An Indigenous Perspective on Mathematics Contextualisation in a Pre-school: From Safety to Empowerment

Leesa Watego
Queensland University of Technology
<l.watego@student.qut.edu.au>

Contextualisation of mathematics for Indigenous children has received an increased degree of attention over the past two decades. This paper offers an Indigenous perspective to contextualised activities undertaken at one Indigenous learning space, an inner-city kindergarten and pre-school centre (referred to throughout this paper as The Centre), situated in Brisbane, Queensland. It discusses these activities from the perspectives of cultural safety and empowerment.

As an Indigenous Australian person growing up and going to school in the north-west suburbs of Brisbane in the 1970s and 1980, I was continually confronted with the invisibility of my culture. There were few Indigenous people living in our suburb. Primary school life reflected our isolation at home; there were no other identified Indigenous students and the classroom was essentially an example of a "homogenous" Australia. There were many other Indigenous young people in my inner-city state high school; there was a meeting room, an Indigenous counsellor, camps to go on with other Murri kids and *The Message Stick*. This was very positive for my identity as an Indigenous young person but, unfortunately, what was taught in the high school classroom was essentially the same mono-cultural curriculum as primary school and presented little relevance to our attempts as young people to explain or rationalise the complex Australian social world outside.

As a young person I was confused. There was an expectation of me that differed greatly from what was understood of my identity as an Aboriginal within my family to how others outside of my family expected me to identify and behave accordingly. While I was unafraid to say I was Aboriginal when asked, *"Ya not white. What are ya?"*, this would often lead students to comment that *"Well, ya not **real**"*. The students' view of Aboriginality (supported by the curriculum and most likely their family's understanding) was a reflection of the classic traditional/contemporary dichotomy of Aboriginality that was the conventional wisdom of time and continues to be, however inaccurate, the pervading construction of Aboriginal identity today. On the one hand there is the reality that we know, that being the complex fabric of distinctiveness and dynamism that through which Aboriginal peoples would more readily define themselves. On the other hand there is the overly simplified, romanticised and exotic view of what Aboriginality is. Anderson (2003) reflects on the impact of reading of Elkin's "The Australian Aborigines" when he was a young boy:

> It was this experience which promoted in me a deep sense of the impossibility of ever being able to better understand my own Aboriginal heritage – I couldn't hear the voices of any of the people I knew (or know) in those texts through which I was attempting to stumble. (p.43)

I have come to understand that this 'de-contextualisation' of indigenous people in the education experience was common throughout Australia. Where Indigenous culture was not rendered invisible, it was subjected to aggressive over-simplifications and distilled into base definitions. Initially by legislation and later by subtle and unofficial indirect racist attitudes of staff, Indigenous people have been excluded by education systems in Australia. While our identities and sensibilities as Aboriginal peoples suffer under a constant barrage of marginalisation and cultural eradication, we struggle to learn our culture and what makes us distinct. We have experienced systemic inequalities in unemployment, health, the criminal

justice system, housing, and rights to land and sea. I agree with Partington (1998) that the current Indigenous educational situation can only be understood "within the framework of history" (p. 31).

Mathematics education for Indigenous students has historically followed a similar ethnocentric and exclusive model as outlined above; it has not been contextualised with respect to Indigenous culture (Cronin, Sarra & Yelland, 2002; Matthews, 2003; NSW Board of Studies, 2000; Sarra, 2003). This has resulted in low mathematics performance for Indigenous students in relation to non-Indigenous students (Frigo, 1999; Matthews, Howard & Perry, 2003; Queensland Studies Authority, 2003) However, as an urban Indigenous person, some of the literature on effective Indigenous mathematics learning utilizes dated understandings of identity and culture (e.g., Harris, 1984) and fails to take into consideration the realities of Indigenous life today where mathematics involves spreadsheets and shopping lists. To say that this real life mathematics is owned and authored only by non-Indigenous peoples, and that there is another more "real" mathematics for Aboriginal people, is a distortion of our lives and culture. The situation is similar to that stated by Ah Kee (2004) about language:

> … for Blackfellas, English is all of our second language, we just don't know our first language. And that's not our fault … in the way we live our life, this urban existence is all our second culture and we can only use our sensibilities that we have as urban Aboriginal people to express what we are …. I wish….no actually I don't wish … it just is … I'm not going to regret the things we've lost, but I am going to hold people accountable for taking that away from me.

