



How Mathematics as Storytelling Challenge Eurocentric Mathematics Education

Online First

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Abstract

This paper argues that critical studies in education must meaningfully engage with Indigenous scholarship, Global South theory (Connell, 2007; Santos, 2014) and epistemologies beyond the Eurocentric canon. Drawing on Nakata's (2007) Cultural Interface and the Goompi Model (Matthews, 2020a), we propose a framework for integrating these diverse knowledge systems into educational discourse. The study adopts methodologies that centre Indigenous scholarship and Global South perspectives, privileging codesigns, community leadership and contextualised research practices that challenge dominant Eurocentric paradigms. We contend that such integration advances epistemic justice and enriches critical education by offering alternative pedagogical orientations, exemplified by Mathematics as Storytelling (MAST). Both Global South theory and the Goompi Model critique Eurocentric dominance in knowledge production and learning outcomes, advocating for non-Western theories of knowledge to better serve Indigenous and marginalised students. The Goompi Model, rooted in Indigenous Australian knowledge systems, operationalises mathematics as storytelling, using stories from Country to situate concepts in cultural meaning. This ethos aligns with Global South emphases on situated knowledge and culturally authentic pedagogy, demonstrating how weaving students' cultural backgrounds into curricula fosters relevance, engagement, and equity. The paper concludes with implications for research, policy and teacher education to support plural, decolonising practices in mathematics.

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How Mathematics as Storytelling Challenge Eurocentric Mathematics Education

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Abstract

This paper argues that critical studies in education must meaningfully engage with Indigenous scholarship, Global South theory (Connell, 2007; Santos, 2014) and epistemologies beyond the Eurocentric canon. Drawing on Nakata's (2007) Cultural Interface and the Goompi Model (Matthews, 2020a), we propose a framework for integrating these diverse knowledge systems into educational discourse. The study adopts methodologies that centre Indigenous scholarship and Global South perspectives, privileging codesigns, community leadership and contextualised research practices that challenge dominant Eurocentric paradigms. We contend that such integration advances epistemic justice and enriches critical education by offering alternative pedagogical orientations, exemplified by Mathematics as Storytelling (MAST). Both Global South theory and the Goompi Model critique Eurocentric dominance in knowledge production and learning outcomes, advocating for non-Western theories of knowledge to better serve Indigenous and marginalised students. The Goompi Model, rooted in Indigenous Australian knowledge systems, operationalises mathematics as storytelling, using stories from Country to situate concepts in cultural meaning. This ethos aligns with Global South emphases on situated knowledge and culturally authentic pedagogy, demonstrating how weaving students' cultural backgrounds into curricula fosters relevance, engagement, and equity. The paper concludes with implications for research, policy and teacher education to support plural, decolonising practices in mathematics.

Keywords: *culturally responsive pedagogy, Global South theory, Goompi Model, indigenous education, mathematics as storytelling*

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1. Introduction

This paper explores the transformative concepts of mathematics by storytelling exemplified by the Goompi Model (Matthews et al., 2005). The paper is based on a non-Indigenous teacher-researcher lived experience, and how she adapted the Goompi Model by embedding mathematics within local cultural narratives and collaborating with Aboriginal Elders to ensure protocol, then mapped curriculum outcomes to stories and analysed language demands in mathematics lessons for English as Additional Language (EAL) students in her school (Sze, 2025). Lessons used storytelling, manipulatives, images, bilingual glossaries, explicit vocabulary teaching and sentence frames, with translanguaging encouraged. Tasks designed provided meaningful, low risk pathways for EAL students to develop mathematical understanding and confidence. It connects mathematics concepts to Country and the students' cultural backgrounds. Students are encouraged to use symbols, recognise patterns, and work collaboratively to solve real-life problems (Ní Ríordáin et al., 2019).

The Global South theories and the Goompi Model both challenge Eurocentric dominance in knowledge production and learning outcomes (Connell, 2007; Matthews, 2020a; Santos, 2014). They both champion for non-Western epistemologies for Indigenous and marginalised students. The Goompi Model, rooted in Indigenous Australian knowledge systems, exemplified mathematics as

storytelling. While Global South theories advocate for education and research (Lunney Borden, 2018). The Goompi Model's ethos of using stories from Country complemented Global South theories' situated knowledge and the importance of weaving the students' culture backgrounds to make learning authentic (O'Halloran, 2015).

