

Supporting Pāsifika Students in Mathematics Learning

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In this paper, we report on data gathered through Talanoa on how Pāsifika students can be supported to learn mathematics. The perspectives of five teachers were analysed, highlighting three themes. Firstly, the importance for Pāsifika students to feel a sense of belonging at school. Secondly, how the core cultural values of Pāsifika students can be drawn on to develop effective social and sociomathematical norms. Finally, the significance of presenting learning and mathematical activity in authentic contextual frames to support engagement and participation in learning. These findings offer potential for implementing pedagogical approaches that are meaningful, relevant, and can support the mathematics learning of many students currently marginalised in New Zealand schools.

Pāsifika is an overarching term used to describe a diverse group of people who originate, or identify in terms of ancestry or heritage, from the Pacific Islands of Tonga, Samoa, Cook Islands, Niue, Tokelau, Tuvalu, and Fiji. Each group is unique in terms of how they identify with specific ways of knowing, being, and viewing the world. However, there is a set of common values which Pāsifika peoples share, and some of these are family, respect, spirituality, service, humility, relationships, leadership, love, and reciprocity. All Pāsifika students bring these rich cultural values to school. When teachers understand and recognize the important role these values play in mathematics teaching and learning, they open up opportunities for Pāsifika students to connect important mathematical concepts to their cultural and everyday experiences (Bills et al., 2015). Supporting Pāsifika students to link their cultural values with their education offers potential for greater access and success in learning (Hill et al., 2019; Hunter et al., 2018). Drawing on core cultural Pāsifika values can also support teachers to co-construct important social and participatory norms with students who are often marginalised in mathematics classrooms in New Zealand. To draw on these core values, teachers need to understand what these values are and how they may be used to support mathematics learning.

In this paper, we report on findings from a small inquiry exploring how teachers can support the mathematics learning of diverse (in this case, Pāsifika) students. Specifically, we explored the following research questions:

What do teachers consider important to know about the students they teach?

How can teachers use what they know about their students to enhance mathematics teaching and learning?

Literature Review

Even though it is acknowledged that Pāsifika students enter school with rich cultural values, language, and experiences, there is often a detachment of the school system with the background these students bring to school, which in turn, can affect their academic achievement (Bills et al., 2015; Hill et al., 2019; Hunter et al., 2016).

Several New Zealand studies (Anthony et al., 2015, 2019; Bills & Hunter, 2015; Hunter et al., 2020) have drawn attention to the importance of establishing positive relationship with Pāsifika students to support their engagement in mathematics learning. In interviews, many Pāsifika students have stated that good teachers take time to get to know them as holistic learners, have high expectations, allow them to take risks and value students working collaboratively as a family to solve mathematics problems (Bills & Hunter, 2015; Hill et al.,

2019; Hunter, 2014). When these kinds of positive relationships are established, an environment that embraces students' cultural values as resources for learning can be established (Hunter et al., 2018). To create these communities of learning it is essential to develop positive social norms. Social norms help set expectations and guidance for effective student collaboration. In addition, establishing social norms can guide students to work together in respectful and mutually accepted ways.

Establishing social norms can be static and rigid, or inclusive and vibrant. Initially, classroom norms associated with expectations regarding how to work as an individual within a group need to be established. This action supports student engagement with peers as they work together on mathematical activity. Importantly, social norms should be co-constructed with students and aligned with realistic cultural contexts such as working together as a whānau (family) or helping (supporting) each other in the group (Hunter & Miller, 2022). Teachers who use family/whānau as a metaphor for ways of working together allow Pāsifika students to draw on the concept of family to support their mathematics learning. For Pāsifika learners, the concept of family is a vital factor affecting their engagement in learning (Hill et al., 2019). Moreover, the value of respect for family members can be drawn on to support effective student collaboration. Cultural respect is understood as an accepted means of working collectively. When Pāsifika students learn mathematics through this cultural lens, they understand how to ask questions for clarification and to challenge their peers' mathematical claims or content in respectful ways (Hunter et al., 2018). Asking questions supports diverse learners to take ownership of their mathematics learning and become knowers and doers of mathematics. Establishing and maintaining effective social norms drawn from core cultural values are significant to Pāsifika students' learning because these are mutually understood and expected ways of interacting with others. Furthermore, Pāsifika students have been seen to engage more deeply with mathematics learning when teachers regard their cultural values as strengths and use them to establish effective participation and interaction patterns (Bills et al., 2015; Hunter et al., 2016; Hunter et al., 2018). While core cultural values can be drawn on to establish positive and effective norms, these can also be used to support the design of culturally relevant mathematics activity (tasks) that Pāsifika students can relate to.

