Pāngarau Unleashed: A multiple case study of de-streaming secondary mathematics

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Introduction

Streaming—grouping students by perceived ability through separate classes, in-class groups, or rigid prerequisites—has long been normalised in Aotearoa New Zealand. Streaming remains highly prevalent in our secondary schools—our best estimate is that about two thirds of New Zealand secondary students experience streaming in maths (OECD, 2023; Tokona Te Raki, 2023). Streaming is usually justified by the claim that it helps teachers to focus on students with a narrower range of capabilities or prior knowledge than in a non-streamed class (Anthony & Hunter, 2017; Johnston et al., 2024). However, Māori and Pacific learners are disproportionately allocated to low streams, with limited opportunity to influence decisions and restricted future pathways. These practices reflect historical inequities rooted in colonial and deficit-based education systems and have been widely critiqued in recent literature (Pomeroy et al., 2024a; Tokona Te Raki, 2023). Against this backdrop, our study explored de-streaming as a transformative step toward culturally sustaining, anti-racist education that empowers all learners (Taleni, 2023; Tokona Te Raki, 2023).

Researchers and educators have been debating streaming for decades and their findings have not always appeared to be consistent (Francis et al., 2020b). To us, this is not surprising. Beyond the wide range of methodologies used and outcomes measured, there is also the fact that every example of streaming (and not streaming) is distinctive. Meta-analyses show no relationship between streaming and average academic achievement, and tend to show that streaming widens existing achievement gaps (e.g., Steenbergen-Hu et al., 2016; Terrin & Triventi, 2023). Qualitative studies mostly converge on two main reasons for why streaming exacerbates inequalities in education:

1. Learning opportunities: top streams are "stretched" with challenging learning while low streams learn less and more basic maths, leading to a narrowing of educational opportunities for students in low streams (e.g., Oakes, 2005).
2. Self-concept: low stream membership can contribute to shame and give students the message that they are not capable (e.g., McGillicuddy & Devine, 2020).

The two reasons are mutually reinforcing (Francis et al., 2020a)—low self-concept and stigmatisation hamper persistence, enjoyment, and achievement. A limiting curriculum limits achievement, which reinforces and reifies identity as a low achiever. Building on these international studies, members of our research team have recently published some of the first empirical studies of streaming mathematics in New Zealand secondary schools, research which is largely consistent with the international research base (Pomeroy et al., 2024a, 2024b; Pomeroy & Quaye, 2025). Furthermore, our New Zealand research based on prior studies emphasises that, in our context, streaming's inequity is a form of institutional racism with intergenerational consequences. Beyond the academic community, there is now an established movement to end streaming in our schools, commissioned in 2021 by the Mātauranga Iwi Leaders' Group and the Ministry of Education, and led by Tokona Te Raki.

While there is unlikely to be an absolute consensus in education, we think that there is already enough evidence to justify the move away from streaming. Therefore, we proposed Pāngarau Unleashed with a simple aim—to facilitate effective transitions to non-streamed secondary mathematics. There are already models and suggestions

from international literature that give some ideas about how to teach maths well without streaming, (e.g., Boaler & Staples, 2008; Solomon et al., 2021) which involve removing streaming alongside intensive external PLD on a particular teaching and learning approach. However, in the collaborative spirit of the TLRI and aspiring to enact *ako* and *whanaungatanga* we proposed a model of teacher capacity building that involved teachers themselves as active co-designers of learning.

We worked with teachers of maths from schools that had already self-initiated a transition away from streaming maths (or in one case, had never streamed maths) to support each other to move towards increasingly effective non-streamed practices. There was no expectation that all schools would enact non-streamed maths in exactly the same way, but rather there was a natural convergence of practices as they learned off each other, while maintaining some distinct elements related to their own school cultures, communities, and skillsets

We came into this project with two ambitious and overarching research questions:

1. How can an effective transition to non-streamed secondary mathematics be achieved and sustained?
2. What are the benefits and challenges of an inter-school, bi-cultural, teacher-researcher-student collaboration in supporting capacity for effective non-streamed mathematics?

Related to these questions, this report is structured around two themes, both of which focus on the *how*, not the *why*, of de-streaming secondary maths. The first theme is what it takes for a school to move away from streaming in effective ways. In this theme, we address questions such as:

- What reasons do teachers, school leaders, and students provide when discussing benefits and harms of streaming?
- How do teachers perceive the key enablers and barriers of de-streaming?
- How can senior leaders best support de-streaming?
- What forms of collaboration and solidarity support effective de-streaming transitions?

The second theme zooms in on the core work of secondary maths teachers in non-streamed settings, providing practical principles and examples. We structure this discussion around three components of teachers' work:

- planning
- teaching
- assessment.