This paper argues the urgent necessity of critical education studies to engage authentically with Indigenous scholarship, Global South theory, and epistemologies that lie beyond the Eurocentric canon. Drawing on Nakata's (2007) Cultural Interface theory and the Goompi Model (Queensland Curriculum & Assessment Authority (QCAA), 2026), we advance a conceptual framework for the meaningful integration of diverse knowledge systems into critical educational discourse. Our approach places Indigenous epistemologies and Global South perspectives at the methodological core, actively contesting prevailing Eurocentric assumptions that shape research questions, pedagogy, and policy.

Methodologically, the study foregrounds Indigenous led scholarship and the intellectual traditions of the Global South, privileging co design, reciprocity, and community centred methods. We contend that such integration delivers epistemic justice and simultaneously enriches critical education studies by offering new pedagogical orientations exemplified here through Mathematics as Storytelling (Banes et al., 2020; Casey et al., 2021). By reframing

mathematics teaching through narrative and place-based knowledges, the framework illustrates how plural epistemologies can reshape both theory and practice in transformative ways.

The knowledge of this work explores how Indigenous scholarship and Global South theories can complement and challenge Western perspectives, leading to a more holistic of education. We posit the position that by employing the culturally responsive pedagogy of teaching mathematics, we will have student engagement, fostering a learning classroom where the students can be seen, heard and be accepted for who they are, regardless of their ethnicity and gender (D'Ambrosio, 2016; Gay, 2018).

The Goompi Model and Global South theories promote cognitive justice. Both theories advocate for promoting diverse epistemological. The Goompi Model and Global South theories believe in preserving cultural artefacts and bringing this cultural heritage as ways to understand and interact with the world both in and outside of the classroom (Rosa & Orey, 2013; 2016). The article concludes by calling for a shift in education studies, calling researchers and teachers to teach mathematics with a culturally responsive lens. By integrating language and storytelling to bridge the abstract of mathematics to Indigenous knowledge (Schiro, 2021).

2. Literature review

The Goompi Model is a culturally responsive framework that integrates mathematical learning with Indigenous storytelling and knowledge systems. It was developed by Professor Chris Matthews (a Noonuccal man from Quandamooka) to make mathematics part of students' living world and identity. Instead of teaching mathematics in isolation, the Goompi Model encourages teachers and students to ground mathematical concepts in cultural narratives (Barry, 2020). That is by using stories, symbols, and experiences from Indigenous culture to introduce and explore mathematics ideas. The approach often summarised as "mathematics as storytelling" allows learners to create their own representations of mathematical ideas and see mathematics as connected to their lives (QCAA, 2026).

The Goompi Model envisions mathematics learning as a cycle connecting the real world and cultural context to formal mathematical knowledge. It consists of four key stages (Aboriginal & Torres Strait Islander Mathematics Alliance: Reality, Abstraction, Mathematics and Critical Reflection (ATSIMA), 2026). This cycle mirrors how mathematical knowledge as developed over time through human inquiry. The Model explicitly highlights Creativity, Symbols, and Cultural Bias a crucial factor, recognising that mathematics is a human creation embedded in culture (Matthews, 2020a). Using the Goompi Model, Reality begins with First Nations knowledge and real-world contexts. The teacher shares stories, practices, or perspectives from Indigenous culture as the starting point for learning (Matthews, 2020a; QCAA, 2026). This grounds mathematics in reality, the lived environment, and cultural experiences of students. By tapping into the cultural wealth of the community, this stage situates mathematics as part of the students' world rather than an abstract foreign object.

Next, Abstraction begins with the teacher helps to abstract the mathematical concepts from that real context. In this stage, students and teachers identify patterns, relationships, or quantities embedded in the story or cultural activity. They begin to represent these ideas using various forms such as drawings, symbols, language, or physical models to bridge the concrete story to mathematical thinking. In this phase, it sometimes calls the 'Third Cultural Space,' where it is an intermediate zone where learners

can view mathematics from a diverse cultural perspective. This creative abstraction phase lets students express ideas in their own way before linking to conventional mathematics notation (Matthews, 2020b; Mathematics Hub, 2026).

