Risks and Opportunities of Online Platforms for Learning Mathematics

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New Zealand education policy is targeting the subject of mathematics in a series of rapid and extensive reform initiatives, including tutoring interventions and promoting online platforms for learning mathematics. Given this setting, this paper presents research into the mathematics instructional platforms *Matific* and *Education Perfect*. A multiple, embedded case study was conducted in three different classrooms that used these platforms, with a view to understand how students constructed mathematics learner identities in these contexts. Findings highlight various risks and opportunities for students using these platforms going beyond any affordances for mathematics learning.

Due in part to unsatisfactory results in recent TIMMS and PISA international tests (Education Counts, 2024; OECD, 2023), the New Zealand government has embarked on a period of rapid and extensive reform in mathematics education. The curriculum has been rewritten three times in the past three years, four different mathematics textbook programmes have been sourced from private, international providers and distributed to primary schools, and a mathematics intervention programme has been trialled in 2025 and expanded in 2026. This intervention programme was trialled with both in-person and online formats, using the privately operated platforms Matific and Education Perfect. Considering the known difficulties in resourcing extra mathematics teachers, it is likely that these online platforms will be relied on heavily as the intervention programme is rolled out across the country.

Initial trials showed the intervention programme to increase student progress, as widely announced by government media releases (Stanford, 2025). However, this progress was not without criticism, academics pointed out the lack of transparency in the methods used for assessment and argued that a 'year's progress' could not be claimed from testing only a small portion of the curriculum (Gerritsen, 2025). Furthermore, those students who received the online intervention achieved similarly to the control group, raising the question of whether the costs of the programme justify the benefits in the case of the online option.

However, there is more than just achievement at stake when introducing a new programme of mathematics. The decisions we make in our mathematics teaching have implications for students' mathematical learner identities (e.g., Darragh, 2021a). The experiences students have with the learning of mathematics impacts their development of positive relationships with mathematics, which in turn impact their future life choices (Black & Williams, 2013). Thus any nationwide promotion of a particular programme of mathematics, such as online platforms Education Perfect and Matific, should only be done with careful consideration of the wider implications.

In this paper we draw on case study research into the use of platforms Education Perfect and Matific. We interrogate the potential risks and opportunities regarding their use, with a focus on student learner identity.

Background

Online Mathematics Instructional Platforms (OMIPs) are subscription-based online platforms providing curricula material that students engage with on a computer or other digital device. They are more than a digital textbook as they may include interactive activities, video tutorials, and instant feedback on submitted responses. The platforms typically claim a

(2026). In N. Berger, M. Thompson, J. Ley & C. Wilsmore (Eds.), *Beyond boundaries: Strengthening futures in mathematics education. Proceedings of the 48th annual conference of the Mathematics Education Research Group of Australasia, Sydney* (pp. 98–105). MERGA.

comprehensive coverage of mathematics curricula (adapted to different countries worldwide), and some include reward incentives, such as games or items for purchase with points received for mathematics work. OMIPs also incorporate assessment and data analytics that assign to the student a level and then identify their next learning steps, a process that uses hidden 'black box' algorithms (Boninger et al., 2019) and they are increasingly drawing on artificial intelligence, including large language models (Education Perfect, 2024).

Some research in mathematics education has explored the phenomenon of OMIPS. Studies have looked at individual OMIPs, including Mathletics, Matific, Khan Academy, or Sumdog (Attard, 2016; Day, 2014; Jablonka, 2017; Nansen et al., 2012). Other research has examined digital technology use in the classroom, of which OMIPs are a part (Attard & Holmes, 2020; Muir, 2014; Nicholas & Fletcher, 2017). Notwithstanding one critique of surveillance and gamification in the platform Sumdog (Jablonka, 2017) much of this body of research appears to see digital use as either inevitable or largely beneficial (Young, 2017), reflecting research on digital technologies in mathematics education more generally (Borba, 2021). A critical examination of these platforms remains limited within the context of our field (Darragh, 2021b).

Outside of mathematics education, by contrast, there is some critique of such platforms and of educational technology (EdTech) in general. This body of work notes the 'hyper-individualism' of EdTech which 'magically' determines pacing, path and content for the students (McRae, 2013), transferring power away from the teacher and to the private providers of the platforms (Roberts-Mahoney et al., 2016). Questions are raised about the impact of 'Big data' that harvests information from the student users to be resold (Knox et al., 2020; McRae, 2013). The literature also argues that EdTech is reductionist, as learning platforms are constrained by what is easily programmable (Boninger et al., 2019; McRae, 2013).