In a similar manner to how Ah Kee argues that it is not possible for him to pretend that English doesn't exist for him or cannot be used by him even though it his not his first language, Indigenous mathematical frameworks may not necessarily be obviously distinguishable from so-called Western mathematics. The distinction that needs to be made is to what *meaning* is ascribed to the frameworks and *how* they are applied; this is what gives the mathematics Indigenous context.

Attempts have been made in recent decades to address children's' negative experiences of mathematics. A number of projects across the country have attempted to provide a more contextualised mathematical learning experience for Indigenous students (see NSW Board of Studies, 2000; Sarra, 2003). While these and other projects have worked hard in individual communities, there is a growing body of literature about contextualisation,. It is my experience that questions and difficulties continue to exist for this area as a realistic day-to-day practice. Some such questions that have occurred to me are: What is contextualization in practice, particularly for urban settings? How can it be applied to the diverse aspects of curriculum of modern schools? How do teachers contextualize for a community of which they have little knowledge? How much do they understand of the importance of contextualization, particularly in urban communities? How can Indigenous parents and communities be involved in the process of developing and supporting contextualized learning environments?

This paper focuses on the issue of contextualising the mathematics taught in an Indigenous kindergarten and preschool in an urban environment (hereafter referred to as The Centre). It discusses the philosophy of the school and the form in which mathematics is presented in relation to cultural safety and empowerment.

Safety, Identity and Empowerment

Indigenous People have been excluded physically and culturally from education systems across Australia since colonization. As Ah Kee (2002) argues, "If my children were White, they would learn about their culture at school". The goal of contextualization is about bringing

our culture into one of the key learning environments in contemporary Australia – school. *Contextualization* is not a word readily used by Indigenous people; terms such as "looking at it our way" or "bringing the community to the classroom" are used. Within academic writing, however, there appears to be two main meanings in the way the term is used, namely, *context as deficit* and *context as culture*.

Context as deficit is related to the well documented social and economic conditions of Indigenous Australians (e.g., Fitzgerald, 2002). Within an environment of poverty, unemployment, substance abuse, and domestic violence, young people struggle to achieve successful outcomes. Howard (1998) argues that "the contexts in which Aboriginal children live and learn may result in many Aboriginal children not achieving to their potential". Children who live in communities with high levels of long-term unemployment may also not make the links between successful schooling and positive employment outcomes (Howard 1997). This has led to some commentators arguing that the cultural, and social knowledge required to succeed in school is not present in Indigenous families; that the mismatch between home and school leads to poor educational achievement (Frigo, 1999). However, as Frigo states: "Aboriginality is not in itself a reason to expect poor educational outcomes" (p. 6).

Context as culture relates to using the home and cultural knowledge within the classroom and is the form of contextualisation relevant to this paper. As Gillespie (1995) argues, "Aboriginal students come to school being able to communicate and function very effectively in their communities and have an enormous amount of knowledge and skills already" (p. 145). With respect to mathematics, this form of contextualisation is "building on the mathematical knowledge that Aboriginal students utilize outside the classroom" (Frigo, 1999, p. 14) and requires teachers "to find out what kinds of mathematics exist in the students' communities as this forms the basis of the students' own mathematical knowledge base" (p. 13).

However, it is vital that the sources of information for teachers come from communities themselves and not from simplistic stereotypical assumptions. The literature is replete with such assumptions: for example, Crawford (1990) argues that Indigenous peoples are a "non-technically oriented culture" with language difficulties but are spatially intelligent and naturally collaborative, while Robinson and Nichol (1998) refer to Aboriginal learners as imaginal learners, holistic learners, and referential learners. These kinds of images fail to acknowledge the diversity and sophistication of Indigenous peoples. Stereotypes have a negative influence on young people. Indigenous children, particularly in urban schools, are continually presented with pictures of themselves that don't always look like them. Their experiences of being Aboriginal are often not reflected in the images or discussions which happen at school. Thus contextualization can have a positive impact on the identity of young people if developed in conjunction with families and community. Educators must keep in the forefront of their minds the role that identity plays in forming positive or negative experiences of school, work and life. As Howard (1997) argues, "Aboriginal children know that they are black and that there are differences for them in the way that they are treated because they are black"