This report provides a high-level overview of the project and the key findings at the time of writing (December 2025). This project created a large and rich body of data so some analysis and writing is still work in progress—additional findings and publications will be listed on the TLRI website as they are published.

Methodology

Everything we did in the project was guided by our aim—to support effective transitions to non-streamed mathematics in secondary schools—and our core principles for working together, ako (reciprocal teaching and learning) and whanaungatanga (relationships). Within these principles we drew pragmatically on a range of methodologies that the research team were experienced with. The methodology, and in particular our hui—which at various points included classroom observations and rangatahi focus groups—were influenced by kaupapa Māori methodologies and principles, feminist praxis, and a pragmatic approach to what influences the day-to-day work of maths teachers. We embedded tikanga Māori appropriately and much of the research project was underpinned by kaupapa Māori principles including ako (culturally preferred pedagogy), whānau (collective responsibility), and āta (approaching research with care, respect, and consideration) (Pohatu, 2004; Smith 1997) enabling co-constructed hui. We aimed to show respect and manaakitanga for our partners by scheduling hui during normal work hours, providing kai, and where possible meeting kanohi ki te kanohi (in person).

The data were mostly drawn from "naturalistic" settings—in other words, we used recordings of authentic conversations during our 11 hui, observations of classes in five schools, and artefacts that teachers brought along to our hui. Alongside transcribed audio recordings from our hui, we also:

- conducted one or two semi-structured interviews with 17 teachers from seven schools overall
- conducted individual semi-structured interviews with principals and/or deputy principals at six schools
- recorded three rangatahi (student) focus groups at three schools, with five to seven rangatahi in each focus group in senior year levels
- observed non-streamed mathematics teaching at five schools and debriefed the observations during hui.

As the project progressed, the research team was increasingly transparent with teacher partners about specific research aims of each hui. This approach aligned with kaupapa Māori principle ako, a co-constructed approach allowed both research aims to be met and teacher aspirations for the collaborative hui to be enabled. For example, Hui 10 in November 2024 aimed to gather data to contribute to descriptions of key adaptations that each school was making in their planning, assessment, and pedagogy. During this hui, teachers sat in same-school groups and made a written brainstorm and recorded conversation directly addressing this research aim.

The research team is diverse in terms of methodological and theoretical knowledge, and this diversity is reflected in the publications and outputs that we have led. Research team members took leading roles in different parts of the analysis, reflecting and drawing on our respective strengths. For example, Kay-Lee's passion for giving voice and agency to rangatahi, and her knowledge of kaupapa Māori theories and methodologies, are reflected in her analysis and explanation of student perspectives on streaming (Part 1 in the Findings section). Kaitlin's disciplinary expertise in educational psychology informed her use of self-determination theory in her analysis of teachers' perspectives of enablers

and barriers to de-streaming. Our process for interpreting qualitative, often naturalistic, data, combined concepts from the theoretical approach being used (for example, self-determination theory) and, at times, unanticipated themes that emerged from close reading of transcripts. Like much qualitative analysis, the themes and findings are derived from a combination of looking at the data with pre-existing categories like enablers and barriers ("deductive" analysis) and emerging findings like collective views of success ("inductive" analysis). In this report, space limitation prevent us from providing a detailed description of the analysis used for every line of inquiry. Instead, we provide a selection of key findings and implications, which we are expanding on in academic publications.

Findings and implications

This central part of the report is about key findings from our research. We have presented and published some of these, while others are emerging findings at the time of writing this report. There are five sections: 1) catalysts for de-streaming; 2) enablers and barriers to de-streaming; 3) leading de-streaming; 4) planning, teaching, and assessment in non-streamed secondary mathematics classes; and 5) de-streaming together or whānau (family structure) pedagogy, which describes the collaborative approach we took in this project.

Catalysts for de-streaming: Student, teacher, and researcher perspectives

In an education system where schools determine their own grouping policies and most secondary schools stream mathematics, schools will continue to stream unless there is a reason to change. Furthermore, once a decision is made to de-stream, the process is smoother and more effective when there is a widely understood rationale, even if not everyone involved agrees with the rationale. One partner school from a community where support for de-streaming was uncertain, reported strong support from parents—this was also the school that was the most transparent about de-streaming, sending home newsletters and holding meetings with parents the previous year explaining what de-streaming would look like, the reasons for the change, and the measures that the school would take to support its highest and lowest achieving students. This section outlines some reasons for de-streaming, from student, teacher, and researcher perspectives. The purpose of presenting these reasons is to highlight some of the perspectives that acted as catalysts for de-streaming, not to present a systematic argument for de-streaming.