From the above literature it is clear that the mathematics education field could benefit from a critical look at the implications for mathematics learners of using OMIPs, going beyond achievement data and considering learner identity. Given the context of a future for New Zealand that may include ministerial promoted use of platforms such as Education Perfect and Matific, the research question we aim to address in this paper is:

- What are the risks and opportunities for student learner identity when using platforms such as Education Perfect and Matific as part of the mathematics programme?

Conceptual Framework

We use the concept of mathematics learner identity to understand the data produced in this study. Mathematics learner identity may be defined as:

> A socially produced way of being, as enacted and recognized in relation to learning mathematics. It involves stories, discourses and actions, decisions, and affiliations that people use to construct who they are in relation to mathematics, but also in interaction with multiple other simultaneously lived identities. This incorporates how they are treated and seen by others, how the local practice is defined and what social discourses are drawn upon regarding mathematics and the self (Darragh & Radovic, 2020, p. 582).

Seeing identity as socially produced requires an understanding of the context in which an identity might be enacted. In the case of this study the online platform is the mathematics learning context, but it is also important to understand the context of the regular classroom to provide a comparison. In particular, we focus on how the "local practice" is defined in the context of OMIPs.

To operationalise mathematics learner identity in the context of OMIPs, we draw on Darragh's (2024) *Identity Sites* framework, that includes the *scripts*, the *stage*, and the *audience*. Specifically, we attend to the 'stage', which is the context for learning mathematics (e.g., a classroom, or an online platform) and ask the following three questions during our data analysis: What is mathematics in this context? What roles are available for the mathematics learner? And

how does the learner access that mathematics, and take up those roles? The first two questions interrogate the context, in this case the online context of Education Perfect and Matific, whilst the final question considers an individual's identity within that context.

Methodology

The use of OMIPs in New Zealand is relatively widespread (Darragh & Franke, 2021) and relates to overall trends in the increase of digital technologies in mathematics education (Suripah et al., 2025). The data for this study comes from a wider project, in which we have been exploring the phenomenon of OMIPs from a variety of perspectives, including teachers' use, senior students' reflections, website analyses, and case study research (Amos et al., 2024; Darragh, 2021b; Darragh & Franke, 2021). For this paper we draw on three case studies in classrooms using OMIPs. We used a multiple, embedded case study approach (Yin, 2003). Three classroom cases were conducted, and we also recruited individual student cases within each of the classroom cases, a total of 12. The classroom case studies were: First, a Year 10 mathematics class (students aged approximately 14 years) at an innovative Year 7 to 10 middle school that used Education Perfect in conjunction with other educational applications and Apple iPads. We call this case *EP Classroom*. Second, a Year 5 and 6 modern learning environment classroom of 90 students (aged 9-10 years) and three teachers in an urban primary school using Matific. We call this case the *ILE Matific Classroom*. Third, a Year 7 and 8 Kura (students aged 11-12) that gave all instruction in Te Reo Māori and used Matific. We call this case the *Te Reo Matific Classroom.* In each classroom case, the students used the OMIPs as just part of their mathematics programme; that is, there were other types of mathematics learning, such as group work with the teacher or worksheets. The schools in the first two cases were situated in immigration catchment areas and extremely diverse. The third case classroom included only students who identified as Māori.

Data Collection and Analysis

In each case, we collected a variety of data. We observed mathematics lessons over a period of six-ten weeks, approximately 15 lessons in each classroom, and took field notes. We held semi-structured interviews with the teachers from each classroom at the beginning and end of the observational periods. We interviewed students from each class (five students in the first two cases and two students from the third case, a total of 12 students) and we interviewed the parents of these volunteer students (11 interviews), and finally we asked the students to take us on a 'tour' of their OMIP account which we screen-recorded and captured the audio as they spoke. Interviews were transcribed and sent to the participants for member checking.

Analysis involved three key steps. First, we identified the mathematics that was made available on the platform and compared it to the mathematics made available in the other contexts for mathematics learning in each classroom. Second, we identified the roles for mathematics learner that were available on the platform and again compared to the roles available in the classroom more generally. Third, we considered the ways in which each individual student accessed the mathematics and took on various available roles. This analysis enabled identification of risks and opportunities for mathematics learning and learner identity.