Contextualisation is an approach which aims to empower Aboriginal identity. However, a key component of understanding identity is cultural safety. Williams (1999) defines cultural safety as:

> … an environment that is spiritually, socially and emotionally safe, as well as physically safe for people, where there is no assault, challenge or denial of their identity, of who they are and what they need. It is about shared respect, shared meaning, shared knowledge and experience of learning together. (p. 213)

Purdie, Tripcony, Boulton-Lewis, Fanshawe and Gunstone (2000) argue that positive self-identity plays a significant role in successful education, particularly in building resilience. Although once seen as genetic, resilience or adaption despite risk (Arrington & Wilson, 2000) is now believed to be an every day skill that can be fostered and taught (Bickart & Wolin, 1997) through educators providing care and support that builds self-worth and self-confidence (Henderson, 1997).

The relationships between safety, identity and empowerment are problematic. It could be argued that they are prerequisites for each other (e.g., safety is necessary for identity which is a requirement of empowerment), but which direction (e.g., does empowerment lead to identity or identity to empowerment). It could also be argued that they are very different; for example, empowerment builds while safety preserves. However, as Bin-Sallik (2003) argues, they could be similar; for example, cultural safety could be considered as something that "empowers individuals and enables them to contribute to the achievement of positive outcomes" (p. 21).

Contextualisation at The Centre

There is little research on contextualisation in kindergarten/preschools, particularly with mathematics. There are arguments that there should be a focus on "changing the process of teaching and learning to fit the child, rather than changing the child to fit [the teachers'] approach to education" (Gillespie 1995, p. 415). As well the content should "be related to important issues and everyday activities to be meaningful" (Frigo 1999, p. 13), and that there should be consultation and collaboration with students, parents, community members, education workers and school staff to find a way to make mathematics real for students (Frigo 1999). However, it is possible that not all involved (particularly parents) will see this as "real" mathematics. There are also arguments that contextualised learning should reverse the traditional approach and work from the known to the unknown, immersing the students in problems from the context and then gradually de-contextualising (Gillespie, 1995). Another argument is that the basis of contextualising is building a "trusting relationship between the Aboriginal child and their teacher" (Howard, 1997) in which the teacher engages with the students' "social and cultural context" (Howard, 1997), understands their attitudes and feelings (Howard, 1998), and makes connections with homes and communities (Perso, 2001).

I have observed the process of contextualisation at The Centre for over two years (2003-present) as a parent, parent-volunteer, Management Committee member, and Master of Education student researcher. Over the last half year, as I have begun to gather data for my Masters, I have been more formal in these observations, visiting regularly and keeping field notes, and interviewing staff and key members of the community. These observations are the beginning of my study and I present them in three parts: with respect to The Centre itself; the teaching and learning approach in general, and mathematics activities in particular. The last two parts are a consequence of my initial analysis that mathematics contextualisation at The Centre is at two levels: first, through the general approach to teaching and learning taken across all activity; and, second, in the particular mathematics activities.

The Centre Itself

The Centre is an independent Indigenous controlled kindergarten and pre-school in an inner-city suburb with a physical layout consistent with other kindergartens/pre-schools. It works with families as well as children and employs an elder, a community development worker, a social worker, and two people to clean, garden and drive the buses, as well as two teachers and two teaching assistants (one each for the kindergarten and preschool). It has a

broad educational framework that includes culture, language and dance, and a "caring-family" focus which includes coordinating a range of health services. Its framework and practices were developed through consultation with the Indigenous community. Its core focus was empowerment and its vision integrative:

[The Centre's] ability to develop its potential in social, cultural and economic terms is dependent on its recognition that Indigenous preschool education cannot be considered in isolation from multiple and complex social problems. Problems like family issues, poverty, health, housing, gambling, criminal behaviour, domestic violence, child abuse (physical, sexual and emotional) and neglect. Aboriginal literacy, numeracy and Aboriginal parent participation in the running of the preschool depend on these wide range of social problems being simultaneously addressed. (Yelangi, 2000, p. 3)

The Centre's program is longer than other kindergarten/preschools, providing care for the hours parents need it. Children are collected by bus and The Centre takes responsibility for taking children to medical and dental appointments and other necessary activities.

