Wondering, Wandering, and Desiring in Mathematics

Rosalie Miller

Flinders University

rosalie.miller@flinders.edu.au

Traditional mathematics teaching approaches result in inequitable outcomes for students outside the dominant community. One reason for this is a school system that prioritises overly narrow ways of knowing, being and doing. One example of this is a teaching approach that prioritises very specific learning goals and highly structured lessons that focus on performance and product to be judged as a success or failure by a teacher. This paper explores an alternative teaching approach that opens possibilities for intellectual movement and exploration, recognising additional ways of being, knowing and doing to be valued equally to more traditional ways of knowing, being and doing.

Introduction

Much research has been done into mathematics education as it pertains to equity. Under this theme, we might consider the inequity of learning outcomes for students, for example, de Freitas (2008) points to school mathematics as a form of cultural capital that is distributed along lines of class, race, and gender among other categories. Thus, mathematics education is "implicated in the social stratification of communities" (p. 43). In thinking about why this is the case, one important aspect to consider is the type of knowledge that is valued in the classroom. Aslan Tutak, Bondy, and Adams (2011) explain that mathematics within schooling and society is commonly viewed as apolitical, standardised, and universal with little space for interpretation. This traditional view of mathematics puts the focus on the students learning a fixed set of facts and ignores the background and identity of the students (Louie, Adiredja, & Jessup, 2021). However, Yolcu (2019) suggests that equitable mathematics learning outcomes must consider both the knowledge that is privileged and the learning approaches that are made available to students. Looking at the Australian context, Spillman and Wilson (2024) suggest that the contemporary schooling system generally "works to prioritise a far too-narrow set of ways of knowing, being and doing, and requires serious rebalancing" (p. 78). Pedagogical practices shape possibilities of what kinds of learning and knowing are able to happen within a classroom. Lesson planning gives indications of what teacher's value as mathematics and mathematics learning. It is fairly standard practice for teachers to ensure each lesson includes a clear learning intention and success criteria that can be used to measure if students have performed successfully (Wiliam, 2017). In this paper, I reflect on whether the expectation that every lesson has a clear purpose and goal may be a narrowing influence on student possibilities for knowing, being and doing. In particular, it narrows possibilities of knowing down to just those available in the standardised curriculum, and it narrows possibilities of being and doing down to a performance and the creation of a product to be assessed based on the standardised curriculum.

This reflective paper came from the early stages of analysis of a PhD study. The PhD study is a self-study that explores the interactions between primary pre-service teachers and a mathematics teacher educator. During the early stages of analysis of this study, I found myself reflecting on the tendency for both school and university structures to focus on performance and product rather than seeing learning as an emergent process that students go through, and rather than seeing that process as having value separate from any ensuing performance or product. This paper was shaped by a combination of ideas from academic sources and data from the study. It tentatively proposes an alternative teaching approach for mathematics based on a literacy teaching approach called literacy desiring. This approach attempts to offer

opportunities for students to be able to be, do and know in ways that are process driven rather than outcomes orientated. The PhD study is investigating the research question:

- How might primary pre-service teachers and a mathematics teacher educator deconstruct their positionalities and consider possibilities for equitable mathematics teaching practice in a neoliberal education system?

This paper then uses data and reflections from this research focus to consider the question:

- How might a move away from a focus on achievement outcomes open up possibilities for additional ways of knowing, being and doing in mathematics for primary school students?

The educational system in Australia is built around an emphasis on standardised achievement outcomes, similar to the situation in North America, as described by Francis (2019). Learning intentions are ubiquitous, if not standard, for the majority of teacher planning, and are a tangible illustration of this emphasis. Hattie (2009, 2023) discusses the role of learning intentions and structured lessons as a contributor to learning. He is a key advocate for learning intentions in the Australian landscape, and his perspective is influential, particularly with government agencies. His work continues to influence education decisions. Hattie explains that the purpose of learning intentions and success criteria is to "make students understand what the teacher is using as the criteria for judging their work, and, of course, to ensure that the teacher is clear about the criteria that will determine if the learning intentions have been successfully achieved" (Hattie, 2009, p. 169). The picture built in relation to learning intentions is one of rigidity. Each lesson must be purposeful and structured around a specific goal, and there is no space and time "to pursue the marvelous (*sic*) leads introduced by the students themselves" (Regenspan, 2002, p. 583). Francis (2019) suggests that the over-emphasis on standardised achievement outcomes reduces the potential for joy and play in mathematics and is detrimental to the majority of students, including causing trauma for some. Do lessons that are overly structured and focused on specific achievement outcomes fail to leave space for students to develop creativity and bring their ideas in mathematics, thus hindering multiple ways of being, knowing and doing?