An article currently under review privileges rangatahi perspectives gathered during a collaborative hui in 2022, where senior Māori and Pacific students shared lived experiences of streaming in mathematics. Guided by kaupapa Māori principles, youth voices were embedded throughout; not confined to findings, challenging Western academic norms. Their narratives echo themes in prior scholarship, including lowered self-worth, constrained career pathways, and exclusion of whānau from decision-making (Bonne & Johnston, 2016). These insights align with national and international calls for de-streaming as an equity imperative. Reasons for change include evidence that streaming does not improve achievement (Hattie, 2009; Oakes, 2005), exacerbates racial and socio-economic disparities, and undermines student agency and cultural identity.

Students reported that streaming promotes deficit labelling, often internalised, affecting identity and achievement. They described feelings of shame and systemic bias, noting that “brown kids in the lower class” was normalised. These insights resonate with the Māori proverb “Ko ngā rangatahi, ngā rangatira ō āpōpō” (youth are the leaders of tomorrow) and reinforce findings from other rangatahi-focused research advocating for urgent structural change. Acting on youth leadership now is critical to dismantling harmful practices and create equitable pathways for Māori and Pacific learners.

The Year 13 students were able to remember with confronting detail the groups to which they had been allocated in primary and intermediate school and recalled noticing the racial composition of the different groups—a phenomenon that we have documented in

three schools using data from a previous study (Pomeroy et al., 2024b). The concentration of Māori and Pasifika students that they recalled being in low streams and groups caused shame and distress, even for students who were in top groups. One student commented:

> When I came into college, I had such a low self-esteem when it came to math because with the streaming, I was in, you know, the dumb class, and a lot of my peers around me were my Pasifika brothers and sisters, my Māori brothers and sisters.

As an ethnically diverse research team with diverse experiences of streaming in our own schooling, we reflected on this data and on our own experiences of schooling. We noticed a common pattern of students in bottom streams feeling ashamed, consistent with previous research on streaming (McGillicuddy & Devine, 2020). We showed that shame that comes from group allocation can exist even when the teacher is personally encouraging, and fits closely with what Sayer (2005) calls "structural humiliation". We also think that the shame of being in a low stream is exacerbated and complicated for Māori and Pasifika students in these groups, who can feel that they are living up to a negative academic stereotype (Pomeroy et al., 2024a).

Arguably more positive but still concerning was students' experiences of being in top groups, which were highly varied. Pākehā (non-Māori) boys reported being most "at ease" in top groups and most likely to feel they deserve to be there—an experience we interpreted as entitlement. Pasifika and Māori students, and girls, were more likely to report impostor syndrome and discomfort of separation from friends when they were in top streams (Pomeroy et al., 2024b; Pomeroy & Quaye, 2025). While we can see academic benefits to being in a top stream as a result of high expectations and a rich curriculum, we also noted that for many students being in a top stream is an uncomfortable or conflicted experience.

We also analysed the "moral reasoning" of teachers when discussing streaming and de-streaming, drawing on data from interviews and hui (paper in preparation). A moral reasoning perspective focuses on what reasons for and against streaming matter most to teachers, especially arguments about harm, wellbeing, and opportunities to flourish in the future. While this discussion was rich and varied, there were three crucial moral claims that teachers provided as reasons for de-streaming. These were:

1. Low-stream classes limit students' opportunities to learn rigorous mathematics, closing doors to valued educational and occupational pathways.
2. Low-stream classes give students an unspoken message that they are not capable.
3. Māori and Pasifika students are over-represented in low-stream classes, so streaming disproportionately harms these students. Streaming is racist.

Although these findings were based on a close examination of the subjective views of a small number of teachers, it is worth noting that the teachers' views are strongly supported by prior research on streaming.

Recommendations:

What we learned about the reasons that motivated teachers and school leaders to reduce or remove streaming has implications for de-streaming transitions. School leaders and teachers could:

- Map the realistic mathematics learning pathways for students in low maths streams in the first year of secondary schooling. Is there a viable pathway to Year 13 Calculus or Statistics? If not, why not?

- Ask students, or read about, students' own experiences of being in low-stream classes. What messages are these students taking on about themselves? Are we comfortable supporting a system that conveys such messages?
- Analyse the ethnic and (if possible) socio-economic profiles of different streams. To what extent does this data support school strategic goals, or teacher professional standards?

Enablers and barriers to de-streaming

Major pedagogical transitions are not viable without teacher buy-in, so we endeavoured to understand teachers' perspectives and experiences of de-streaming. Teachers engaged in interviews with the research team when they joined the project. Thematic analysis of their responses gave valuable insights into teachers' motivations and beliefs about successfully transitioning to de-streamed classrooms.