The Centre's community is made up of a few traditional owners and diverse groups from elsewhere in Queensland and Australia. It is a community with a strong identity and history of resistance and participation in national actions for rights. It sees The Centre as an organisation that supplies services free from discrimination. It has its own distinct culture coming from "reflecting contexts of shared world views, meanings, and adaptive behaviours derived from simultaneous membership and participation in multiple settings and situations (Arrington & Wilson, 2000, p. 227). It believes strongly in the importance of its Indigenous heritage and providing Indigenous role models. Therefore, it has been important to the group that the staff of The Centre reflect Indigenous culture. However, because of the diverse background of its members, the community does not see this Aboriginality in terms of colour. As an Indigenous teaching assistant said: "We know that blackfellas in 2005 are all colours". There is a consensus that "whiteness" and "blackness" are displayed more as a set of behaviours and values. The children seem to know this too; they are able to recognise behaviour and actions before skin colour, and they feel comfortable and safe with teachers that reflect Indigenous behaviours. As the teaching assistant remarked:

When I first came here, the teacher I had was an old white lady, she was different. The kids used to ask me all the time if she was Aboriginal. With Patricia [the new white teacher] they've never asked me about her. Its like she's one of us, the kids know.

General Contextualisation

In my observations of teaching and learning at The Centre over two years, it has become evident that there are four key elements that influence contextualisation with respect to Indigenous culture: namely, acknowledging, listening, understanding, and valuing and nurturing.

Acknowledging. While the myth of *terra nullius* was overturned in 1992 through the Mabo Decision, the acknowledgement of Indigenous peoples as the First people of this continent and cultural connections to country, is still lacking throughout education. The Centre privileges Indigenous knowledge and ways of seeing over and above all others. First and foremost it is an Indigenous site and this is reflected in a range of acknowledging activities including flying the Aboriginal flag, using Indigenous resources, celebrating Indigenous events, and emphasising Indigenous communities as important. The mathematics activities in this category include worksheets which include early number activities that feature Indigenous imagery.

Listening. Indigenous people are regularly called upon to tell and re-tell stories which are often not listened to. At The Centre, listening is an integral part of daily life whether it is in the

relationship between the non-Indigenous teacher and the Indigenous teaching assistant, the involvement of the elder, or the "yarn mornings" for families facilitated by the Community Development Officer.

Understanding. Understanding and respecting different ways of doing things is everyday practice at The Centre. Because it takes account of the socio-economic and socio-cultural issues which influence educational outcomes, The Centre has always, as part of day-to-day practice, actively supported families. It takes account of their values in its education programs and it provides workshops on areas of need (e.g., parenting and employment).

Valuing and Nurturing. The Centre's day-to-day practice also privileges Indigenous values and ideas. It seeks to provide an effective learning environment where children's identities are not questioned or challenged, where they are valued and nurtured. This is done by ensuring Indigenous participation in all levels of decision making and by building relationships which increase Indigenous participation. The use of language at The Centre values the children's everyday language as well as teaches them appropriate rules of behaviour.

Mathematics Contextualisation

The Centre's teaching and learning program is typical of preschools: it is a play-based curriculum and involves a range of indoor (e.g., reading, painting, computer work, puzzles, home corner) and outdoor activities (e.g., swings, cubby house, sandpit, metal play equipment and wooden materials) and group trips (e.g., swimming, dancing). Where possible, children are not singled out for special attention: specialists work with groups. The key emphasis is preparation for school. The teachers and teacher assistants regularly reminds the children of what "deadly" (intelligent) behaviour is, the Elder's motto of "listen and learn and do as our told" is regularly reinforced, and positive and responsible, not "gammon" (uncaring) behaviour, is reinforced.

As the curriculum is play-based, mathematics learning is incidental as well as explicit and integrated with other learning. Much of the incidental mathematics activity can be in relation to Indigenous culture although a lot of the activities are similar to non-Indigenous preschools (e.g., musical activities such as "five little ducks" and "one-two-three-four-five, once I saw a fish alive", rote counting activities when playing tag, in sandpit play or during storytelling). However, the explicit mathematics learning is more obviously similar to what would be in any other preschool (e.g., sorting objects, counting objects, making patterns, constructing shapes, covering, identifying numerals and their names, cutting and pasting to represent numerals). The materials used are also similar to those in any other preschool (e.g., simple worksheets, counters, pattern blocks, jigsaw puzzles, building blocks, unifix cubes), although there are a number of "Indigenous" puzzles.