Methodology

The methodology for this study is an inquiry informed by self-study of teacher educator practice (self-study). This methodology uses a range of qualitative methods and involves a practitioner-researcher inquiring into themselves and their practice in order to bring about positive transformation (Feldman, 2016). Those who undertake self-study stress that its focus is on the personal and professional self and is usually undertaken by teacher educators (Bullough & Pinnegar, 2001; Feldman, 2016). Self-study provides a dual purpose within the study, looking reflectively at the teacher educator's practice while at the same time looking at the context in which the teacher educator practices – teacher education more generally. In this study, I focused on my own practice as a mathematics teacher educator – looking at both my work with the participants, and also my work more generally as a primary mathematics teacher educator, as relevant. Thus, the more general focus on teacher education looks at the participants' learning through the study, and also at the context which impacts their learning and my teaching through the study – this includes the relevant teacher education degree, and then broader aspects such as Initial Teacher Education (ITE) accreditation and curriculum, the Australian Curriculum and the political and social context that shapes these.

Context and Participants

The study involves two pre-service teacher (PST) participants, Olivia and Annie, who are both PSTs attending an Australian university in an ITE program of four years duration. They are undertaking a Bachelor of Education (Primary R-6), and both were in the second year of

their study when they commenced their participation with the study. Both PSTs involved in the study are female. I am the third participant in the study. I work as a mathematics teacher educator at the same university. The participants were identified using purposeful homogeneous sampling. Homogeneous sampling involves the researcher purposefully sampling individuals or sites based on possession of certain characteristics (Creswell, 2012, p 208). The recruitment was conducted within a primary mathematics education course, ensuring the participants had some common experiences.

The positionality of all three of the participants is important to address. As white women, our educational experience as learners was one that privileged and mirrored our beliefs, values and cultural norms. The ways of knowing, being and doing valued in schools have aligned with our cultural norms in many ways, as we formed part of the dominant group of society. Thus, it is important to acknowledge the privilege and whiteness that informs all three participants' perspectives as we engaged together and as I reflected individually. Pough and Willey (2022) highlight that whiteness refers "to the attitudes and behaviors that serve to maintain systemic racism and white dominance" (p. 135). They note that it is standard for white teacher educators and PSTs to bring unexamined biases to their engagement in the educational context. Additionally, both Annie and I had experienced achievement and success with mathematics learning, while that was not the case for Olivia. Regardless, all three of us had our identities and perception of our values shaped by the education system's focus on meeting achievement outcomes, and its narrow view of success and performance. Olivia experienced feeling "dumb", and like maths was not something she could do during her time at school. Annie had a more positive experience when learning maths, but she still acknowledges that her experience nonetheless created pressure to be successful: "I got it. Therefore, that was my value, you know... And if I didn't maintain that, then I wasn't intelligent." And my own experience aligned with what Annie described.

Methods

- Eight 1-hour meetings across 10-month period
- Different short articles, chosen by researcher, read together within each meeting
- After reading, participants engaged in reflective dialogue together
- Researcher undertook reflective journalling as relevant

In this study, I have been exploring the process of deconstruction and of imagining possibilities for social justice in mathematics teaching practice undertaken by a group containing two primary pre-service teachers and me as a mathematics teacher educator. I was interested in the experiences of all participants as we sought to interrogate and deconstruct our personal positionality and consider possibilities regarding mathematics teaching practice for social justice. The three participants met across eight one-hour occasions. Encounters would begin with reading of a different short article each time, which then gave impetus to shared reflective dialogue. The meetings were minimally structured and deliberately intended to allow flexibility to follow the reflections of the two PST participants. My role was to find relevant articles and to be a participant in the discussion, to suggest themes, and bring in alternative perspectives. These meetings were separate from any formal learning undertaken by the PST participants. I also worked to interrogate my own practice as a teacher educator as I undertook my role in this research. My individual reflections took the form of journal entries. The foci for the journal entries included reflection on my encounters with the participants in the study, and additionally, any classroom interactions and practice choices that caused thinking about my teaching practice, especially related to mathematics as cultural. This means that the focus for my journal entries encompassed a wider context than the meetings with the PST participants. The data used for this paper take the form of transcripts of the group meetings, and excerpts from my own journal entries.