Using Self-Determination Theory (SDT) (Ryan & Deci, 2019) as an analytical frame for motivation, we aimed to understand how externally driven reforms can become internalised, and what supports or constrains teachers as they transition away from streamed mathematics. SDT distinguishes the "quality" of motivation along a spectrum of completely extrinsically-driven to fully internalised (Deci & Ryan, 2008). This distinction can correspond with wellbeing, performance, and persistence and can be explained by an individual's related goals (Ryan & Deci, 2000).

The teachers' goals for participating in this project ranged from practical insights, such as guidance and resources, to broader issues, such as equity, cultural empowerment, and encouraging de-streaming nationally. The content of these goals can be understood as intrinsic because they focus on professional development and personal satisfaction, through encouraging meaningful change for others. It will be important to allow teachers to develop appropriate intrinsic goals during the transition, emphasising that teachers should not be forced into formulating extrinsic goals, which can undermine motivation (Ryan & Deci, 2000) (e.g., through tracking student achievement while transitioning).

Teachers in this project participated voluntarily, but there were still varying sources of motivation for their engagement. Importantly, our analysis suggested that it is realistic for teachers to internalise the goals of externally introduced de-streaming initiatives. For schools moving to de-stream, a source of intrinsic motivation appears to often originate from teachers' concerns about the broader societal inequity and negative attitudes toward mathematics, which streaming can perpetuate. Our findings suggest that more autonomous motivation is evident when valuing and developing goals around educational equity are apparent. Thus, encouraging a school-wide dialogue around broader social issues and presenting this as a goal of de-streaming is a potential approach to fostering intrinsic teacher motivation for de-streaming, though this may not be completely internalised for everyone early in the process.

Reflecting on teachers' broader perspectives on what helps or hinders their transition to de-streamed classrooms, we employed social-cognitive theory. This theory suggests that the changing academic and personal needs of the student classroom population may influence teacher beliefs and behaviours in managing that classroom. Conversely, their behaviours result in different outcomes, such as student engagement or achievement, and can reinforce or disrupt teacher beliefs and corresponding choices (Bandura, 1986).

A barrier to successful de-streaming was the ongoing beliefs from the broader school community entrenching a streaming culture. These beliefs stifled or prevented the teachers from constructing their desired learning environment or executing behaviours they believed to be effective. The perceived lack of unification in the school community to accept this transition can lead to greater difficulties. This barrier is a particular burden on teachers during the transition process that could be somewhat alleviated through communication and explanation for the transition to all the stakeholders before de-streaming. Consequently, de-streaming should not be treated like an on/off switch, but as a journey. It will likely take time to see the effects of de-streamed practices while teachers and schools adapt to a system entrenched in streaming and manage the long-term effects of streaming, such as students' negative mathematical identities. Through a social-cognitive lens, this will occur through an iterative process of beliefs, behaviours, and the environment reciprocally impacting each other, and must be allowed time to find positive channels of influence.

A de-streamed classroom presents a different range of student needs, both academically and personally, and coping with this was identified as a barrier to teacher transition. To facilitate managing more diverse academic needs, teachers described the importance of encouraging students' responsibility for their own learning, specific resources catering to a range of levels, and time to develop these skills and tools. To address the diversity in students' personal needs, teachers expressed their beliefs in constructing a safe learning environment, with an emphasis on the development of teacher–student relationships. This is another approach that cannot be immediately developed or implemented and therefore warrants anticipation and further attention.

Teachers participating in this research suggested that reframing successful teaching was one aspect of challenging streaming culture; for example, re-assessing the belief that successful teaching means keeping students quiet. While such reflection was discussed as a facilitator to de-streaming, it can also present a significant barrier, as teachers need time to identify and address the necessary changes in their practices to avoid de-streaming "traps", such as teaching to the middle, which can pose issues with respect to student self-concept (Fleischmann et al., 2023; Jónsdóttir & Blöndal, 2022).

Despite the diversity of pedagogies and resources teachers used, they largely agreed that classroom and school culture, as well as student responsibility for learning, were key facilitators of successful de-streaming. The results suggest the need for teachers to feel equipped to scaffold students in recognising their own learning needs and monitoring their long-term educational goals, while still being given the option to aim highly, in the knowledge that their mistakes are a part of learning. In shifting away from streamed classrooms, the teachers discovered new barriers and the limitations of changing their personal beliefs and behaviours due to the broader school environment. Ultimately, the teachers described both these facets of need management as works in progress, with it persisting as a barrier in their transition to de-streamed practices. While they reflected on their beneficial behaviours in the classroom and developing resources, these were not discussed as completely remedying the issue, particularly within certain mathematical topics.

Leadership

Our research on how schools transition to de-streamed mathematics instruction reveals important preliminary findings about the critical role of leadership. School leadership emerged as an integral component of the transition to de-streaming early on in our TLRI project. As such, we sought to more systematically understand the role of leadership through interviews that focused on this aspect of the transition with school principals, heads of mathematics, and the teacher leaders in our project. The findings have compelled us to understand de-streaming as a form of collective social justice leadership that challenges deeply entrenched structural inequities in education.