Personal Reflection

Reflection on The Centre's activities leads to three conclusions with respect to contextualisation: one general, one particular to mathematics, and one on empowerment.

Learning in General

In general, there are two key aspects to contextualisation in this situation. First, contextualisation works to improve students' learning and understanding by providing activities and problems which are related to their lives. Second, contextualisation provides an opportunity to ensure that students' identity is acknowledged, listened to, understood, and valued and nurtured. Not including Indigenous knowledge or perspectives into curricula can be

damaging to students. Gale (in Smith, 1999) argues that even books can be dangerous to Indigenous people if they

> … do not reinforce our values, actions, customs, culture and identity; when they tell us only about others they are saying that we do not exist; they may be writing about us but are writing things which are untrue; and they are writing about us but saying negative and insensitive things which tell us that we are not good. (p. 35)

Thus, contextualisation has a role to play in ensuring that classrooms are *culturally safe spaces* for Indigenous children. This all means that contextualisation is important on a number of levels. As Corrie and Maloney (1998) argue:

> Children construct a sense of belonging when their culture and cultural values are reinforced in the early childhood setting … reinforcing the children's culture will enable them to develop their self concept without experiencing the dilemmas that occur when one set of values is promoted at the expense of another. (p. 229)

For the children in The Centre, the relationship between cultural safety, identity and empowerment was that contextualisation leads to both identity and safety which lays the groundwork for empowerment.

Learning Mathematics in Particular

With regard to mathematics, While The Centre's learning activities were a mixture of both explicit and incidental mathematical learning opportunities, consistent with the integrated approach of Early Childhood Education, the contextualisation of the activities was also mixed. Some incidental activities were contextual in terms of being part of the general cultural activities of The Centre, but the other activities, particularly the explicit ones, were identical to what would be taught across all preschools. Thus, the staff had attempted, within Early Childhood frameworks, to use a number of learning approaches appropriate for the children at The Centre. Many observers may argue that the mathematical teaching and learning at The Centre is indistinguishable from what happens in other Centres around Queensland. However, as an Indigenous person, the activities, which incorporate specific language, meanings and behaviours, the activities are distinctly Aboriginal. As stated before contextualisation with regard to mathematics may be more in the applications and meanings considered than in what was done. As educators and participants in a dynamic culture, we must continue to ask *What does contextual mean? Particularly in an urban setting?*

Empowerment

With regard to empowerment, the cultural contextualisation seems to have laid the foundations for empowerment by building the base of confidence and identity that is necessary. Thus, safety appears to be necessary for empowerment; however, whether it is sufficient may have to be left for later (and longer) study. As was said at the start, there are many questions still to be answered.

References

Ah Kee, V., (2002). *If my children were White*. Satin Laminate Digital Print on Synthetic Board.

Ah Kee, V., (2004). *Address to Black Insights Conference, Queensland Art Gallery*. Downloaded Radio National. www.abc.net.au/messagestick.

Anderson, I., (2003) Black bit, White bit. In Grossman, M., (Ed.), *Blacklines* (pp43-52). Melbourne, Vic: Melbourne University Press.

Arrington, E., & Wilson, M., (2000). A Re-examination of risk and resilience during adolescence: Incorporating culture and diversity. *Journal of Child and Family Studies, 9* (2), 221–230.

Bickart, T., & Wolin, S., (1997). Practising resilience in the elementary classroom. *Principal*, November.

Bin-Sallick, M., (2003) Cultural safety: Let's name it. *The Australian Journal of Indigenous Education.*(32) pp21 – 28.

Corrie, L., & Maloney, C., (1998). Putting children first: Programs for young Indigenous children in Early Childhood settings. In Partington, G. (Ed.), *Perspectives on Aboriginal and Torres Strait Islander education* (pp. 220 - 243). Katoomba, NSW: Social Science Press.

