Chapter 6
Equity and the Australian Curriculum: Mathematics

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A national curriculum in Australia (The Australian Curriculum) may represent an attempt to bring a common experience to all Australian students. It is premised on a notion that shared experiences are part of the national psyche. However, in this presentation, we challenge this approach and argue that the experiences of students living in remote parts of Australia, or those whose home language is not Standard Australian English; or those whose culture is not that of mainstream urban Australia, may be particularly disadvantaged. Other priorities may be necessary for students who consistently are unable to make benchmarks in numeracy (and literacy) which are foundational to active and successful participation in Western practices. Drawing on experiences from remote work, we seek to illustrate how a national *intended* curriculum will not necessarily improve education provision for students living in remote areas, but most particularly Aboriginal and Torres Strait Islander students for whom the language of instruction is different from the home languages. A multifaceted approach to understanding equity, and by implication, exclusion, is needed, if the goals of a quality education for all Australians are to be met.

In a diverse country such as Australia, the perceived need for a national curriculum comes from many spheres. In terms of equity, it is important to consider the contexts of Australian education and how these impact on the provision of education. Also, the political landscape, geography and spread of population constrain many aspects of education provision. The diversity of populations range from first peoples who have occupied the land for tens of thousands of years, to people who are descendants from the first fleet or the many migration waves including the Chinese in the mid-nineteenth century, through to Europeans from post-war migrations. More recently they include arrivals entering the country as refugees from African and subcontinent countries. With such diversity, there are many cultures, many languages and many diverse aspirations for education and life in Australia. Providing an education that is sustainable for governments, allows pathways for all Australians to achieve a quality life, and simultaneously allows all

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Australians access to dominant forms of knowledge is the challenge ahead of a national curriculum.

While issues around the diversity of Australia are an integral part of this chapter, we particularly draw on remote education provision. This context enables us to highlight the challenges for a national curriculum that aims to provide all students with access to high-quality schooling and reduce the effects of disadvantage including remoteness. (MCEECDYA, 2008)

In this chapter, we discuss the implications of equity and the Australian Curriculum drawing on the contrasts between the remote parts of the Northern Territory and those of the more heavily populated states of Victoria and New South Wales. Using these comparisons, we discuss the tensions around equity in terms of provision, access and cultural diversity that are inherent through a national curriculum in a diverse country such as Australia.

The Australian Curriculum specifies what all young Australians should learn as they progress through schooling. It is designed to be taught well within the overall teaching time and with the resources available to teachers and students. School authorities make decisions about the allocation of time and other resources. (ACARA, 2010) It is evident from this information that the Australian Curriculum presented in the documentation, is the intended curriculum, and that the design of this influences the implemented (or enacted) curriculum in classrooms by teachers. This distinction between different parts of the curriculum is recognised in research (e.g. Nyaumwe, Ngoepe & Phoshoko, 2010) and by education systems in Australia. Education Queensland (2011) for example, recognises five inter-related aspects of curriculum:

- The intended curriculum – what students should learn (documented)
- The enacted (implemented) curriculum – the pedagogy used to shape learning and engage learners
- The experienced curriculum – the curriculum experienced will differ from student to student based on what they bring to the learning context
- The assessed curriculum – the knowledge being assessed and hence prioritised in learning contexts
- The achieved curriculum – what has been learned as a result of what has been taught

The *experienced* curriculum, whilst considered part of the implemented curriculum, is a distinction that requires consideration and attention by teachers, particularly of students with different worldviews. Whilst the intended curriculum is the same for all students, students will experience it in different ways, depending on what they bring with them to the learning situation. Vital (2003) highlighted how teachers may seek to develop a curriculum that will address differences but how

that curriculum is enacted in the classroom or school may be quite different from the intended curriculum.