Drawing on Welton and Freelon's (2018) conceptualisation of community organising as educational leadership, our findings illustrate how school leaders (e.g., principals) employed grassroots leadership tactics including relationship building, public discourse engagement, and direct action to mobilise support for de-streaming. Leaders also demonstrated what DeMatthews and Tarlau (2019) identify as critical awareness of the interconnectedness between societal issues and school environments, explicitly naming systemic racism and low expectations for Māori and Pacific students as drivers for change. (Many of the school principals and teacher leaders identified Tokona Te Raki as being integral to the development of their critical awareness of this key equity issue. Some schools had also previously participated in related efforts such as Te Hurihanganui.) As such, the school leaders exhibited both social justice-oriented dispositions and contextually responsive leadership, recognising how school systems perpetuate racial inequities through the organisation of educational opportunities such as course placement.

The research also reveals tensions between appeasement, compliance, and social justice commitments, a challenge DeMatthews and Tarlau (2019) highlight as central to social justice principalship. Some leaders navigated substantial resistance from staff, parents, and the community while maintaining an "unapologetic stance" toward Te Tiriti o Waitangi-based and broader equity-based reform, demonstrating the capacity to "break silences" and confront institutionalised racism in educational systems (DeMatthews & Tarlau, 2019).

The collaborative and incremental nature of implementation across all schools suggests that successful de-streaming requires building collective ownership beyond individual principal commitments. However, it should be noted that one of the participating schools in our project successfully moved to de-streaming, and strategically changed governance structures to increase Māori representation, through the principal's strong, courageous leadership, despite resistance from the community and from the mathematics department. Across the board, leaders invested in sustained professional development to shift teacher mindsets and utilised data to demonstrate impacts of streaming on student mathematical learning and participation, approaches consistent with Welton and Freelon's (2018) emphasis on community capacity building.

Essentially, each school represented varying degrees of a "head, hearts, and minds" approach. The teacher leadership focus groups revealed that pedagogical shifts were also necessary in order for other teachers to come on board. These pedagogical approaches required moves toward student agency, differentiation, and flexible assessment practices. Focus groups with teacher leaders indicated that structural change alone (i.e., mandating

de-streaming) is insufficient without corresponding transformation in classroom practice. Teachers described ongoing adaptation and peer support for teachers, especially those struggling with the transition, as essential, highlighting the "multifaceted demands of social justice" work that DeMatthews and Tarlau (2019) documented. Teachers also reported that participating in Pāngarau Unleashed supported them to build confidence (e.g., that they were doing the right thing), solidarity (knowing that and working alongside others in the Pāngarau Unleashed collective were committed to the journey, experiencing both "gains" and "setbacks" along the way), and expertise (sharing their personal practical and professional knowledge with like-minded others). One thing that surprised us was the frequent comment from participating teachers that Pāngarau Unleashed was the best "professional development" they had ever had, yet we never framed or thought of the work as professional development! However, this expression signalled to us how much teachers valued the time and opportunity to come together and learn with/from each other.

Ultimately, this research extends traditional educational leadership paradigms by demonstrating how mathematics de-streaming serves as a site for enacting equity and racial justice-oriented leadership through organisational restructuring, pedagogical innovation, and sustained challenge to deficit-oriented mindsets. Our findings affirm that social justice educational leadership requires both strategic organising (i.e., of the community organising "type") and the cultivation of collective commitment to dismantling systems such as streaming that reproduce educational inequality.

Planning, teaching, and assessment in non-streamed mathematics

Our project took place during a period of rising awareness of the harms of streaming, including the launch of Kōkirihia: the plan to end streaming in our schools and position papers on ending streaming from key education unions. In this context, it is especially timely to share how our partner schools de-streamed mathematics. Previous research has documented de-streaming secondary mathematics alongside the implementation of a specific pedagogical approach selected by the researchers as part of the study design; for example Complex Instruction (Boaler & Staples, 2008) and Realistic Mathematics Education (Solomon et al., 2021). While these teaching approaches were selected partly because they are suitable for non-streamed classes, the design of the project positions the researcher as the expert and the teacher as the novice. Our pedagogical recommendations are less systematic and are the result of teacher improvisation, sharing, and iterative refinement. What we present here is not a singular teaching method or a novel pedagogical approach, but rather a synthesis of the actual adaptations made by mathematics teachers in a diverse range of school settings. While we are not yet able to attest to the impact of these adaptations on mathematics achievement, we can say that they were developed by teachers and were manageable in a range of New Zealand secondary schools. The following is not a full description of how our partner schools taught, but rather the changes that they made to how they taught as intentional adaptations for non-streamed mathematics classes.