The data analysis frameworks used for this study are thematic analysis and critical discourse analysis (CDA). Thematic analysis is used to explore themes that I notice within the data. Thematic analysis (TA) helps with identifying and then analysing patterns (Clarke & Braun, 2017). Braun and Clarke (2006) write that thematic analysis can have commonalities with discourse analysis, considering "the sociocultural contexts, and structural conditions, that enable the individual accounts that are provided" (p. 85). Thus, it can be suitable to use in conjunction with CDA. Within CDA, data must be considered in the context that shaped its meaning. MacDonald-Vemic and Portelli (2020) state that, "[c]ritical discourse analysis in educational research involves highlighting the coexistence and intertextuality of the multiple discourses that circulate in the educational sphere" (p. 298). As this is a reflective paper, the data included has informed my reflective writing. However, data analysis is incomplete. Thematic analysis has commenced and has informed this paper. CDA is incomplete and has not informed this paper.

Discussion and Findings

In reading through the transcripts from the meetings with the participants, I found myself noticing and reflecting on a binary perception of learning – someone has succeeded or failed, someone has achieved or not achieved. Connections can be made from this back to Hattie's discussion of learning intentions and success criteria. He sees learning intentions as important to allow the teacher to judge the students' work, and to know when they are successful. This suggests that his view of learning is as destination or as a performance. In talking about success criteria, he even says, "Too often students may know the learning intention, but not how the teacher is going to judge their performance" (Hattie, 2023, p. 313). This theme also came up within my reflective journal entries (RJE). The first time I wrote about it in a journal entry, I called it learning as process vs destination, and I connected it to the current focus in learning on assessing students against set learning intentions or outcomes. In the journal entry, I note that having fixed learning outcomes "make[s] everything learning and goal oriented" (RJE, 12/7/22). In a later journal entry, I state, "learning is a verb - to learn. But I wonder how much we treat it as a noun, a product, rather than recognising it as a process, and more importantly a relational process" (RJE, 23/7/22).

I see connections between this idea of learning as focused on process and becoming, that moves away from fully planned and controlled learning activities, and a discussion that took place during one of the meetings with the participants. During a discussion about teaching mathematics in a way that connects to other curriculum areas, one of the participants, Olivia, was concerned that the necessary mathematics may not come through strongly when teaching in a cross curricular way. She says, "I suppose to me it looks like it could potentially become a little bit wishy washy about what the [mathematics] concept is." In thinking about breaking down boundaries between learning areas, she wondered, "how far do you go down each area, you know, before you get lost?"

This comment struck me as being strongly shaped by an "assumption that exploration as part of schooling/education might result in getting lost, because it starts with the framing of needing to meet certain goals" (RJE, 2/12/24); that is goals as defined by the curriculum. A teacher may be less concerned about getting "lost" if there was not the same pressure to perform a certain way as a teacher, and to "get your students to learn", as Olivia expressed. She explained, "you've got certain goals to meet and, you know, assess the standards and it's trying to in your head making sure that you're ticking… ticking those boxes and making sure it's achieved." Does an expectation that teachers create learning intentions and structured lessons result in teachers who feel they must rigidly adhere to lesson plans? In a neoliberal context, the drive to ensure efficiency and meet certain outcomes are key factors (Connell, 2013). Learning intentions that focus solely on performance along with a lesson structure intended to optimise

time on task are both shaped by a neoliberal discourse about education. Neoliberal discourse in education comes from a Western way of knowing, being, and doing. It is a significant shaping force in our current education system. How might we rise to the challenge from Spillman and Wilson (2024) and bring in some additional ways of learning, knowing, being and doing to work alongside what is currently prioritised.