How the intended curriculum is enacted in schools and classrooms is at the behest of the individual teachers. Whilst the Australian Curriculum aims to address an intended curriculum and *influence* the implemented curriculum, this design feature would seem to assume quality teaching in every classroom. The intended curriculum can only become a reality when teachers are able to "deeply understand the goals that learners are expected to achieve, the content learners are to master, and the pedagogies that enable learners to conceptually understand what they learn". (Nyaumwe et al., 2010, p. 65)

Fogarty (2010) points out that, in remote parts of Australia, regardless of the intended curriculum and policy positions, in the end provision "will always come down to a set of formative pedagogic moments where a student either learn or does not". He continues "It is because of this, that the design and nature of the pedagogy that creates and supports these moments must remain a paramount consideration." (p. 217)

In trying to bring some shared sense of quality to the enacted curriculum and the quality of the teaching environment, the National Professional Standards for Teachers (AITSEL, 2011) have been developed. These standards describe the capabilities that teachers need to have and include seven standards, as follows:

1. Knowing students and how they learn
2. Knowing the content and how to teach it
3. Planning for and implementing effective teaching and learning
4. Creating and maintaining supportive and safe learning environments
5. Assessing, and providing feedback and reporting on student learning
6. Engaging in professional learning
7. Engaging professionally with colleagues, parents/caregivers and the community

The link between the intended Australian curriculum and the implemented or enacted curriculum – enabled through these desirable capabilities – is unclear. In particular, 'knowing students and how they learn' requires deep, not superficial knowledge in order to ensure that the experienced curriculum enables the desired achieved curriculum. Moreover, the achieved curriculum should be equitable for all Australians.

Herein is where the development and delivery of a national curriculum may fail to address the needs of all learners. Applying a common learning experience to a group of students may have the appearance of equality – all students have the same learning experience – but they enter the situation with very different backgrounds, including language, culture, knowledge frameworks, life experiences, and so on.

These all act as filters to the learning experience that is presented. Ensuring that robust bridges can be built between the knowledges, skills and dispositions of learners that they bring to the formal school context and the intended and enacted curriculum is where issues of equity are most exposed.

Before moving into the body of this chapter, it is important to clarify two theoretical points. First is the notion of equality of access for all students to high-quality schooling. (MCEECDYA, 2008) The notion of a *common curriculum* embeds an approach to social justice that implies an assumption that it is fair and right that all students, schools, families, and/or communities have equal access to common learning. This approach to social justice is underpinned by a belief that inequalities in education, and life more generally, are shaped by inequalities in access to shared or common resources. Such a view, however, fails to consider that not all students enter schools with a common starting point; the provision of a common (intended) curriculum already denies these unequal starting positions.

In contrast, an alternative view of social justice recognises that there are different starting positions for students – some who enter school with different literacy experiences from those of the language of instruction, or from different cultural perspectives where there are differences in orientation to learning or authority; or where there are different aspirations for schooling and life beyond school. Within this view of social justice, greater equity is achieved through providing different learning experiences that try to bridge the differences in starting points.

Having a common (intended) curriculum to which all students have access represents an assumption that this is a fair way of working in a diversely populated country. The provision of the same intended curriculum to all students regardless of location, culture, language or life experience is the conservative mantra that masks the complexities of access to that curriculum as a factor of these variables.

A conservative viewpoint advocates fairness and social justice through equitable provision; all students being treated similarly so that there is no differentiation regardless of background. Knowing that all Australian students will be exposed to a similar curriculum at similar periods of the lifespan rhetorically *seems* to be fair since no child will be at risk of being exposed to an impoverished curriculum. Such a viewpoint suggests that all students and teachers can be expected to have common experiences in terms of their mathematics learning and teaching. Students in inner-city Sydney, the Western suburbs of Melbourne, or the leafy-green affluent suburbs of Perth have the chance to have similar experiences regardless of their wealth, social status, language background, gender or culture. Outwardly, this rhetoric espouses a viewpoint that prioritises a sense of being fair and reasonable to expect that all children will have common experiences across the range of curriculum areas, including mathematics. In adopting this approach, all teachers regardless of

their backgrounds will then be able to offer all Australian students access to the same mathematical knowledge regardless of the teachers' or students' background. This standpoint has gained momentum under both Labor and Liberal governments, both of which are conservative in their political and educational orientations.

