Not at the moment - waiting to see what comes out of the Curriculum and Assessment group.
* Voices from this group would be important. How do we get our voice heard?
* The sector wants help with how to work out what is going to make a difference.  “Do more of this and less of that.”
* What is going to get results??  This may not be the question we want to ask?  What do we mean by ‘results’?
* Rather than reacting to policy, we want to be involved in developing the policy.  Do research, communicate research and help develop and drive the policy.
* MOE seems to be getting more people in to review policies.
* Would be good to include PPTA, NZQA as well as MOE and NZEI in future SIG meetings.
* Bringing policies together from different place.
* Need to have societal change alongside the policy.  Wider implications of policies - what other changes have to happen?  Involvement of parents in education - not always possible in all areas unless society changes to allow.
* Keeping up with all the change. Updates page - review closing dates etc. A lot happening - might help with keeping up with that. What have been the Ministry responses to the Education Conversations? Can some of these conversations be co-ordinated?
* Organise a group response to education changes. (new websites might facilitate this)
* Virtual journal club - possible on-going event every two months or so. Like a book club but for maths education journal articles. Such a club would need someone to take a role of “nudger” to keep up the momentum.
* What other roles might there be in the SIG? Website coordinator might be another role. Certainly, if this is to be a well-subscribed and active group, it would be helpful for people to take roles additional to co-convenors.
* What other groups exist in this area?  E.g. Statistics Assn, NZ Mathematical Society, NZAMT. Often people double up in these groups. How can we use connections across these groups to keep informed? Thinking strategically - should be working together. Wanting the same outcome.
* Teachers are wanting the same things as us.

David Pomeroy shared his work about secondary schools and moving away from ability grouping:

* Working with teachers in three secondary schools. All departments that have taken initiatives to reduce or eliminate ability grouping i.e. traditional streaming at Year 9 and 10.
* Co-generative dialogues - teachers sharing their journeys, their reasons and how they are transitioning.
* Burning question - what is most helpful?  Research shows that not ability grouping is the way to go but how can they support schools to make the transition.
* Why is it so hard? e.g. maintaining credibility with parents and/or SLT.
* What is the pedagogy that goes alongside this change?
* Schools that are in the transition process, learning from each other.

**Writing projects underway, with authors looking for research publications:**

Lisa is writing a chapter for the latest Rimea book (“Research in mathematics education Australasia”) – there is a book every four years which summarises the research from our region within various areas of mathematics education. Lisa is working on the chapter on in-service teacher learning for the period 2016 – 2019. Contact: l.darragh@auckland.ac.nz

Glenda and Raewyn are in the process of writing a New Zealand based chapter for International Perspectives on Mathematics Teacher Education. Any published papers (or forthcoming  - eg., Merga) on ITE or induction in last 5 years pleased send to Glenda  g.j.anthony@massey.ac.nz so they can be included in the review.

## Additional discussion points

* How do we make our group more diverse?  How do we make ourselves more culturally responsive?
* Ideally would be great to have one teacher in every school who are specialised in Maths.
* MST teachers can learn the information - may take a long time for them to make an impact in their schools. MST has the ability to help build capacity in schools.
* Teachers give their own time - would be good to have things set up at system level.
* Using networks - what’s enabled some schools to manage things to achieve success in maths teaching and learning.
* Attracting the right people into teaching. What is the profile of a teacher? People look down on teachers. Students who are doing high level maths are not thinking of going into teaching.  Mindset problem in teaching. Societal change needed.
* Don’t use maths as the gatekeeper to further courses.

**What’s going well?  What are we proud of?**

* Very happy that we don’t have a national test for maths OR national standards any more.
* Also happy that we don’t performance evaluate our teachers in a formal way. We have autonomy across the country - a strength at school and ITE level - we have a lot of choice over what we do and how we do it - good to maintain.
* In a month’s time 300 teachers are going to attend a maths day. Excitement about NZAMT’s get together.
* Across the country the number of primary grads are slightly increasing. Happy that during selection of pre-service teachers there are some great people signing up to be teachers.
* Scholarships available for those changing careers.
* We are involving more teachers in research.
1. These notes are a compilation of various people’s interpretations of what was said on the day. [↑](#footnote-ref-1)