The findings we present below are organised according to each aspect of the research question; presenting various opportunities and risks of the OMIPs, illustrated with aspects of the individual cases, then a brief discussion of the potential impact on identity.

Findings and Discussion

Our analysis of the mathematics made available on the platforms and the roles available for the learner to take up revealed three key opportunities and three key risks in the use of the platforms for mathematics programmes. The opportunities included alternative access to

mathematics learning; an opportunity to learn mathematics in another language, specifically te reo Māori; and enhancing parental involvement in mathematics learning. The risks included: the promotion of a superficial and competitive version of mathematics; a loss of local and cultural relevance; and issues of dataveillance. Below we elaborate on each of these.

Opportunities

Whilst teachers allocated work to students on the platform, the platforms also contained other resources for learning mathematics that the students could independently access. For example, on Matific there was a 'training zone' (to practice skills), 'arena' (to compete with other users), and an 'adventure island' (with tasks assigned by the platform's learner analytics), each offering different learning options. We noted occasions during observations across the case studies where some students accessed more mathematics learning than that which was assigned by the teacher.

> I like the way [Education Perfect] explains it if you get something wrong like it has a good explanation and it is a good way to work on things that you are confused on because there are different tasks that you can do on your own without a teacher assigning it to you. (Sky, EP Classroom)

Thus, having the online platform available sometimes facilitated mathematics learning opportunities that would otherwise not have happened. For one student, David Bowi (all names are pseudonyms chosen by the students), he worked with his mother at home on extra Matific tasks, that she supervised from the kitchen. Another student (Sofia, ILE Matific Classroom) felt uncomfortable speaking to her teacher due to social anxiety and was thus excluded from much classroom learning. However, the Matific platform allowed her to engage in mathematics as it did not require oral participation.

Another aspect appreciated by students was the instant feedback provided:

> "I think it takes a while to do each task [on EP] and especially if I don't understand it then it is quite difficult because it is not like I can ask my iPad the question. But I feel good after because every time you do a correct answer it makes this noise and it makes me feel more smart and it is very nice." (Claire, EP Classroom)

Altogether most students across all cases expressed a preference for mathematics learning with the teacher, however, there were some who found either the social context of learning interactions difficult to negotiate or the teacher difficult to access, and thus the online setting became an important mathematics learning resource for them.

In all three case study classrooms there were students for whom English was either not their first language or not their language of instruction. In the high immigration contexts of the first two case study schools, students often arrived in class with very little experience with English. Matific is available in many languages and can thus give mathematics learning access to students in their home language. In the ILE Matific Classroom case, some students had only been in New Zealand for a matter of days. The teacher found Matific extremely useful in being able to provide mathematics learning during the first months of settling into a new country and new language of instruction.

> I think with Matific that was a big drawcard … they had like 57 something languages that you could translate into. So, you could put it into their home language, and they would be able to […] obviously you want them to learn English language, but also you want them to be able to access maths at the level that they are confident at. (Teacher, ILE Matific Classroom)

At the time, there were children in the class using Matific in Russian, Chinese, and Japanese.

Unique to Matific is that the available languages on offer include te reo Māori. There is an acknowledged dearth of resources, particularly digital resources for learning, within te reo (Allen & Trinick, 2021). Being able to learn mathematics in te reo confers not only the

advantage of learning the subject in a preferred language but it also upholds the cultural identity of the learner at the same time (Webber & MacFarlane, 2018).

> [My past experiences with mathematics] haven't been that good. Because last year, I didn't like pāngarau [mathematics] at all, because I wasn't very good at it, and the whole class was good at it, except for me, that's why I didn't like it at all. But now that I've got to play like games, pāngarau games, it's helped me with my pāngarau experience, and I love pāngarau now. (Maia, Te Reo Matific Classroom).

However, whilst having a te reo Māori resource for mathematics (pāngarau) was useful, the classroom teacher had hesitations in that the language used on the platform was not 'everyday' reo, and the students required a fair amount of support to understand the mathematics vocabulary.

Finally, some parents expressed a liking for the online platforms due to them making the mathematics learning visible to them. For example, Sofia's mum commented that "Yes, every day, when I come home from work, she is already seated in her desk doing Matific. She says mum I have work to be done" (Mother of Sofia, ILE Matific Classroom). There is much research that explores the disconnect between home and school (Wadham et al., 2020). Having a platform that allowed for mathematics learning to enter the home invites the parent into the world of mathematics learning, as we have noted in previous research (Amos et al., 2024).