Planning

De-streaming often meant that planning became more standardised within each year level, rather than each teacher adapting or creating a plan to suit the prior attainment of their students. A crucial and necessary change to planning when de-streaming is that,

within each year level, all classes have a common curriculum. In other words, all Year 9 classes do the same maths topics in the same order, have access to the same tasks and resources, and do the same assessments. This is a key intended outcome of de-streaming—every student has access to all the mathematics.

Schools used a range of planning adaptations to avoid the "streaming traps" of teaching to the middle and replacing streaming with in-class "ability" grouping. Mathematics tasks needed to be adapted so that students with diverse levels of prior knowledge could learn mathematics that was accessible yet challenging. The most common approach was to offer practice tasks that varied in their complexity. One school adopted a "curry" scale of "mild", "medium", and "spicy", on worksheets and slides. Students usually self-selected their level of "spice" and could choose to move between them, with the teacher sometimes also making suggestions. Other typologies included "must do", "should do", "can do", and at another school "mahi" and "wero/challenge". A less commonly used adaptation was to plan "low floor, high ceiling" tasks. Most schools used a combination of both, with "low floor high ceiling" tasks sometimes used as whole-class starters. This approach is similar to the standard "topic-based" long-term planning that is also common in schools that stream mathematics, with students working together through a common syllabus.

The approaches to planning used in our partner schools rely on students making decisions about what tasks they do—they are high student autonomy approaches. In all cases, teachers used their judgment around the extent to which they intervened in students' decisions. Teachers with prior experience and training in primary schools pointed out that students entering secondary schools have often had a high level of autonomy over task selection for years and that students are better at making such decisions than many secondary teachers may assume. Teachers' reflections and our conversations with students during classroom observations suggested that students were able to adjust the level of challenge appropriately. We also noticed that, given such a choice, some students successfully attempted more challenging tasks than teachers would have "prescribed", an important indication that offering pathways that are "too hard" can accelerate learning in mathematics (Coles & Brown, 2021).

Teaching

Teachers reported relatively few and minor adaptations to their everyday classroom teaching practices. For example, the way they explained mathematical concepts, typical lesson structures, and classroom management routines remained similar to those teachers had previously used with streamed classes. When teachers observed each others' mathematics lessons it was common for them to express relief that teaching looked relatively "normal" and therefore achievable. Whole-class explicit teaching and modelling of examples remained frequent in non-streamed classes. In some schools, Years 9 and 10 teachers increased their use of low-floor, high-ceiling tasks as the main activity of a lesson; however, extended rich tasks remained the exception rather than the norm. Some schools adapted the "starter" task to include an open-ended question, such as "If I have three consecutive odd numbers, what do I know about the sum?" Several schools embedded instructional videos in the schemes of work and students could access these flexibly, usually in addition to face-to-face teaching. Such videos gave students the option to revise material that was not well understood the first time, or which they may have missed due to absence.

A key barrier to teachers' openness to de-streaming is the perception that they do not know how to teach classes with such a wide range of prior attainment. In this context, we suggest that the most important finding regarding adaptation of teaching practices is that they were relatively minor. In other words, if you can teach maths, you can teach maths to a non-streamed class. Furthermore, where behaviour management was discussed, teachers reported little change or a net improvement from de-streaming. In particular, some teachers reported that where previously bottom-stream classes had been notoriously difficult and teachers of these classes felt they were drawing the "short straw", students with low prior attainment appeared more motivated and focused in non-streamed classes.

Assessment

A consistent and unanticipated finding was that when schools de-streamed, they adapted some elements of their formal assessment of mathematics. A direct consequence of having a common year-level curriculum was more consistency in assessment within that year level. In all schools, but especially those serving socio-economically disadvantaged communities, de-streaming meant teaching more algebra to more students. In some schools, in Year 11 all students were taught algebra where previously only a small minority had been. As a result, many students completed NCEA standards that they would not have had access to in a low-stream programme. For schools in which significant numbers of students were learning algebra in Year 11, who would not previously have learned algebra, students could choose whether to sit external assessments. One interpretation is that schools had a high "risk tolerance" and were willing to enter students into assessments that students were at risk of failing, in order to give those students the opportunity to succeed in consequential learning that would keep academic pathways open to them.

A recurring phrase in our discussions was "assess when ready". In practice this meant that Year 11 students sitting Internal NCEA assessments had some flexibility in the assessment date. While there was still normally a nominal assessment day on which the majority of students attempted the assessment task, these dates were negotiable. Teachers were clear that this was not a lowering of standards, but rather a necessary adaptation to differences in learning trajectories and life circumstances.