In the Mathematics phase, the teacher would teach formal mathematics knowledge and curriculum content. The teacher connects the students' abstracted ideas to standard mathematical concepts or skills as defined in the curriculum. In this phase, the teacher uses their content knowledge to highlight the correspondences of the pattern in a story to an algebraic rule as an example. This involves going outdoors or 'on Country' for learning by emphasising that mathematics exists in the environment and community, not in textbooks. Students make connections of formal mathematics because they have a personal, meaningful understanding of it from the prior steps (Matthews, 2020b).

In the final phase, the students and teachers critically discuss how mathematical model or solution makes sense in terms of the original story or reality. This may involve testing a theory, reflecting on the interconnection between Country to the mathematics concepts the students just learned. In practice, students move from culturally meaningful stories toward standard mathematical notation, by first developing their own representation and symbols. Through this process, learners grasp the meaning behind mathematical symbols and operations in an intuitive way before encountering the abstract formalism of Western mathematics language (Matthews, 2020b).

Culturally responsive teaching through the Goompi Model connects mathematical ideas to Country and students' cultural backgrounds. This is done by making concepts meaningful, relevant and motivating the students. This is different from the Western-centric mathematics teaching of using abstract and formula. Using narrative, symbols and place-based problems supports conceptual reasoning, pattern recognition and representation variety. Students collaborate and by relating to real life scenarios encourage discussion, justification and shared strategies to deepen understanding and building empathy across cultures. EAL students particularly benefit from multimodal support that would overcome language challenges to develop academic vocabulary. They would further be supported by referring to their own culture for background knowledge to further make connections to mathematics concepts (Ni Ríordáin et al., 2019).

3. Theoretical framework

The knowledge of this work explores how Indigenous scholarship and Global South theories can complement and challenge Western perspectives, leading to a more holistic of education (Mutanga & Marovah, 2024). We propose the position that by employing the culturally responsive pedagogy of teaching mathematics, we will have student engagement, fostering a learning classroom where the students can be seen, heard and be accepted for who they are, regardless of their ethnicity and gender (D'Ambrosio, 2016; Gay, 2018).

Boaventura de Sousa Santos foregrounds what he calls 'Epistemologies of the South' (2014), an ideology that challenges Eurocentric hierarchies of knowledges by recognising the legitimacy of knowledges born out of colonised and marginalised experiences. Rosa and Orey (2013; 2016)' scholarship in ethnomathematics highlights how mathematical practices are culturally embedded, arising from everyday problem solving. By documenting and validating the mathematical knowledge present in different cultural traditions, Rosa challenges the universality and alleged neutrality

of mainstream mathematics education. His work supports curricula that situate mathematical learning in students' cultural worlds that respect Indigenous and local mathematical logics as legitimate pedagogical resources (Santos, 2014).

Global South theory is a dynamic and evolving field of critical thought that centres the experiences, histories and knowledge of regions and commonly grouped as Africa, Asia, Latin America, and the Middle East (Slovic et al., 2015). It offers a corrective to dominant narratives by foregrounding perspectives that have been marginalised within mainstream academic discussion, and by integrating the intellectual and material legacies of empire, extraction, and unequal development. A central aim of Global South theory is to challenge the Western-centric framework. It problematises the assumption that European and North American theories and methodologies are universally applicable, calling instead for plural epistemologies that reflect diverse cultural logics and intellectual traditions. This critique extends to the metrics, categories and research practices that often shape scholarly inquiry (Smith & Tickner, 2020).