The rationale for a common curriculum has some roots in the highly differentiated outcomes of national testing practices that have gained increasing precedence in the past decade. A common intended curriculum enables a degree of alignment with the assessed curriculum. This maximises validity which in turn facilitates some degree of reliable reporting of achievement of what is assessed.

The National Assessment Program (NAP) incorporates standardised tests which measure attainment of aspects of the Australian Curriculum by Australian students. The Literacy and Numeracy tests currently measure student *potential* to be literate and numerate, being closely aligned with the National English and Mathematics curricula. Regardless, the assessed curriculum through NAP is not equitable for all Australian students. This type of assessment can privilege select groups of students whilst marginalizing or segregating others (Weinstein, Tomlinson-Clarke & Curran, 2004). This is largely due to the fact that these tests require literacy in the dominant language and consequently are culturally and linguistically biased in spite of the best efforts of producers to ensure otherwise.

Rhodes (1994), working with Indigenous students in the U.S., explains that the genre of most standardized tests requires students to answer quickly, guess, and take risks, skills which many students raised in traditional communities do not have, having been raised to make decisions slowly and accurately. He also notes that in tribal communities (similar to the remote communities of Australia) the norm is to help those in need and work collectively rather than individually. Solano-Flores & Nelson-Barber (2001) similarly argue that 'cultural validity' (i.e. referring to the ways that individuals from different cultures are predisposed to respond to questions and to solve problems) should be a key component in assessment design and implementation. As a consequence, issues of translation, decision-making processes, and rules around teachers offering students support, are three possible factors affecting students' performance on standardized tests.

Further to this, not only do the written questions effectively 'lock out' students from engaging with them on the basis of language used, question contexts can act as a barrier for students who are unfamiliar with them. For example, a numeracy question contextualized in a 'garden centre' about fractional quantities making up 'potting mix' where students have never even heard of either of these concepts (National Assessment Program – Literacy and Numeracy (NAPLAN) – Numeracy Test 2008), neither allows entry nor engagement for second language learners from remote parts of Australia let alone enables them to deal with the mathematics

involved. Such questions are discriminatory and hence do not allow for equitable demonstration of achieved curriculum. Hence the achieved curriculum that is reported on the basis of these tests not only has the potential to be at odds with the intended curriculum, but is more than likely to be markedly different from the implemented and experienced curriculum for the majority of learners from remote schooling contexts. As explained earlier, this is due primarily as a result in inequities in teacher capability in provision, and cultural and language biases in assessment. Currently, the Australian population has been led to believe that data available on the *My School* website (where NAPLAN results for individual scores are available to the public), demonstrates the achieved curriculum. This data is hardly reliable or valid due to the inequities described above.

The National Assessment Program has been the catalyst for considerable reforms and policies in the Australian political and educational landscape. Results from the program, particularly from the literacy and numeracy tests, have shown that there are stark differences in achievement based on the social and economic backgrounds of Australians. The correlation between achievement on NAPLAN and social background is alarming for those in education, although not surprising. From the early 1970s, there has been wide recognition of the differentiated outcomes based on social background internationally (Bowles & Gintis, 1976) and within Australia (Connell, Ashendon, Kessler, & Dowsett, 1982).

To illustrate this correlation, we selected schools with varying 'Index of Community Socio-Educational Advantage' (ICSEA) scores[1] across states of Australia and plotted these scores against the school NAPLAN scores (see Figures 1 & 2). In selecting the schools, we sought to have a comprehensive range of ICSEA scores as the independent variable and then to plot these against NAPLAN outcomes. The graphs reveal the strong correlation between the two variables.

[1] ICSEA indicator is a measure used by ACARA to enable comparisons of schools. It is a school-based measure of relative advantage. It is an amalgam of a range of factors and has been outlined in the fact sheet in the following way:

> ICSEA uses Australian Bureau of Statistics (ABS) and school data to create an index ... The variables that make up ICSEA include socio-economic characteristics of ***the*** small areas where students live (in this case an ABS census collection district), as well as whether a school is in a regional or remote area, and the proportion of Indigenous students enrolled at the school. (ACARA, 2010)