Thinking about lostness made me recall a quote from The Lord of the Rings: "Not all those who wander are lost" (Tolkien, 2001, p. 167). This led to the question, why is wandering as part of education seen as getting lost? Why is it a bad thing to go off the trail? Wandering is a way of moving – it equates to there not being a clear purpose or direction in the movement. However, it is also used to describe thoughts and conversation that leave the original trail. Dominguez et al. (2020) talk about movement, both physical and intellectual, as being connected to creativity. They state, "Learning bodies do not move aimlessly; they mobilize material and human resources purposefully across time and space as part of mobilizing mathematical concepts" (p. 80). What is wandering if not a form of movement. Surely following wonderings can be intellectual movement. Dominguez et al. (2020) also suggest, "repetitive and regimented movement recreates a space to which children come back each day to do the same. A body that moves the same way again and again is a constricted body often producing what is expected not what [it] is capable of creating" (p. 81). The same is surely true for the mind. Rigid goals and structure within learning may need to be augmented with opportunities for both mental and physical movement and in ways that are less regimented and repetitive to bring in opportunities for creative potential.

I wonder if opportunities to wonder/wander, and even perhaps get lost, might open space for students to move past producing what is expected, towards surprising and creative possibilities. Through the study I am undertaking, I have come to see mental wandering as an important part of my own learning. I've found myself going down rabbit holes and undertaking side quests as my curiosity is piqued. And those side quests so often have shaped and enriched my thinking. Conversely, I experience negative pressure from existing in a system that feels like it is constantly requiring performance and a finished product. I state: "School feels like it's always about making a product; there's never the space to just be. It's about performing all the time… rather than the space to learn and learning to be a process… and also the space just be yourself in that" (RJE, 1/7/23). The wondering/wandering process for me acted as a compost to fertilise (Rozitis, Debono, Brady-Clark, Jarrett, & Walker, 2025) my thinking about both research possibilities and pedagogical possibilities. Fertilise can be used with dual meanings here. The process of wondering/wandering was a fertilisation where fertilise means both to implant new ideas and also to enrich and nourish existing ideas. All this leads me to speculate about the value of a process of wondering/wandering that acts as a fertiliser and allows students to focus on the process and on becoming (mathematicians) within a mathematics class. I suggest that this may allow a move in mathematics from "an outcome-focused curriculum to one based on flourishing, which I feel would be more kind and loving" (Francis, 2019, p. 80).

Kuby and Rucker (2020) discuss an approach to teaching and learning literacy that they call literacy desiring. They describe it as a "both/and" approach, which both provides "spaces for traditional learning objectives" (p. 32) and also opens space for student exploration and interaction with materials and artefacts in ways that challenge traditional ideas of what constitutes writing and literacy, and can constitute valid knowing, being and doing. They are particularly concerned with those students who are Othered "based on abilities, race, language proficiencies and so forth" (p. 17) and the way certain students are seen as requiring interventions because they are judged as being at a deficit when compared to school ways of knowing and being, which tend to be based on a White, middle-class, abled bodied standard. They argue that "if we continue to conceptualize literacies in the ways we always have, we will

continue to produce and tame children as not fully human and lively – perhaps inhuman – in their relationships with the world coming to be" (pp. 30-31).

In this approach, students are told to go be writers. But that does not have to mean alphabetic writing. Literacy is seen as moving beyond the alphabetic to include interactions between people and also interactions between humans and materials or artefacts. Kuby, Rucker, and Kirchhofer (2015) seek to open up possibilities for learning experiences that are much more interactional, and focused on "processes and becoming, not necessarily on a future product" (p. 398). They see the materials as playing an active role – it is through interactions with materials and artefacts that learning emerges, and the materials themselves are agents that shape learning possibilities. From their observations, students "who were hesitant to write (traditionally speaking) at the beginning of the year flourished when desiring with materials and with conventional writing as the year progressed" (p. 415). This approach celebrates other ways of knowing, as knowing is seen as an embodied, relational and interactive process – considering interactions between humans within the classroom, and also between humans and artefacts and materials. It opens possibilities for student and teacher being and doing that is not focused on achievement, performance, and success or failure.

Might this be a beneficial approach to explore within the mathematics space? What might it look like? Kuby et al. (2015) provide an example when discussing literacy desiring that shows clear potential connections to mathematics learning. Within the literacy class, students were told to go and be writers, and that was flexible enough to allow students to explore, design and build physical artefacts, working with a range of physical materials. This process of working with materials would sometimes turn into finished products, but that was never an expectation placed on students. One group of students when engaging in the process of literacy desiring built 3D bird houses. Another time, reading a book about animal bones inspired the creation of a life-size giraffe out of paper. This happened because the students learnt from the book that humans and giraffes have the same number of bones in their neck. There are some clear connections from these tasks both to measurement during the creation of the artefact, and also the use of mathematics including, but not limited to, measurement once the artefact has been completed. This approach, valuing the mathematics learning afforded by artefacts, has similarities to Percival (2001) description of the use of ancient artefacts to drive mathematics inquiry. However, I argue that the removal of the pressure for a product or a specific curriculum sanctioned outcome, may be one alternative to allow students kinder and more joyful interactions with mathematics, as advocated by Francis (2019). To facilitate connections between the engagement with materials and mathematics learning, teachers will need to develop their own confidence to see mathematics in the everyday. Annie describes this as "learning to use the muscle to find maths in other things". This must be part of our work as teacher educators – to support PSTs to develop their muscle of noticing mathematics.