Rooted in post-colonial scholarship, Global South approach scrutinises how colonial histories continue to shape knowledge production, cultural forms, and socio-economic structures (Omodan, 2025). The theory examines continuities of power in the present moment, including neo colonial relations mediated through globalisation, aid, and other development policies, and it interrogates whose interests such arrangements serve (Martinez Vargas, 2022). Global South theory promotes ways of knowing that may not align with Western academic modes. It draws on values of local, Indigenous, and vernacular knowledge, emphasises placed based practices, and insists that context matters in both explanation and praxis (Moodie, 2019). Intersectional analyses are central, attending to how race, class, gender, Indigeneity, and other axes of difference intersect within historical and geopolitical formations (Randell-Moon, 2024).

Many Global South scholars such as Boaventura de Sousa Santos (2014) and Linda Tuhiwai Smith (2012) offer robust critiques of dominant development paradigms, exposing the socio-economic harms brought by externally imposed models and advocating for pathways that reflect local priorities and sovereignties. Decolonisation of knowledge is both an analytic and normative commitment within Global South theory (Mormina & Istratii, 2021). That is, to unsettle Eurocentric assumptions, to legitimise marginalised epistemologies, and to reconfigure institutional practices of research and pedagogy. In the context of critical education studies, engaging with Global South theory entails incorporating non-Western educational philosophies and practices, examining colonial legacies in schooling, and validating Indigenous knowledge systems within curricula and research (Arian, 2025). By being conscious to include a respect for First Nation knowledge, education will be more inclusive and be cognisant of its role in broader struggles for epistemic and political transformation (Reid, 2024).

The Global South theories and the Goompi model share several important connections and complementary aspects. Global South theories and the Goompi model both challenge Eurocentric dominance in knowledge production and education (Santos, 2014; Smith, 2012; Matthews, 2020). They seek to validate and centre non-Western epistemologies, particularly those from historically marginalised communities. The Goompi model embodies Indigenous knowledges and, exemplifies the localised, culturally specific approach that Global South theories advocate for in education and research.

Both models emphasise the importance of context-specific knowledge and reject the notion of universal culture free learning (Rosa & Orey, 2013; 2016; Rudolph & Brown, 2017). The Goompi model's integration of storytelling and connection to Country aligns with Global South theories' focus on situated knowledge and the importance of local narratives. They share a commitment to decolonising education by challenging the hegemony of Western academic traditions and incorporating diverse ways of knowing (Sinclair, 2021).

Culturally responsive pedagogy within mathematics education challenges the assumption that mathematics is a universal experience and recognises that mathematics understanding is always co-constructed through culture, language, relationships, and lived experiences (Gay, 2018; Hogarth, 2026). Within the Goompi Model of teaching and learning sees the students themselves as the agents of knowledge whose identities and experiences matter in mathematics, rather than as pedagogical afterthoughts (Boyd, 2023).

The Goompi Model is aligned with culturally responsive pedagogy, creating a learning context where Indigenous knowledges are not treated as supplementary content, but as legitimate and sophisticated mathematical systems. Storytelling is used as both pedagogy and methodology by which students can engage with mathematics using narrative, observation, pattern, kinship, and place. Such approaches challenge Eurocentric constructions of mathematics as abstract, individualistic and decontextualised, and instead centre collective learning, reciprocity, and the context of mathematics (Boyd, 2023).

Importantly, culturally responsive mathematics education helps to foster student belonging and engagement by validating diverse cultural ways of knowing and doing mathematics. In this way, the Goompi Model contributes to the decolonisation of mathematics education by disrupting dominant epistemologies and establishing more socially just mathematics learning environments.

4. Methodology

In this paper, we have used autoethnography as a research methodology. Autoethnography is a research methodology that focuses on the researcher's own voice and personal experiences (Sze & Southcott, 2019). In this method, the first author, Jennifer Sze, has expressed her thoughts as a non-Indigenous teacher-researcher teaching in a Secondary school in Melbourne, Australia where the demographic is diverse. Jennifer has used this method to tell her lived experience as a mathematics teacher teaching Mathematics as Storytelling to her English Language Centre (ELC) mathematics class at her secondary school in 2023. The personal aspect of this paper examines what it means for the first author to be a decolonial, anti-racist teacher within a Western centric education that privileges worldviews that uphold systems of oppression (Bishop, 1990; Gerrard et al., 2022).