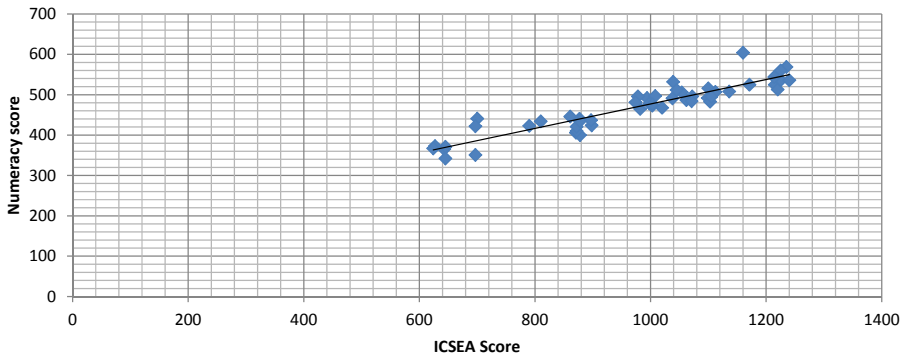

Figure 1. Numeracy result against ICSEA score for Year 5 in some schools, 2009 NAPLAN

From the graph of the Year 5 results, it is clear that there is a strong relationship between the background and location of the students and their scores on the Numeracy test. The higher the social background, as measured by the ICSEA score, the greater the chance that the students (as represented by their school score) will achieve a higher score on the NAPLAN test. The Year 9 results for the same schools shown in Figure 2 below, suggest that these schools have generally been unable to make significant learning gains to the results of students/school over time and indeed, that the relationship between student background and location, and numeracy achievement demonstrated in national tests remains strong over time.

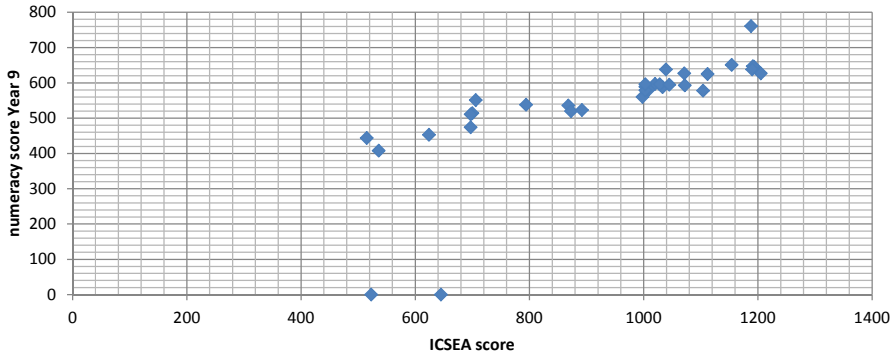

Figure 2. Numeracy result against ICSEA score for Year 9, 2009 NAPLAN

These types of data raise questions for policy makers and educators about the provision of education, particularly for those who are at most risk of failing.

A random selection of almost any remote Indigenous school illustrates the significant differences between performances in literacy and numeracy with that school and other non-Indigenous schools in Australia. In Table 2, the results for Nyangatjatjara College are used to exemplify the disparity in student performance. This College is an Indigenous owned and operated college in Central Australia with 100% of the students being Aboriginal. This College represents many schools in the tri-state region of Australia. This region is the central Australian area that covers South Australian (The APY Lands), the southern part of the Northern Territory and the central eastern part of Western Australian. Unlike the political demarcations of state boundaries that influence education provision, the tristate region is one where the Indigenous families move between states without the usual sense of boundaries. The College is selected merely to represent many of the schools found in this region. While there may be disparities between schools, there are some common trends. According to the *My School* website, 38% of the students have a language background other than English, attendance is 42% and 70 students are enrolled at the College. Costs to operate education are listed at recurrent net income as $27,952 per student. It can be seen from Table 1 that the performance in literacy and numeracy is considerably below that of similar schools on all measures but even worse in comparison with the scores for the national cohort. Such figures highlight the significant differences in performance between many remote schools and mainstream urban settings.