Meaningful contextually relevant mathematical tasks can support diverse students' learning of mathematics in several ways. Firstly, when mathematical activity or tasks are contextually or culturally relevant, Pāsifika students can begin to connect mathematics they encounter at school with their cultural and everyday experiences (Hunter & Miller, 2022). These kinds of tasks also provide access for students to engage in robust discussion with their peers, as the familiarity and relevance of context provide an entry to the mathematics inherent in the task (Hill et al., 2019). When Pāsifika students can see their lived realities within mathematical activity, they are given opportunities to explore their mathematical understanding through multiple pathways which allow equitable access for all. In such ways, these students are recognized and acknowledged as intellectually capable knowers and doers of mathematics (Lotan, 2003). Contextually relevant mathematics tasks also provide students with multiple entry and exit points to mathematical concepts, as well as numerous opportunities to explore and show intellectual competence (Hunter et al., 2018). In such ways, Pāsifika students are given access to showing their mathematical smartness in many creative ways. In turn, they can openly accept and appreciate their peers' contribution and reasoning

When Pāsifika students' core cultural values are drawn on to support their mathematics learning, they develop a sense of belonging and can engage meaningfully in mathematical discourse, thus experiencing more equitable outcomes and success.

Research Methods

This study was grounded in a sociocultural perspective and drew on a qualitative

interpretive framework. This small inquiry was set in three urban primary schools in New Zealand. These schools are situated in very low socio-economic areas, where most of the students are identified as Pāsifika. Five teachers participated in this study. Four of the teachers were experienced, and one teacher was in their first year of teaching. Three of the teachers were of Pāsifika heritage, while two were of European descent.

Data were collected through Talanoa. Talanoa is a talking tool that is used by Pāsifika people to address any concerns within family, extended family, church, or within any collective setting (Havea et al., 2021). Talanoa is a tool utilised for discussing important issues through a process of starting a conversation that can lead to innovative ideas, or a discussion of political views (Vaiolēti, 2006). Talanoa can be done collectively where everyone in any gathering, a family, or church can share their feelings and thoughts on certain matters. In essence, Talanoa is viewed as a time for Pāsifika people to share their concerns or ideas for their communities' growth, or to discuss a problem affecting the wellbeing of everyone (Havea et al., 2021). The justification for the use of Talanoa in this inquiry is multilayered. Firstly, the main researcher is of Pāsifika descent and Talanoa is a culturally appropriate way to discuss issues. Secondly, most of the teacher participants were of Pāsifika heritage. The use of Talanoa allowed the main researcher and the participants to develop a positive relationship that enabled the participants to share their ideas and perspectives openly. The main researcher used Talanoa to create a safe Vā (space) for the participants to share their perspectives truthfully and encourage conversation. The use of Talanoa to create a safe Vā (space) allowed both the main researcher and the participants to respect each other's views, but at the same time keep the focus of the talk on ways to support Pāsifika students' mathematics learning.