The second author, Melissa Serrurier has given her expertise as an Aboriginal educator, curriculum specialist, author, Deputy Program Director, and PhD candidate to ensure the Global South theory and the Goompi Model demonstrate that there is a way to challenge the Euro centric ways in education. The co-authorship of this article meant Jennifer as a non-Indigenous teacher-researcher consulted Melissa for her Indigenous expertise (Sriprakash et al., 2022). The authors discussed intellectual labour and negotiated authorship criteria. It was agreed that as the article is written from Jennifer's non-Indigenous teacher-researcher's lived classroom experience prior to joining the university as an academic. Both au-

thors collaborated to discuss transparent roles and joint decisions about dissemination.

Both researchers kept reflexive journals, document choices and power dynamics and conduct regular meetings to use member checking, adjust methods as the authors discussed their reflexive practice throughout the period of writing the article. Clear positionality statements make identities, relationships and biases visible and are updated as roles evolve. These practices created trust, protect cultural knowledge, and produce research that is ethical, culturally safe and respectful. They enable capacity building, respectful knowledge exchange and provide mutual benefits for both researchers to understand the research from their respective backgrounds (Bolton et al., 2023).

Narrative approaches are particularly meaningful in Indigenous contexts where the art of storytelling has historically been, and continues to be, a primary means through which Indigenous communities teach, learn, and share knowledge. Storytelling is not simply a mode of communication, a way of knowing relationships, identity, place, and knowledge systems (Kovach, 2021). The study is framed through narratives, as cultural and contextualised expressions which reveal how participants make sense of mathematics, culture, and education. Narrative inquiry privileges the voices of the participants and respects the relational and represented knowledges of Indigenous pedagogies. Narrative analysis complements the thematic approach by examining how stories are structured, communicated and situated within broader social and cultural contexts (Riessmen, 2008). This involves analysing how participants construct meaning through storytelling, including the use of metaphors, temporal sequencing, emotional expressions and connections to Country, family, or community. Narrative analysis allows the research to move beyond thematic categorisation to consider the significance of storytelling itself as an Indigenous pedagogical and epistemological practice.

The research process is also informed by decolonising methodologies, which critique normative Western understandings of knowledge and its use in educational research (Smith, 2012). Decolonising research seeks to legitimise Indigenous knowledge systems while disrupting colonial relations embedded in knowledge production. Through the Goompi Model, this study holds storytelling, connection to Country, relational accountability, and contextual learning at its centre. The Goompi Model functions as a pedagogy and as a methodological orientation in the study. In other words, the Goompi Model provides a central position for Indigenous perspectives and rejects tokenistic inclusion and deficit discourses.

5. Discussion

In this section, we are merging the proposition that critical studies in education must incorporate with Indigenous scholarship and Global South theory (Connell, 2007; McGregor, 2012; Santos, 2014) to teach students in Australia, regardless of their backgrounds. We drew on Nakata's (2007) Cultural Interface and the Goompi Model (Matthews, 2020a), as a framework to teach mathematics as an example. Drawing on Indigenous knowledges alongside critical and Global South scholarship (Connell, 2007; McGregor, 2012; Santos 2014) reframes schooling from Eurocentric, discipline instruction to plural, place-based learning. Indigenous knowledges are relational, holistic and rooted in Country. When educators weave all these knowledges into mathematics, they bring a holistic education to their students through ecological literacies, and from storytelling, moral literacies and in the arts and wellbeing.

This plurality cultivates critical thinking, epistemic humility and students' capacity to evaluate whose knowledge counts.

Merging with Global South theory and Indigenous scholarship support all learners by increasing relevance and engagement. By fostering intercultural understanding and collaboration, for students from all backgrounds, but particularly for Indigenous students, this will allow them to promote a deeper appreciation of diversity. Co-designing with Indigenous communities, and story centred pedagogies, providing professional learning for teachers promote confidence in incorporate Indigenous knowledges in lesson plans. Such integration moves education towards decolonises, socially just practice that prepares students to engage with complex local and global challenges from diverse traditions (Morris, 2023).