Table 1. Year 7 2010 NAPLAN scores for Nyangatjatjara College (Source: My School Website)

Reading		Writing		Spelling		Grammar and punctuation		Numeracy	
361 (school av)		274 (school av)		404 (school av)		339 (school av)		323 (school av)	
SIM	ALL	SIM	ALL	SIM	ALL	SIM	ALL	SIM	ALL
442	546	401	533	447	545	409	535	449	548

In contrast, there is quite a different story for schools set in urban settings with most of the students at the middle social/economic index. Consider the results for Belmont High School in Victoria (an urban secondary school with of similar size) in Table 2 where a dramatically different story from that of Nyangatjatjara College is shown. Here the ICSEA score is 1029 so it is slightly above the national average social index (of 1000) and has no Indigenous students. Fourteen percent of the students are listed as having a language background other than English. The cost for recurrent expenses for each student is listed as $9,653 so the cost is considerably less than for remote education students. Unlike the remote Aboriginal school, the results at this school are above the national average, albeit only slightly. The data for this

school suggest that the demographics are on par with the average socio-economic status of many Australians and that the numeracy scores are comparable with the average scores for Australian students.

Table 2. 2010 year 7 NAPLAN scores for Belmont High School, Victoria (Source: My School Website[2] 2011)

Reading		Writing		Spelling		Grammar and punctuation		Numeracy	
567 (school av)		551 (school av)		554 (school av)		558 (school av)		559 (school av)	
SIM	ALL	SIM	ALL	SIM	ALL	SIM	ALL	SIM	ALL
549	546	539	533	545	545	540	535	551	548

The comparison in achievement of the two schools is stark. While the urban state school is certainly not an elite school in terms of socio-economic index, but rather an 'average' school, it scores considerably higher than the remote Aboriginal secondary college. The comparisons for the economic investment in education are considerable. In the urban setting the costs for education is approximately one third of the cost for remote education provision but there are very large differences in outcomes. The differences in such achievements have been used to justify a national curriculum since one of the concerns regarding remote/indigenous education has been the delivery of an impoverished curriculum that effectively locks students out of progressing through school. While quality of education is a large concern, the economic costs of providing education (quality or inferior) in remote sites are vastly disproportionate to the outcomes that have been achieved. The quality concern has been evident in many of the arguments proposed by Aboriginal educational activists such as Chris Sarra (2007) and Noel Pearson (2009). Providing a quality curriculum to all students is essential for quality and equal learning outcomes. It is without doubt that providing education in remote sites is an expensive venture but extra funding should result in improved educational outcomes for students.

It is widely acknowledged that there are many hard-to-staff schools and that such schools are frequently located in remote locations, in economically-deprived communities, and have high proportions of families from non-mainstream backgrounds (Panizzon & Pegg, 2007). Such schools are often characterised by high turnover of staff, inexperienced staff, or staff who are not trained in the areas in

[2] 'SIM' = average for statistically similar schools; 'ALL' = average for all Australian schools; Factors used to determine a group of similar schools are the socio-educational backgrounds of the students' parents, whether the school is remote, the proportion of Indigenous students, the proportion of students from a language background other than English, or a combination of these factors

which they teach. Collectively, these factors are likely to contribute to the capacity of staff to implement/enact the curriculum as it is designed.

Whilst quality and consistency is enabled through the Australian Curriculum, the equity in student achievement still resides in variations of teacher quality. As previously indicated, the implemented curriculum depends primarily on the quality of teachers. This quality is, in turn, affected by resources and facilities (some of which depend on location), and the knowledge and skill base of teachers, which can also depend on location since access to professional learning and development is critical in developing teacher capability.

Geography and Education Provision

The stark differences between states and territories require an askance look as to how these very different states are able to offer similar educational opportunities for their constituents. Table 3 below enables a comparison between the population and area of each state/territory. The population of the entire Northern Territory is comparable with some major cities in other states (such as Geelong in Victoria or Wollongong in New South Wales) yet the Northern Territory is the third jurisdiction in the nation by area. The challenge in providing education to so few people over such a large area is enormous. The implications for policy rollout or teacher professional development are considerable in this context. The Northern Territory has previously assumed responsibility for developing its own curriculum and supporting resources (other than the senior curriculum which is shares with South Australia). However, with such a small population, the responsibility for such development has relied on a small body of people. Logic suggests that in comparing population alone, the multiplier effect between the Northern Territory and states such as Victoria (25 times greater) or New South Wales (33 times greater) means that there are many more people available and greater expertise to draw from, to work on curriculum support resources in these states than in the Northern Territory.