It is important to recognise that there would be tensions and concerns for many teachers at the thought of bringing a pedagogy such as this into their classrooms. In discussing a creative interpretation of curriculum within a New Zealand school, Tweed (2021) acknowledges that any teacher choosing to open up possibilities in this way opens themselves up to criticism from school leadership, other teachers, and parents. It may be that others "cannot recognise that mathematics is happening" (p. 61). These tensions would also arise due to the requirement to assess students against a formal curriculum. Olivia expressed this tension clearly when discussing a pedagogical approach that is more student-centred: "I don't know whether the time is given to teachers and students in especially those curriculum things, because it's like, do this, do this, do this, do this, and now you've marked off a piece of work." In another meeting she says, "You've gotta be able to show at the end of the year that you've done this, this, this and this. So so I… quickly quick, I haven't done… It's not very collaborative. Look, it's like teacher at the front…" In one of the meetings, I also recognise these tensions related to bringing more

openness into a teaching-learning situation. I say, "I think as a teacher, if you're like and now we're doing maths, and maths, looks like this and I can control it, it feels safer". Here, I am drawing on my own experiences engaging with a less controlled and structured way of teaching-learning. Engaging in a less structured approach may cause doubts when compared with a traditional conception of the role of teacher as instructor and explainer (Lo, 2021). Teachers are likely to feel tension between the pressure for efficiency and a pedagogical approach that allows students to wander and wonder. And moreover, that tension is likely to be magnified when contrasting a wondering/wandering approach with something more structured and controlled.

Conclusion

I can't help but wonder what mathematical ideas might emerge if students were given the chance to wonder/wander with materials, including creating their own artefacts or working with mathematical artefacts. What other ways of knowing and doing mathematics might students come to recognise as valid? What other ways of being might be able to be validated and celebrated? Can we as teachers engage in a both/and approach. This would mean that at times there is a focus on specific learning goals, meeting curriculum standards, and end products that will enable students to meet formal educational goals (Kokka, 2015), while other times students are given the chance to bring their whole selves, take time with their learning, and encounter other ways of being, knowing and doing. Could this provide opportunities for students to be fully human, not tamed and produced in constricted ways within mathematics learning? Might this allow their wondering/wandering to act as compost and fertiliser for creativity and intellectual movement that can both enrich the more formal educational goals, and also bring in unexpected creations and ideas? Future research into a mathematics desiring teaching approach is warranted. This could initially involve a study conducted in partnership between a researcher and a primary classroom teacher to explore the practical impact of this approach when working with a diverse range of students. This would provide evidence of whether it opens opportunities for additional ways of being, knowing and doing within mathematics.

Acknowledgements

References

Aslan Tutak, F., Bondy, E., & Adams, T. L. (2011). Critical pedagogy for critical mathematics education. *International journal of mathematical education in science and technology, 42*(1), 65-74. doi:10.1080/0020739X.2010.510221

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa

Bullough, R. V., & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study research. *Educational researcher, 30*(3), 13-21. doi:10.3102/0013189X030003013

Clarke, V., & Braun, V. (2017). Thematic analysis. *The journal of positive psychology, 12*(3), 297-298. doi:10.1080/17439760.2016.1262613

Connell, R. (2013). The neoliberal cascade and education: An essay on the market agenda and its consequences. *Critical studies in education, 54*(2), 99-112. doi:10.1080/17508487.2013.776990

de Freitas, E. (2008). Troubling teacher identity: Preparing mathematics teachers to teach for diversity. *Teaching education (Columbia, S.C.), 19*(1), 43-55. doi:10.1080/10476210701860024

Dominguez, H., Crespo, S., del Valle, T., Adams, M., Coupe, M., Gonzalez-Garcia, G., & Ormazabal, Y. (2020). Learning to transform, transforming to learn: Children's creative thinking with fractions. *Journal of humanistic mathematics, 10*(2), 76-101. doi:10.5642/jhummath.202002.06

Feldman, A. (2016). Self-study in preservice science teacher education. In G. A. Buck & V. L. Akerson (Eds.), *Enhancing professional knowledge of pre-service science teacher education by self-study research turning a critical eye on our practice* (1st ed. 2016. ed., pp. 23-39): Cham : Springer International Publishing : Imprint: Springer.