5.1. The use of culturally relevant narratives to contextualise mathematical principles

There are approximately 1.3 to 2% of registered Aboriginal and Torres Strait Islander teachers in Australia (Australian Institute for Teaching and School Leadership, 2024). It is difficult to expect a teacher base of 2% to be responsible for teaching First Nations knowledges, perspectives, and languages mandated by the curriculum (Assessment Authority n.d.). Some teachers believe that it is not their job to teach these perspectives due to them not belonging to Indigenous culture (Hare et al., 2025). For other teachers, it is the lack of confidence, understanding, or authority to teach these perspectives due to them not possessing a cultural awareness and knowledge in the topic (Berry et al., 2019; Shay et al., 2024). The common sentiment often shared: "I am not Indigenous, so it's not appropriate for me to teach Indigenous perspectives.." This sentiment is shared by many Australian teachers and pre-service teachers. While this position is not coming from malicious intent, it comes from factors such as fear, lack of confidence for fear of offence for getting it wrong (Hogarth, 2026).

Such resistance, however, can impede progress and prevent Indigenous education from being adequately understood. It is paramount to challenge this belief, as it is flawed. Macdonald et al (2024), espouse Indigenous knowledges are essential components of Australian education, offering insight into culture, history across a range of subjects (Kovach, 2021). If educators fail to address this sentiment, this will lead to further disconnection of students to Country (Colman-Dimon, 2000). More importantly, all educators are mandated to generate high impact teaching strategies to achieve excellence in teaching and learning (Department of Education and Training, 2020).

The spectrum from openness to resistance highlights that dismantling Eurocentric assumptions requires more than curricular addition. It demands identity work and structural supports (Zembylas, 2025). The Goompi model offers a clear contrast to the Western centric approaches by foregrounding community centred knowledges and reciprocal responsibility. To address this issue, policy makers should reconfigure curriculum design around culturally grounded models and incentivise co-design with First Nations partners to institutionalise change (Lowe et al., 2021).

As a primary and secondary teacher prior to joining The University of Melbourne (UoM), Jennifer has seen first-hand the impact when students are disengaged in mathematics at the junior level, irrespective of whether they have learning difficulties or not. The disengagement may lead to low self-esteem, mathematics anxiety, and lack of confidence (Martinot, et al., 2020). Engagement in mathematics can lead to students considering Science, Technology, Engineering, Mathematics and Medicine (STEMM) related careers post-school (DET, 2024; Matindike &

Ramdhany, 2025). However, this can only be achieved if students are engaged and interested in mathematics in the early years of secondary schooling.

The data include examples of Jennifer's lived experience to teach her ELC class the Goompi Model as an example. Bayside Secondary College (pseudonym) has an ELC where students learn English for three to six months before they transfer to mainstream English. In this class, the students range from Year 7 to Year 10 in age group with varying levels of English. In this ELC class, mathematics was also taught as part of the curriculum. However, it is the language of mathematics that is being taught due to the differences in age group in this class. As the students were from different cultures, Jennifer incorporated mathematical stories and problems that reflect the cultural diversity of the student population. She used folktales from various cultures that involve mathematical concepts such as pattern recognition, spatial reasoning, or problem-solving to teach the language of mathematics of a particular topic. Researchers such as (Matthews, 2020; Albool, 2020; Ni Riordain et al., 2019) demonstrated the importance of using storytelling in mathematics education, from theoretical frameworks to practical applications across various educational levels and contexts. Another practice Jennifer used was to incorporate cultural artifacts, art, or traditional practices as a springboard for mathematical exploration (Harrison & Skrebneva, 2020). One example when the students were learning the language of Measurement, Jennifer used the Chinese puzzle tangram to teach the students the name of the different shapes (Gao, 2021). In addition, she used Number Talk (Boaler & Dweck, 2016) at the start of each lesson to encourage the students to bring in photographs they either have taken themselves or photographs they have taken from the Internet to discuss the various shapes. The students were encouraged to discuss how shapes related to all aspects of our lives, and thus mathematics is everywhere in our daily lives (Banes et al., 2020).