The small population, vast distances, the fact that most community schools are small in terms of the numbers of teachers, and that most Aboriginal and Torres Strait Islander people are living in remote communities, creates a unique set of circumstances in The Territory. Providing professional development for teachers is challenging not only in terms of delivery where distances are vast but even satellite technologies are not so reliable for on-line delivery. Many of the teachers are early career teachers, and the staff turnover in remote schools is high. (Roberts, 2004) Implementing and sustaining reforms, such as the national curriculum, become challenging under these circumstances. In such a context the need for, and capacity to deliver, professional development for teachers in remote areas is quite different from urban, centralised states and systems.

Table 3. Populations and Areas for Australian States and Territories[3]

	Area (sq kms)	Estimated resident population (millions)	Capital	Estimated resident population (millions)
Australia	7 692 024	21.01		
New South Wales	800 642	6.89	Sydney	4.34
Victoria	227 416	5.21	Melbourne	3.81
Queensland	1 730 648	4.18	Brisbane	1.86
Western Australia	2 529 875	2.11	Perth	1.56
South Australia	983 482	1.58	Adelaide	1.16
Tasmania	68 401	0.49	Hobart	0.21
Australian Capital Territory	2 358	0.34	Canberra	0.34
Northern Territory	1 349 129	0.21	Darwin	0.12

While geography and population are considerable in their shaping and constraining of possibilities, a further consideration is the diversity within regions. Culture and language must be considered as these vary considerably across the nation. For example Victoria, New South Wales and Tasmania are quite different in their makeup of Indigenous people. While the majority of Indigenous Australians reside in these states, they are very different from the Indigenous people who live in remote parts of Northern Territory, Queensland, Western Australia and South Australia.

In terms of cultural differences, the contrasts between the states and territories are also quite marked. In the Northern Territory, approximately 30% of the population is Indigenous which is in stark contrast from the national average of 2%. Almost 50% of school-age students in the Northern Territory are Indigenous. Most of these people live in remote communities in contrast to many of the more populous states where almost all the Indigenous Australians live in urban or regional centres. There are approximately 30 Indigenous languages in the Northern Territory with the remote students often learning and speaking English as a foreign language. For many remote students living in community, their only encounter with English is in the school classroom. With traditional cultural practices still very strong in many remote parts of the country, there are further challenges to the orthodoxies embedded in curriculum as to whose worldview is represented in and through the curriculum.

[3] Source: Department of Foreign Affairs and Trade (2011) using ABS 2007 census data

Teachers working in these contexts require a strong degree of cultural competence. Villegas and Lucas (2002) use six characteristics to describe culturally responsive teachers: They

1. are socio-culturally conscious
2. have affirming views of students from diverse backgrounds
3. see themselves as responsible for and capable of bringing about change to make schools more equitable
4. understand how learners construct knowledge and are capable of promoting knowledge construction
5. know about the lives of their students, and
6. design instruction that builds on what their students already know while stretching them beyond the familiar.

It can be seen that all of these characteristics require knowledge of the students that teachers are working with, and in particular, the communities and worldviews that they bring with them to the learning environment.

Worldviews and Dominant Forms of Knowledge

As educators, it is critical to appreciate the very different worldviews of Aboriginal people. Trying to represent complexities of cultures and worldviews in and through curriculum documents is a difficult challenge. In the current National Curriculum mathematics document, the framework is very heavily located in Western worldviews and represents the dominant Anglo centric worldview. As such, it excludes Aboriginal and other non-dominant cultures (including, for example, working-class, Muslim or non-Anglo cultures). Some attempts are made to embed examples in non-dominant forms as if such tokenistic examples may be seen to be inclusive of different cultures. The framework itself preserves the status quo that the mathematics curriculum is a set of objective and reified facts that are transcultural (Bishop, 1988).