Crawford, K., (1990) Language and technology in classroom settings for students from non-technological cultures. In *For the Learning of Mathematics* Volume 10 Number 1. Retreived 31 August 2004 from www.enc.org/topics/equity/articles/document.shtm?input=ACQ-111330-1330

Cronin, R., Sarra, C., & Yelland, N. (2002). *Achieving positive outcomes in numeracy for indigenous students.* Paper presented at the Australian Association for Researchers in Education Conference. Brisbane. Retreived 10 October 2003 from www.aare.edu.au/confpap.htm.

Fitzgerald, A. (2002). *Cape York Justice Study Report.* Brisbane, Qld: Queensland Govt Dept of the Premier and Cabinet.

Frigo, T. (1999). *Resources and teaching strategies to support Aboriginal children's numeracy learning: A literature review*. Sydney, NSW: NSW Board of Studies.

Gillespie, K., (1995) Mathematics acquisition for Aboriginal students – The importance of contextual teaching. In Richards, A. (Ed.), *FLAIR: Forging links and integrating resources* Darwin, Northern Territory: Australian Association of Mathematics Teachers.

Harris, S. (1984). *Culture and learning: Traditional and education in North-East Arnhem Land.* Canberra, ACT: Australian Institute of Australian Studies.

Henderson, N., (1997). Resiliency in schools: making it happen. *Principal*, November.

Howard, P. (1998). *Contextualisation issues related to Aboriginal Children's mathematical learning*. Paper presented at the Australian Association for Researchers in Education Conference, Adelaide.Retreived 9 October 2003 from www.aare.edu.au/98pap/how98283.htm.

Howard, P. (1997). *Aboriginal voices*. Paper presented at the Australian Association for Researchers in Education Conference, Brisbane. Retreived 10 October 2003 from www.aare.edu.au/ confpap.htm.

Matthews, C. (2003). *Notes on teaching Indigenous students mathematics*. Unpublished paper, QUT, Kelvin Grove, Australia.(Paper no. 4059).

Matthews, S., Howard, P., & Perry, B. (2003). Working together to enhance Australian Aboriginal students' mathematics learning. In L. Bragg, C. Campbell, G. Herbert & J. Mousley *MERINO* (Proceedings of the 26th Annual Conference of the Mathematics Education Research Group of Australasia, Sydney: MERGA.

NSW Board of Studies. (2000). *How we learn what we need to know*. Sydney, NSW: NSW Board of Studies.

Partington, G., (1998). In those days it was rough. In Partington, G. (Ed.), *Perspectives on Aboriginal and Torres Strait Islander education* (pp. 27-54). Katoomba, NSW: Social Science Press.

Perso, T., (2001) Inclusive mathematics teaching. *Australian Mathematics Teacher*, 57 (4), 6-9. Retrieved 8 September 2004 from www.aamt.edu.au/ICSIMAN/resources/papers/person574.pdf

Purdie, N., Tripcony, P., Boulton-Lewis, G., Fanshawe, G., & Gunstone, A. (2000). *Positive self-identity for Indigenous Students and its relationship to school outcomes*. A project report funded by the Commonwealth Department of Education, Training and Youth Affairs. Retreived 3 February 2004 from http://www.dest.gov.au/schools/indigenous/publications/Publications - all.htm

Queensland Studies Authority. (2003). *2002 overview of statewide student performance in aspects of literacy and numeracy* (Report to the Minister of Education). Brisbane: Ministry of Education.

Robinson, J., & Nichol, R., (1998) Building bridges between Aboriginal and Western Mathematics: Creating an effective mathematics learning environment. In A.Editor (Ed.) *The Weaver*. Retreived 31 August 2004 from www.latrobe.edu.au/graded/JRed2

Sarra, C. (2003). *Young and black and deadly: Strategies for imrpoving outcomes for Indigenous students.* In A.Editor (Ed.), *Quality Teaching Series: Practioner Perspectives* City: Publisher.

Smith, L.T. (1999). *Decolonising methodologies: Research and Indigenous peoples.* Dunedin: University of Otago Press.

Williams, R., (1999) Cutlural safety – what does it mean for our work practice? In *Australian & New Zealand Journal of Public Health,23*(2),p213-214.

Yelangi. (2001). *Yelangi preschool and kindergarten strategic plan 2001-2006*. Brisbane, Qld: Yelanji.