As this small inquiry took place during a time of mandated lockdown across New Zealand due to Covid 19, Talanoa was conducted online. The first step of this process involved inviting the five participants to participate in an online (Zoom Platform) Talanoa. As Talanoa is a talking tool that Pāsifika people can use for communicating formal or non-formal issues and it can be done via Zoom platform, as long as the participant and the researcher are talking to each other on the matter of concern. Upon agreement to participate, the teachers were sent a set of questions to reflect on, prior to the Talanoa. Each participant agreed to participate in individual Talanoa. The decision to Talanoa individually is justified as it served to provide all participants a safe space and time to discuss their perspectives and ideas. Each Talanoa began with the main researcher greeting each participant respectfully and checking that they were comfortable. These were important elements to ensure that the participants understood that their perspectives were valued. The researcher invited each participant to talk about their work or family, and as the Talanoa progressed, the researcher would participate and share common experiences. When the researcher felt the participant was at ease, Talanoa turned toward the teacher reflections on the set of questions. Talanoa continued until both the researcher and the participant felt they had fully discussed all that was to be shared. The mālie (joy) of the Talanoa was approaching the end of the conversation, whereupon the main researcher acknowledged and thanked that participant. Each Talanoa lasted for 45 minutes to an hour. While two participants were of European descent, both had been working with Pāsifika students in South Auckland, New Zealand for several years. Both participants were familiar with Talanoa and had used Talanoa with their students to resolve matters in their classes. One of the Pāsifika participants was of Tongan descent and the main researcher Talanoa or spoke with her in Tongan. The other Pāsifika teachers spoke in English with the researcher during Talanoa.

The Talanoa provided insight into what the teachers identified as being important to know about their Pāsifika students; and how they could use these insights to support Pāsifika students' mathematics learning. Data analyses consisted of thematic analyses of the transcribed Talanoa.

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Findings and Discussion

The findings of this investigation are organised around specific themes evident from the data analyses. The first theme illustrates the importance of Pāsifika students feeling a sense of belonging at school. The second theme highlights how drawing on the cultural values of Pāsifika students can support the establishment of effective participatory norms. The final theme argues for the use of authentic learning contexts to engage and enhance Pāsifika students' mathematics learning. Extracts from Talanoa are provided to illustrate the teachers' insights within these themes.

Establishing a Sense of Belonging

Through Talanoa, the teachers were asked to identify and describe what they thought was important to know about their Pāsifika students. All the teachers' initial responses emphasised the importance of Pāsifika students developing a sense of belonging at school. An extract from their discussion is presented below:

Lani: We need to get to know our children because we know that our children learn best in environments of learning, which they can identify with.

Maria: Yes, our children learn better when they are in a familiar place.

Susan: It is important to develop learning situations for my learners which they could relate to-culturally and ethnically.

These responses highlighted that these teachers understood how essential it is for Pāsifika students to hold a sense of belonging and familiarity at school and in their classrooms. A sense of belonging is pivotal for Pāsifika students' participation and engagement with their learning. Previous studies (e.g., Hunter, 2014; Hunter & Miller, 2022) have illustrated that Pāsifika students develop respect towards teachers who set high expectations for their studies. These teachers' statements emphasised the importance of supporting Pāsifika students to connect mathematics at school to their cultural and everyday experiences. In addition, the teachers have recognised the value of connecting with their students and getting to know who they are. Susan has stated the importance of knowing her children's cultural backgrounds as well as their ethnicity. Knowing the differences between a Samoan child and a Tongan child means that assumptions that every Pāsifika child's cultural experiences is the same or similar can be avoided. These concepts link to previous research (e.g., Anthony et al., 2019; Bills et al., 2015; Hunter et al., 2020) highlighting the significance of teachers developing positive relationships with their students to support their engagement in mathematics learning. Other research (e.g., Hunter et al., 2018) has demonstrated that when students develop a sense of belonging in places where their cultural values are acknowledged, their learning can be enhanced.

As the Talanoa progressed, the teachers shared more about how knowing who their Pāsifika students were could support the establishment of an effective learning environment. Specifically, the Talanoa centred on the ways that Pāsifika students cultural values could be drawn on to support the development of effective participatory and interaction patterns in mathematics classrooms.

Drawing on Cultural Values to Develop Effective Social Norms for Participation

Deepening focus in the Talanoa highlighted the teachers' agreement that developing effective learning environments could be enhanced by developing classroom norms that Pāsifika students could identify with. The following excerpt illustrates the teachers' thoughts on how students could be supported to work together in effective ways:

Judy: By discussing these norms with the students.

Lani: By discussing the norms with the students and reinforcing the values of the schools and bilingual unit, so that all have an understanding of what the expectations are in our class.