Risks

One risk of the OMIPS that we saw in our analysis was the promotion of a superficial and competitive version of mathematics. Because the platform design required instant feedback (and at the time of data collection did not incorporate large language model artificial intelligence) the questions were often in short answer or multiple-choice format. This generates a view of mathematics as being quickly or even randomly solvable. We observed instances of children clicking answers seemingly at random in order to gain access to the reward games when working on Matific. If students see mathematics as being about finding one right answer to short questions it may be difficult for them to cohere a sense of their creative self with the subject of mathematics.

> Yeah, but you got to use your elimination, so you are going to be like because there are a bunch of houses on a hill which you will see and you will be randomly picking like is your door pink and if he says no you will basically tap all the ones with the pink doors and it will basically go off. [...] just more I'm saying it doesn't really help us with our learning because we don't know how to keep on doing it, after three tries it would tell us. [...] You will get zero stars which … I don't think the teachers really check the stars. (Butter, ILE Matific classroom)

In this quote we see that Butter, a 9-year-old, is well aware that the random clicking of answers is not conducive to learning, however she is also aware that this is the way to achieve the task completion required by her teacher, who is unlikely to check the number of stars awarded.

A competitive notion of mathematics was promoted in Matific and Education Perfect. Both platforms awarded points to students as a reward for completion of work, arguably positioning mathematics as boring and in need of external motivators (see also Jablonka, 2017). These points could then be cashed in for various purchases - spent on one's avatar in the case of Matific or spent on stickers for friends in Education Perfect. Both thus position mathematics within a capitalist reward for work structure. Further, the points obtained were public. In every tour of the platform, we could see the students' ranking relevant to their classmates, and often students mentioned their ranking. In the case of Education Perfect we could also see a nationwide and global ranking.

Mannat	Here we have the scoreboard. Right now I'm 16th place in the whole school wide. […] The whole school yes, 1005 people.
Researcher:	And what happens if you click on 'class'?

Mannat Class, I should be … I'm 6th. So that's my whole maths class.

Researcher: And you can even see your ranking in the country and the world?

(Mannat, EP Class).

There was no way that students like Mannat could opt out of the competition, with the points always displayed on the screen, and the knowledge that her name and score is visible to others also. Furthermore, this competition was for the individual only, there was no possibility for engaging with mathematics as a group.

Whilst both platforms claimed to be relevant to the New Zealand mathematics curriculum, they were developed overseas and drew on item banks that were developed outside the country. This highlights the risks to a mathematics programme's local and cultural relevance if using the platforms. There is very limited opportunity to connect the mathematics learning developed on the platforms to the local communities in the school. Neither the multicultural and diverse contexts of two cases nor the indigenous context in the third case were reflected in the learning activities on the platforms. As noted in the second teacher interview "we've pulled back a little bit because I've gone back to the old school way" (Teacher, Te reo Matific Classroom). It may be difficult for students to align their cultural identity to that of mathematics learner when the mathematics does not reflect their cultural contexts, as supported in other local research (Hunter & Hunter, 2024).

One final risk that emerged from our analysis is likely to have increasing relevance in years to come. Each platform engaged in dataveillance to an extent the students were likely unaware.

> I think with online it kind of like saves your progress like if you are working in a maths programme you lose it you have lost it type of thing, but on this you have log ins and stuff and it remembers what you've done so far and it kind of backs things up. If you ever want to look back you can. (Sky, EP Class)

> So, when they revise everything and then they explain it to me like of course they explain to everyone whoever is doing the worksheet, but to me it is like they are explaining personally for me and so I understand it better. Yeah, it is basically like EP knows what I'm thinking so they explain it that way. (Mannat, EP Class)

These comments from the older students show an anthropomorphising of the EP platform. Yet giving it the human qualities of 'remembering' and 'personal explanations' generates an artificial separation from a machine that is capable of enormous data extraction and storage. Their parents too are likely unaware of the ways in which private corporations may mine the students' data for future use. Rather, parents spoke of digital technologies as inevitable, and unproblematic, for example, "It is just like having a pen and paper, it is a tool that they have to use so that is just how I see it, it's just a tool." (Claire's mother, EP Class).