Professor Matthews (2020a) gave an example of an activity which similar to what Jennifer has used in her ECL class, which is to use the students' family tree diagram and to extend the diagram to include great grandparents and great grandchildren showing the 'malk' moiety (Mathews, 2020a) of each group. By referencing the 'malk' (Skin Names) and moiety, a Latin word for 'two halves' (Matthews, 2020b). The students can demonstrate that 'malk' and moiety also are in a cycle of four over the generations. Linking the students' ancestral and cultural backgrounds to mathematics, teachers can ask students what would the implications of this? When teachers show they value the students' cultural stories and backgrounds, it can lead to stronger and more trusting relationships (Aguirre et al., 2019; Lunney Borden, 2018).

Encouraging students to write their own culturally relevant stories is a culturally responsive pedagogy to teaching mathematics. Furthermore, it is a multifaceted approach that not only enhances academic skills but also promotes personal growth, cultural understanding, and a more inclusive education environment (Rosa & Orey, 2016).

5.1.1. The role of language in promoting critical thinking and to eliminate fear and discomfort

Fear of getting it wrong and anxiety about causing harm are pervasive. Marnee and Wickes (2017) note that, although many argue for a better understanding of Indigenous 'cultural ways' to improve educational outcomes, the "absence of critique and discussion about how constructs of race are so deeply entrenched in our experiences" is a sign of limited progress for Indigenous

Australians (p. 112). This observation reframes the issue that it is not simply a lack of cultural knowledge, but a deeper failure to interrogate how racism and institutional shape schooling. As a result, Indigenous perspectives are frequently treated as optional or supplementary rather than central to understanding how education systems operate and whose knowledge is seemed important. Eurocentric education privileges neutrality or technical competence leaves educators unprepared for relational engagement. The culturally grounded protocols embedded in models like Goompi can reduce uncertainty by proving community-endorsed principles for respectful practice, while also legitimising the discomfort of unlearning.

Jennifer's teaching ethos is respecting student voice. To demonstrate this, she encouraged students to create their own culturally relevant stories that incorporate mathematical principles (Gay, 2018). The majority of her students celebrate Lunar New Year; she asked the students to write a story problem based on a family tradition or community event that involves mathematical concepts. For example, one student wrote about the cost his family has to save a year in advance to come back to his grandparents' home to celebrate Lunar New Year. Another student wrote about their Chinese Horoscope and did research on the class's Horoscope, based on the findings, they asked the class to write about our own Chinese Horoscope. By involving students to create their own relevant stories that reflect their cultural backgrounds, it validates their experiences and identities within our school. Furthermore, this affirmation boosts their self-esteem and foster a sense of belonging in the classroom (D'Ambrosio, 2016; Zaslavsky, 2003).

By encouraging the students to create culturally relevant stories, Jennifer has empowered the students to analyse and reflect on their own cultural experiences and perspectives (Rigney, 2022). This process promotes critical thinking about cultural norms, values, and practices. Another advantage to this pedagogy is to help the students to improve their literacy skills. Writing personal narratives helps students develop their writing skills in a context that is meaningful to them. It can lead to more authentic and expressive writing, as students draw from their own experiences (Nicol et al., 2013).

As discussed above, the methods Jennifer has demonstrated in her ELC class provided a glimpse for an understanding of the importance of language and storytelling in mathematics education. They emphasise how linguistic elements and narrative techniques can bridge the gap between abstract mathematical concepts and real-world applications, making mathematics more accessible and engaging for a diver range of learners (O'Halloran, 2015).

It is important to note that throughout her teaching of the ELC class, Jennifer ensured that the narratives used are authentic and respectful representations of diverse cultures. She collaborated with students, families, and community members to gather culturally relevant content. Jennifer organised the school's International Students' Feast Day where the students spent the day cooking their country's famous dishes and sharing them with the school community, she used these narratives for deeper mathematical discussion and explorations (Vavrus, 2008).