Finally, some schools adapted their assessment rubrics at Year 9–10 level to shift the reporting of mathematics achievement away from normative comparisons. One school changed the layout of their reports to emphasise individual student progress during each maths topic.

The key implications of this analysis for schools considering de-streaming mathematics are:

- The most crucial adaptation is the development of a common year-level plan that enables students to access mathematics at a range of levels and paces.
- Day-to-day mathematics pedagogy does not need to change radically, although low-floor, high-ceiling tasks and starter activities can provide contexts for collaborative work.
- Adjust assessment to reflect the common curriculum, but plan for some flexibility around whether and when students attempt formal assessment tasks.

De-streaming together: Whānau pedagogy

Pāngarau Unleashed brought together university researchers, secondary school teachers, school leaders, and rangatahi to collaboratively explore equitable grouping practices in mathematics classrooms. Central to the project was a focus on ako and whanaungatanga, drawing on indigenous Māori whānau-based principles to guide both research interactions and engagement.

Whānau-based methodology and pedagogy, as observed in this project, functions as both a methodological process and an educational approach. Grounded in the relational structures, interactions, and interconnectedness inherent within whānau (family), it emphasises collective responsibility, mutual learning, and interdependent support, providing a culturally grounded framework applicable across educational and organisational settings.

The project began by intentionally forming relationships through hui, creating spaces of trust, curiosity, and mutual respect. Early stages emphasised whakawhanaungatanga (relationship-building), enabling participants to recognise and value each other's experiences, strengths, and perspectives. While roles and responsibilities were clarified and evolved, the focus remained on co-construction, with both individual pūmanawa (gifts and skills) and collective contributions encouraged. Sharing vulnerabilities and personal stories, such as experiences with streaming or de-streaming, either personally or within participants' own whānau, highlighted the importance of fostering strong, non-judgemental connections from the outset.

As relationships deepened, collaborative inquiry became more dynamic. Teachers and researchers shared classroom experiences, observed each other's teaching, and engaged in reflection on alternative strategies. Leadership emerged organically and distributively, with participants taking on roles according to their expertise—some guiding discussions, others co-presenting with researchers to teacher and policy audiences, adding further vulnerability and trust. Unlike the initial whakawhanaungatanga phase, which focused on building relationships and recognising strengths, this stage emphasised risk-taking, experimentation, and ownership, creating a supportive environment where new strategies could be tried, successes celebrated, and challenges discussed without judgement. This was a practical enactment of the whānau-based "Give-it-a-Go" approach, in which whānau "have your back" even when outcomes are uncertain. The focus was on evidence-informed, strengths-based intentions and practices, rather than perfection, fostering a safe environment for experimentation and learning. Although providing professional development for teachers was never the intention of the project, many of the teachers mentioned "this was the best PLD I've been a part of".

Regular hui and ongoing dialogue sustained the whānau-like collective, providing spaces to reflect, share challenges, and co-create knowledge about equitable mathematics teaching. Participants also shared life experiences beyond the classroom, from children growing up to personal milestones (including at least six new pēpi being born during the research period) adding authenticity and relational depth. Teachers reported increased

confidence in adapting practices for diverse learners, while researchers gained insights into the collaborative and relational dynamics that shape teaching. Together, the group developed shared tools, frameworks, and resources, extending benefits beyond the project, and creating the beginnings of a transformative movement.

A key expression of whanaungatanga and school-specific wairua (spirit) was the process of welcome. Most schools employed mihi whakatau or pōwhiri (ritual of encounter) to receive the research team and visiting teachers, reinforcing respect, connection, and tikanga Māori (Māori protocols). A particularly memorable experience was the welcome at Rāpaki Marae, closely linked to one of the kura, where intergenerational knowledge was shared about mathematics, local history, and the stories of Ngāti Wheke, strengthening cultural understanding and relational bonds. Through these practices, teachers explored the intersection of pāngarau with mātauranga Māori and culturally empowering pedagogy, demonstrating how whānau-based processes foster collective responsibility, relational trust, and meaningful connections inside and beyond the classroom towards beneficial outcomes for teachers and ultimately more equitable and empowering practices for students.

In our final Pāngarau Unleashed hui some of the themes that emerged were to elevate empathy, emancipation, listen to intuition, disruption, and for mathematics not to be used as a tool of oppression. In reference to the importance of connection, unity and collaboration that evolved in the whānau-based model of engagement, one of the participants explained "people show up, that's the magic which gives us hope".