Mathematics learner identity

The platforms presented a superficial version of mathematics that was, at times, reduced to short answers, with multi-choice questions that could be answered randomly. Yet the mathematics learning was available to the students anytime and anywhere, including in their own homes, and in many different languages. The roles available for the mathematics learner included the agentic and independent learner, who could access additional learning tasks for themselves, but it also positioned the learner as competitive and a compulsory player in the points and ranking systems of the platforms, and as a consumer, using the points to buy things in the world of the platform. These depictions of mathematics and the mathematics learner required the students to position themselves as learners of mathematics accordingly. Some students embraced the invitation to access additional mathematics learning opportunities and relished the ability to play mathematics games in their own language. Others looked at their teacher assigned tasks as simply another thing to complete and did so in the quickest way possible. Finally, there was no escape to being 'datafied,' all students were ranked, and all students provided data for these privately-owned platforms to use as they desired.

Conclusions

As the findings highlight, there are both opportunities and risks inherent in using OMIPs as part of a mathematics programme that go beyond achievement in mathematics. The opportunities include greater access to the learning of mathematics, for example in other languages, at home with parents, when the teacher is unavailable or the social context is challenging for the student. On the other hand, many of the risks reflect concerns shared in the literature outside of mathematics education. For example, the individualisation of learning (McRae, 2013; Roberts-Mahoney et al., 2016), reductionist mathematics (McRae, 2013), and dataveillance (Knox et al., 2020).

This study expands upon that literature by considering the potential impact of OMIPs for mathematics learner identity. Whilst there were mathematics learning opportunities that include access for diverse students (e.g., neurodiverse learners, non-English speaking learners), and for bringing school mathematics into the home, there are also considerable implications for mathematics learner identity. The students positioned themselves as learners of mathematics alongside their rankings and rewards in the points-based systems of the platforms. In some cases, this enabled them to see themselves as successful learners of mathematics, but at other times it positioned them as competitive capitalists and undermined the social context and value of human interaction (see also Roberts-Mahoney et al., 2016).

Given the context of reform in New Zealand, with the likelihood of an increase in the promotion of the platforms Matific and Education Perfect, the findings of this study will hopefully serve as a cautionary tale for the Ministry of Education. Whilst the learning opportunities may seem apparent, there is certainly a trade-off in the promotion of superficial, competitive and capitalist mathematics and a datafied mathematics learner.

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References

Allen, P., & Trinick, T. (2021). Agency–structure dynamics in an indigenous mathematics education community in times of an existential crisis in education. *Educational Studies in Mathematics*, *108*(1), 351-368

Amos, M. M., Darragh, L., & Trinick, T. (2024). A kaupapa Māori critique of digital resources for pāngarau. *Set: Research Information for Teachers, 3*, 2–9. https://doi.org/10.18296/set.1560

Attard, C. (2016). *Research evaluation of Matific mathematics learning resources: Project report*. https://doi.org/10.4225/35/57f2f391015a4

Attard, C., & Holmes, K. (2020). "It gives you that sense of hope": An exploration of technology use to mediate student engagement with mathematics. *Heliyon*, *6*(1). https://doi.org/10.1016/j.heliyon.2019.e02945

Black, L., & Williams, J. (2013). Contradiction and conflict between "leading identities": becoming an engineer versus becoming a "good muslim" woman. *Educational Studies in Mathematics*, *84*, 1–14. https://doi.org/10.1007/s10649-013-9481-7

Boninger, F., Molnar, A., & Saldaña, C. M. (2019). *Personalized learning and the digital privatization of curriculum and teaching*. National Education Policy Center.

Borba, M. (2021). The future of mathematics education since COVID-19: Humans-with-media or humans-with-non-living-things. *Educational Studies in Mathematics*, *online fir*. https://doi.org/https://doi.org/10.1007/s10649-021-10043-2

Darragh, L. (2024). New Insights from Identity Sites. In T. Evans, O. Marmur, J. Hunter, & G. Leach (Eds.). *Proceedings of the 47th Conference of the International Group for the Psychology of Mathematics Education*. PME.

Darragh, L. (2021a). Playing games for positive maths learner identities. *Set: Research Information for Teachers*, *1*, 36–42. https://doi.org/10.18296/set.0166

Darragh, L. (2021b). The promise of online mathematics instruction programs: Producing the mathematics learner and school mathematics. *Research in Mathematics Education*, *23*(3), 262–277. https://doi.org/: https://doi.org/10.1080/14794802.2021.1993977

Darragh, L., & Franke, N. (2021). Online mathematics programs and the figured world of primary school mathematics in the digital era. *Mathematics Education Research Journal*, *online fir*. https://doi.org/https://doi.org/10.1007/s13394-021-00384-9

Darragh, L., & Radovic, D. (2020). Mathematics learner identity. In *Encyclopedia of mathematics education* (pp. 582-585). Cham: Springer International Publishing.