Francis, K. (2019). Play and mathematics. *Journal of the Canadian Association for Curriculum Studies, 17*(1), 75-89. doi:10.25071/1916-4467.40437

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement.* London: Routledge.

Hattie, J. (2023). *Visible learning, the sequel: A synthesis of over 2,100 meta-analyses relating to achievement.* London, England: Routledge.

Kokka, K. (2015). Addressing dilemmas of social justice mathematics through collaboration of students, educators, and researchers. *Educational Considerations, 43*(1). doi:10.4148/0146-9282.1031

Kuby, C. R., & Rucker, T. G. (2020). (Re)Thinking children as fully (in) human and literacies as otherwise through (re)etymologizing intervene and inequality. *Journal of Early Childhood Literacy, 20*(1), 13-43. doi:10.1177/1468798420904774

Kuby, C. R., Rucker, T. G., & Kirchhofer, J. M. (2015). 'Go Be a Writer': Intra-activity with materials, time and space in literacy learning. *Journal of Early Childhood Literacy, 15*(3), 394-419. doi:10.1177/1468798414566702

Lo, W. Y. (2021). Pre-Service teachers' prior learning experiences of mathematics and the influences on their beliefs about mathematics teaching. *International Journal of Instruction, 14*(1), 795-812. doi:10.29333/IJI.2021.14148A

Louie, N., Adiredja, A. P., & Jessup, N. (2021). Teacher noticing from a sociopolitical perspective: The FAIR framework for anti-deficit noticing. *ZDM – Mathematics Education, 53*(1), 95-107. doi:10.1007/s11858-021-01229-2

MacDonald-Vemic, A., & Portelli, J. (2020). Performance power: The impact of neoliberalism on social justice educators' ways of speaking about their educational practice. *Critical studies in education, 61*(3), 296-312. doi:10.1080/17508487.2018.1428642

Percival, I. (2001). An artefactual approach to ancient arithmetic. *For the learning of mathematics, 21*(3), 16-21.

Pough, N. O., & Willey, C. (2022). A closer look at equitable outcomes: A self-study in urban mathematics teacher education. In A. D. Martin (Ed.), *Self-Studies in Urban Teacher Education : Preparing U. S. Teachers to Advance Equity and Social Justice* (Vol. Self-Study of Teaching and Teacher Education Practices Ser, pp. 133-148). Singapore: Springer.

Regenspan, B. (2002). Toward parallel practices for social justice-focussed teacher education and the elementary school classroom: Learning lessons from Dewey's critique of the division of labor. *Teaching and teacher Education, 18*(5), 577-591. doi:10.1016/S0742-051X(02)00017-3

Rozitis, S., Debono, D., Brady-Clark, A., Jarrett, E., & Walker, A. (2025). Towards post-human storytelling: Pushing boundaries in decentring the human. *TEXT, 29*(Special 74). doi:10.52086/001c.129418

Spillman, D., & Wilson, B. (2024). Decolonising through ReCountrying in teacher education. *Curriculum Perspectives, 44*(1), 77-81. doi:10.1007/s41297-024-00242-1

Tolkien, J. R. R. (2001). *The Lord of the Rings* (film tie-in ed.). London: HarperCollins *Publishers*.

Tweed, B. (2021). Indigenous struggle with mathematics education in the New Zealand context: From neo-liberal ontology to indigenous, urban ontologies? *Journal of Urban Mathematics Education, 14*(2), 42. doi:10.21423/jume-v14i2a386

Wiliam, D. (2017). *Embedded formative assessment: Strategies for classroom assessment that drives student engagement and learning* (2 ed.). Bloomington, Indiana: Solution Tree Press.

Yolcu, A. (2019). Research on equitable mathematics teaching practices: Insights into its divergences and convergences. *Review of Education (Oxford), 7*(3), 701-730. doi:10.1002/rev3.3163