While the collaborative nature of the project was a strength, there were challenges and tensions to negotiate. The bicultural makeup of the group, our incorporation of tikanga Māori into hui, and our exploration of mātauranga Māori and mathematics was challenging for participants with sole experience in traditional teaching approaches and schools with a dominant Pākehā culture. The group members—both teachers and researchers—also differed widely in the mathematical expertise and identity. Mātauranga Māori and mathematics were both potential barriers to creating a space where participants could share their strengths and challenges. Whanaungatanga was a key element in addressing these tensions—we found that sharing became more honest, lively, and constructive once participants had had the opportunity to form relationships over multiple hui and visited each other's classrooms.

We were also mindful of giving mana to the knowledge and experience of our Māori participants without assuming that they had all the answers to complex challenges of practice involving mātauranga Māori and Māori students. Kaiako Māori contributed richly to this kaupapa, but some voiced doubts about their own mathematical knowledge or mathematics teaching capabilities early in the project. While such tensions are never fully resolved, steps we took included inviting expert contributors on the intersection of mātauranga Māori and mathematics, and attempting to embed culturally empowering ways of working in our research methodology.

Conclusion

In this project, we worked alongside mathematics teachers from seven schools that had decided not to stream mathematics, to support teachers in those schools, and to learn about key factors to take into account when navigating the de-streaming transition in secondary mathematics. While there was no single blueprint, as they shared practices over the course of several years of co-design, the schools converged on practices that had common principles, despite stark contrasts between the schools' cultures and communities. In providing a small set of key principles we inevitably risk portraying de-streaming as simple when it is complex. A fuller and more complex account can be seen in our previous and emerging research outputs.

Key principles for effective de-streaming of secondary mathematics:

- Schools develop a shared understanding of the reasons for de-streaming and take time to share and discuss these reasons with staff, students, and the wider school community. As part of this process, engage with students' experiences of streaming through direct discussion or prior research and analyse school data on the ethnic profiles of different streams. Staff may consider and share with other colleagues their own experiences of streaming or those of their children to connect more personally with the issues associated with streaming.
- Effective school leadership, supporting a shared understanding of the reasons for de-streaming and resourcing teachers to learn how to teach non-streamed classes effectively.
- Adapt planning, teaching, and assessment so that they are appropriate for non-streamed classes. Develop a common year-level curriculum that is clear, that students can navigate autonomously, and that gives all students access to all maths. Make incremental adaptations to day-to-day teaching, such as increased use of low-floor, high-ceiling tasks and provision of instructional videos. Where feasible, increase the flexibility of formal assessment by assessing if and when students are ready.
- Remain connected within and between schools by meeting with peers at different points in the de-streaming transition.
- Establish and maintain strong relationships with students and their whānau based on ako and whanaungatanga that work toward student (and wider whānau) aspirations.

At a time when streaming in Aotearoa New Zealand is prevalent but declining (OECD, 2023) and the Kōkirihia movement is connecting a broad-based coalition to end streaming (Tokona Te Raki, 2023), the question of how to support effective transitions to non-streamed mathematics is especially pertinent. We hope that the community build through this project, the findings summarised here, and our existing and future publications will play a significant role in supporting effective transitions to non-streamed secondary mathematics.

Research team

Dr. Kay-Lee Jones serves as a Senior Lecturer in Teacher Education at the University of Canterbury and specialises in mātauranga Māori, culturally responsive practice, and language revitalisation. Kay-Lee's research focuses on the experiences of teachers and students in Māori immersion education within Aotearoa New Zealand. Her work aims to foster culturally empowering practices, educational equity, and leadership. As a mother of three children of Māori and Samoan ancestry and a former primary and secondary teacher, Kay-Lee has a vested interest in this kaupapa. In Aotearoa New Zealand, Māori and Pacific rangatahi are disproportionately represented in lower-streamed classrooms.

Dr. Kaitlin Riegel is currently a Postdoctoral researcher at the University of Auckland, with a research background in mathematics education and educational psychology. She is particularly interested in how different forms of assessment and educational practices shape students' mathematical beliefs, experiences, and outcomes. Her work draws on educational theory and empirical investigation to better understand factors that support effective mathematics teaching and learning, with the broader aim of improving accessibility and engagement in the subject.

Dr. David Pomeroy is a Senior Lecturer in the University of Canterbury Faculty of Education. He draws on sociology and gender studies to examine the relationship between who we are—particularly our social class, ethnicity, and gender—and the school subjects we enjoy and succeed in. As a former secondary mathematics teacher, he has a particular interest in educational inequalities in mathematics learning and in pedagogical approaches that enable more students to experience curiosity, joy, productive struggle, and success in mathematics.

Dr. Sara Tolbert is a Professor in the Faculty of Education at Monash University in Melbourne, Australia and has over 20 years of experience working in primary, secondary, and adult education in Australia, New Zealand, the United States, and Latin America. Her current research focuses on reimagining science education in the Anthropocene, leadership for social justice in mathematics and science education, solidarity in science and education, and science education in multilingual classrooms.

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