Day, L. (2014). ICT the changing landscape. *Australian Primary Mathematics Classroom*, *19*(2), 23–27.

Education Counts (2024) *TIMMS 2023: Mathematics Year 5* https://www.educationcounts.govt.nz/publications/series/2571/timss-trends-in-international-mathematics-and-science-study-2023/timss-2023-mathematics-year-5

Education Perfect (2024, May 14) Australian-first AI Feedback tool enhances teaching and learning outcomes https://www.educationperfect.com/news/australian-first-ai-feedback-tool-enhances-teaching-and-learning-outcomes/

Gerritsen (2025, November 26) Maths teaching programme to be rolled out to 13,000 students nationwide. RNZ https://www.rnz.co.nz/news/national/580046/maths-teaching-programme-to-be-rolled-out-to-13-000-students-nationwide

Hunter, J., & Hunter, R. (2024). Weaving together the threads of Indigenous knowledge and mathematics. *Educational Studies in Mathematics*, *116*(3), 501-518. https://doi.org/10.1007/s10649-023-10256-7

Jablonka, E. (2017). Gamification, standards and surveillance in mathematics education: An illustrative example. In A. Chronaki (Ed.), *Mathematics education and life at times of crisis: Proceedings of the ninth international mathematics education and society conference*. Mathematics education and society.

Knox, J., Williamson, B., & Bayne, S. (2020). Machine behaviourism: Future visions of "learnification" and "datafication" across humans and digital technologies. *Learning, Media and Technology*, *45*(1), 31–45.

McRae, P. (2013). *Rebirth of the Teaching Machine through the seduction of data analytics: This time it's personal [Online resource]*. https://nepc.colorado.edu/blog/rebirth-teaching-machine-through-seduction-data-analytics-time-its-personal

Muir, T. (2014). Google, Mathletics and Khan Academy: students' self-initiated use of online mathematical resources. *Mathematics Education Research Journal*.

Nansen, B., Chakraborty, K., Gibbs, L., Vetere, F., & MacDougall, C. (2012). "You do the math": Mathletics and the play of online learning. *New Media & Society*, *14*(7), 1216–1235. https://doi.org/10.1177/1461444812442926

Nicholas, K., & Fletcher, J. (2017). What is happening in the use of ICT mathematics to support young adolescent learners? A New Zealand experience. *Educational Review*, *69*(4), 474–489. https://doi.org/10.1080/00131911.2016.1237476

OECD (2023) *Country Report for New Zealand* Education GPS https://gpseducation.oecd.org/CountryReports?primaryCountry=NZL

Roberts-Mahoney, H., Means, A. J., & Garrison, M. J. (2016). Netflixing human capital development: Personalized learning technology and the corporatization of K-12 education. *Journal of Educational Policy*, *31*(4), 405–420. https://doi.org/10.1080/02680939.2015.1132774

Stanford, E. (2025, November 25) *Focus on basics delivers groundbreaking maths results.* Beehive https://www.beehive.govt.nz/release/focus-basics-delivers-groundbreaking-maths-results

Suripah, Retnawati, H., Zetriuslita, Zafrullah, & Hidayat, R. (2025). No Title. *Research Trends in Scopus Database on Technological Innovation in the Process of Mathematics Learning: A Bibliometric Analysis*, *13*(1), 97–116. https://doi.org/10.23947/2334-8496-2025-13-1-97-116

Wadham, B., Darragh, L., & Ell, F. (2020). Mathematics home-school partnerships in diverse contexts. *Mathematics Education Research Journal*. https://doi.org/10.1007/s13394-020-00357-4

Webber M., & MacFarlane, A. (2018). The Transformative Role of Iwi Knowledge and Genealogy in Māori Student Success In E. A. McKinley & L. Tuhiwai Smith (Eds.) *Handbook of Indigenous Education*, Springer https://link.springer.com/referencework/10.1007/978-981-10-1839-8

Yin, R. K. (2003). *Case study research*. Sage Publications.

Young, J. (2017). Technology-enhanced mathematics instruction: A second-order meta-analysis of 30 years of research. *Educational Research Review*, *22*, 19–33.