Luisa: I use what they would use in their homes. The norms in the family-to listen when someone is speaking, or to pay attention. These things are taken from our idea of respect and family. Teachers are encouraged to go back to our cultural background on how we behave when we are on the mat, or when we work in our groups. It is important to create a connection to the environment of our children similar to how they would behave at home. Our norms carry the way the lesson will run.

These teachers have identified how norms and expectations for learning mathematics need to be co-constructed and explicitly connected to taken-as-shared ways of interacting in Pāsifika students' home and community environments. These responses highlight the importance of establishing a safe learning environment where all learners' experiences and ideas are valued and everyone has a responsibility to contribute. In a previous study, Hunter (2014) illustrated the importance of students taking responsibility for their own learning and that of the group. This responsibility can be recognised as students ensuring their explanations are clear, asking questions when they are unsure, contributing their ideas, and reasoning with their peers conjectures.

The teachers in this inquiry have also highlighted the significance of aligning social norms with specific cultural contexts, such as how students would interact with family at home; including expectations about how to speak, to listen, and to focus on important matters. Norms in the Pāsifika family can also refer to one's role or roles within the family, such as the older children being expected to look after their younger siblings and cousins. Older siblings are taught from a young age that caring for their younger siblings and cousins is their responsibility. These taken-as-shared expectations mean that students understand that their role in a group is to support their peers. An important connection between the Pāsifika notion of family and the value of respect has also been emphasised. Respect in Pāsifika contexts is demonstrated by people working together, listening to one another respectfully, knowing one's role or place within the family, and being of service. Being of service within Pāsifika culture means helping and supporting each other for the greater good. The teachers have explained that if they utilise what their students are familiar with to co-construct taken-as-shared expectations for participation and interaction, these students would understand what they were expected to do and how they were expected to participate (behave).

As the Talanoa progressed, discussions centred on the idea that if Pāsifika students core cultural values could be drawn on to establish and maintain effective participatory norms, they could also be used to develop sociomathematical norms. Sociomathematical norms encompass actions such as, making conjectures, explaining, and justifying mathematical reasoning to enhance mathematical understanding. The following excerpt illustrates how specific Pāsifika cultural values could be utilised to support students to ask questions, be involved in mathematical discussions, and represent their mathematical reasoning:

Lani: We need to teach them how to ask questions to clarify; how to agree and disagree respectfully; how to articulate what they want to say; and how to know when they understand.

Judy: Yes, give them time to talk, not push them too much.

Maria: Look at how they respond when they do not know or when they understand. Do they question, do they clarify? Do they know how to articulate their responses and questions?

Luisa: Provide encouragement. Students can also show their learning through their drawings.

The teachers have noted that explicit instructional actions need to be taken to support students to participate meaningfully in group discussions. One of these actions is for teachers to be mindful of their students' cultural identities and support them in appropriate ways to engage in collective discussions. Another action is to give students *Vā* (space). *Vā* in a Pāsifika world is a time to think and consider what has already been claimed, explained, or justified. *Vā*

is also a safe space and place for Pāsifika children to Talanoa with their teachers about their feelings and ideas regarding their mathematics learning. Talanoa within Vā between teachers and students can also extend to their peers. In addition, the teachers have acknowledged there is more than one way for students to represent their mathematical reasoning, and that students can demonstrate their understanding in multiple ways.

At this point in the Talanoa, one teacher called for caution when setting expectations for productive discourse. An excerpt follows below:

Maria: Encouraging students to share or justify their thinking in a small group can only be done if the group norms are set and the environment is one that is safe for our kids. It also has to be noted that in some cultures it is ok for a child not to share. For example, in a Tongan Talanoa, it is not mandatory for a child to share their thoughts-they have the right to pass. It is hoped that one day that child will participate when confident in their own thinking.

Maria has highlighted how care must be taken when drawing on Pāsifika students' cultural values, as, at times, expectations to share thinking or to ask questions may not be expected at home. In these instances, teachers require deep understanding of how some students interpret school expectations for participation, as for some students, participation (at home) means sitting quietly and listening, and having the right to take time to consider what has been discussed. As the talk continued, attention turned to the learning contexts appropriate to provide support for Pāsifika students. Emphasis on authenticity became evident.