The above lived-experience story demonstrated teachers' prior schooling and professional identities perpetuate Eurocentric frames (Riley et al., 2026). The Goompi approach challenges these frames by valuing multiple ways of knowing, using storytelling, and Country as curriculum. Embedding critical history and reflective practice alongside Goompi practices helps reveal how prior learning shapes pedagogy (Mathematics Hub, 2023). Eurocentric education privileges neutrality or technical competence leaves

educators unprepared for relational engagement. The culturally grounded protocols embedded in models like Goompi can reduce uncertainty by proving community-endorsed principles for respectful practice, while also legitimising the discomfort of unlearning.

Both models emphasise the importance of context-specific knowledge and reject the notion of universal culture free learning. The Goompi model's integration of storytelling and connection to Country aligns with Global South theories' focus on situated knowledge and the importance of local narratives. They share a commitment to decolonising education by challenging the hegemony of Western academic traditions and incorporating diverse ways of knowing (Yunkaporta, 2009; 2019).

6. Limitations

Incorporating mathematics as storytelling and interdisciplinary thinking into the Australian curriculum faces several substantial limitations that help explain current resistance (Hogarth, 2026). Firstly, the dominant curriculum and assessment systems are historically Eurocentric, privileging abstract, decontextualised mathematics forms and a narrow notion of rigour (Bishop, 2021). This orientation sustains disciplinary silos. Meaning, mathematics is taught as a discreet body of procedures and proofs rather than as a narrative practice linked to history, culture, or other fields. Teachers, curriculum developers, and policymakers who were trained within this tradition can be reluctant to adopt approaches perceived as diluting mathematical content or diverging from established benchmarks such as National Assessment Program – Literacy and Numeracy (NAPLAN) and the Australian Tertiary Admission Rank (ATAR).

Secondly, storytelling and Indigenous or holistic perspectives treat knowledge as relational, contextual, and culturally embedded (Casey et al., 2021; Lunney Borden, 2018). While pedagogically rich, these approaches clash with systemic constraints such as tightly prescribed syllabuses, heavy assessment schedules, limited timetabling flexibility in the secondary context, and scarce resources for cross curricular planning (Australian Curriculum, Assessment and Reporting Authority (ACARA), 2026). Schools are under pressure to prioritise measurable outcomes, making it difficult to allocate the time and expertise needed for authentic interdisciplinary projects.

Thirdly, shifting to storytelling and relational pedagogies requires educators, students and communities to 'sit with discomfort' (Burgess et al., 2022). That is, confronting unfamiliar epistemologies, ambiguous classroom interactions, and contested histories (Burgess et al., 2023). Many educators lack preparation for facilitating difficult conversations or managing the uncertainty that comes with emergent, inquiry-based learning. Administrators may view discomfort as risk to achievement data or community harmony, and favour predictable, testable instruction.

Lastly, effective change demands sustained unlearning of entrenched habits such as assessments, teacher centred instruction, and deficit views of non-Western knowledges. Unlearning is cognitively and institutionally difficult as it requires ongoing professional development, mentorship, leadership support, and policy change. Without support from their schools, teachers revert to familiar practices. There is also a risk of tokenistic inclusion rather than deep pedagogical transformation (Brunette-Debassige & Wakeham, 2020).

To demonstrate how teachers can employ hybrid assessment strategies to balance culturally responsive storytelling with existing institutional reporting requirements. For example, In Year 8

mathematics, the Australian Curriculum stated the following for teaching Measurement (ACAA, 2026): "Recognise and use rates to solve problems involving the comparison of 2 related quantities of different units of measure." (AC9M8M05). To teach this concept using the Goompi Model, the teacher might want to investigate the application of rates in First Nation Australians' land management practices, including the rate of fire spread under different environmental conditions such as fuel types, wind speed, temperature and relative humidity (ATSIMA, 2026).

7. Conclusion

The Goompi Model and Global South theories promote cognitive justice. Both theories advocate for promoting diverse epistemological. The Goompi Model and Global South theories believe in preserving cultural artefacts and bringing this cultural heritage as ways to understand and interact with the world both in and outside of the classroom (Rosa, & Orey, 2016). The article concludes by calling for a shift in education studies, calling researchers and teachers to teach mathematics with a culturally responsive lens. By integrating language and storytelling to bridge the abstract of mathematics to Indigenous knowledge (Casey et al., 2021; Schiro, 2021).

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