Authentic Learning Contexts

Authenticity emerged as an important theme of the evolving Talanoa, and the teachers began discussing the importance of designing learning content that was meaningful and relevant for their students. Once again, the teachers looked for ways to connect learning at school with the experiences and contexts that Pāsifika students would find familiar or relate to in authentic ways. The following excerpt highlights the teachers' perspectives:

Maria: I believe it is very important for students to relate to and have authentic learning contexts.

Luisa: Yes, contextual tasks need to be at the forefront when thinking about mathematical context, as this will automatically, hopefully connect them instantly to the problem.

Lani: Yes, relevance and connection to their learning is vital to retaining new information.

Luisa: They are able to reflect culturally on problems they have experienced in their daily lives. They are able to bring in experiences from their culture where it has no limitations for them to solve problems efficiently. There is nothing nicer than seeing the importance of a child when a task is relevant or includes them.

Judy: We are trying to connect to it by thinking when this problem is real life, reality.

Susan: I will set a scene the children are familiar with using culture or home.

These responses highlighted the teachers' understanding of the importance of supporting diverse students to connect with their learning. Previous research (e.g., Hunter, 2014; Hunter & Miller, 2022) has shown that when students can connect to their learning they are more likely to engage actively with learning new concepts, or seeing relevance to what they are learning in school with their everyday experiences outside the classroom. These teachers have recognised that an authentic contextual task is a platform for Pāsifika students to take ownership of their own learning, as the task allows them to Talanoa about their own realities. As has been highlighted in previous study (Lotan, 2003), the use of authentic contextual tasks strengthens diverse students' mathematical knowledge and reasoning while at the same time acknowledging their cultural heritage and experiences. These teachers have demonstrated their awareness of the significance of presenting learning in meaningful ways. Learning that is relevant to students provides multiple access points for students to connect, engage, and reason

with important mathematical concepts. When all students can access relevant mathematics content they are more apt to demonstrate a wider range of capabilities and success. In such ways, there is greater potential for Pāsifika students to experience more equitable outcomes and success.

Conclusions

This paper has reported on key elements identified through Talanoa of what teachers believe is important to know about Pāsifika students, and how to use what they know to support these students in learning mathematics. Several themes were presented and discussed. The first theme explored the importance of establishing a sense of belonging for Pāsifika students and how by doing so, these students could be provided with opportunities to recognise connections between what is important at home and what is valued at school. Establishing a strong sense of belonging offers potential for Pāsifika students to develop positive relationships within the school environment. The second theme explored how drawing on Pāsifika cultural values could support the co-construction of positive and taken-as-shared social norms essential for establishing and maintaining effective collaborative learning environments. Highlighted within this theme was the significance of understanding Pāsifika notions of family and respect. The final theme focused on the essential role authentic learning contexts play in supporting Pāsifika students to access, engage, and be successful in learning mathematics. Woven throughout these themes was the emphasis for teachers to take deliberate action to build meaningful support structures for Pāsifika students.

Although not the main focus of this inquiry, the use of Talanoa as a data collection tool was an important cultural artefact in this research. Utilising this data collection method drew on the cultural practices of the main researcher and most of the teacher participants. In this way, the cultural identities of the teachers were acknowledged and positioned as significant. We acknowledge that the research reported here was drawn from a small inquiry. However, the findings highlight the complexities of teaching mathematics in ways that provide equitable access for students who are often marginalised in New Zealand classrooms. Drawing on the rich cultural backgrounds, experiences, and ways of Pāsifika students to create authentic, relevant learning environments is an important pedagogical approach that provides opportunities for these students to feel a sense of belonging and the right to be there. In addition, when the lived experiences of the students are used as realistic contexts for mathematical activity, these students are able to make connections to important mathematical concepts. The instructional actions highlighted by the teachers in this research illustrate potential opportunities for Pāsifika students to achieve success in learning mathematics.

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