However, culture is much more omnipresent than simple examples. By way of example, at one point during our time in Central Australia, a large storm hit the area with considerable rain falling. The following day, at a meeting, a comment was passed by a non-Aboriginal person about the intensity of the storm to which one of the Elders commented "thank you" as if the comments were being passed as a compliment about the rain storm. This confused many of the non-Aboriginal people. Further conversations followed in which it was explained that on the way home that evening the Elders had seen the rain clouds and 'sang' the rain. They felt that the rain had been sung into existence as a consequence of their actions. They projected a certain pride in their success in singing the rain at a time when it was needed. Sometime later, when no rain had fallen, a non-Aboriginal person asked

one of the Elders if they could sing some more rain. The response was something like "We can't sing any rain, there are no clouds" but the facial expression of the Elder was one of incredulous disbelief as if the requestor was not very intelligent by not recognizing the impossibility of the task. This story struck a strong cord with us as it illustrated the very different ways of seeing and living in the world. In this case, the worldview of how rain came into existence was elusive for us but quite apparent for the Elder. In such a context, it becomes quite a challenge to teach the national science curriculum where the water cycle is explained in a very different way. These contradictory worldviews make for very different learnings for both in-school and out-of-school that may be quite challenging for remote Indigenous students to reconcile. While this has clear implications for the implementation of the science curriculum, how the difference resonates with the mathematics curriculum is somewhat more salient.

Similar differences in the mathematical worlds can be observed. In the Western world, mathematics is often seen as a body of knowledge that represents pre-existing facts and, hence is irrefutable (Ernest, 1991). Being complicit with this worldview results in the mathematical curriculum being taken for granted and being seen to represent a body of facts that transcend cultures, languages and societies. However, much like the rain example, mathematics is equally a representation of the culture/s from which it emanates or within which it exists. For example, in Western cultures, the capitalist imperative shapes the desire to measure and quantify how the world is seen and described. This is starkly contrasted with desert people for whom the world is much more focused on immediate issues, such as food and water. Thus the desire to count is superseded by a very different imperative which may, for example, focus on how edible a food source may be rather than how much (many) of that food source is available. Thus, what remains a greater challenge for curriculum development and implementation is to identify the ways in which the mathematics is shaped by the culture and then to try to build bridges between the two knowledge forms.

In the central desert context, the Indigenous people speak their home languages which are shaped by, and also shape, their worldviews. In Pitjantjatjara, for example, the language is quite restricted in terms of number concepts. The lands of the desert are quite stark with few resources so the need for a complex language for number is limited. As such, the counting system is one of 'one, two, three, big mob'. It is rare that a collection of three or more occurs so the need for a more developed number system is not apparent. Even when living in community, the need for number is limited. Few people are aware of their birthdates, and numbers in community are very limited in terms of home numbers or prices in the local store. As such, the immersion in number that is common in urban and regional centres is

very limited in remote communities. Therefore, many of the taken for granted assumptions about number that are part of a standard curriculum are limited in this context. This makes teaching many mathematical/number concepts quite challenging as it is not only the teaching of mathematical concepts and processes but a process of induction into a new culture and new worldview. In many communities there is a strong resistance to learning many of the concepts in the curriculum with the frequently asked question of "Why do we have to learn this?" as the knowledge is not relevant to their daily lives. Similarly there is a strong resistance in many communities for instruction in Standard Australian English. In the past year, the Northern Territory government dismantled its formal bi-lingual education program but in other contexts, such as Fitzroy River in the Kimberley, there has been a strong push for the first few years of schooling to be in the home language while the students transition into school English.

Pitjantjatjara is also a very gestural language so that the people may use considerable body language and intonations to communicate. In asking directions to a location, the body will be tilted in the direction of the site – this may be with a hand or head movement. The distance is unlikely to be articulated as a form of measure but the intonation of the wording will give a sense of distance. The speaker is likely to say – "him long way" or "him looooong way" to differentiate the distance to be travelled. Similarly, comparative terms such as long, longer or longest are not found in traditional languages so the intonation placed on words aids in differentiating and comparisons. Whilst these are forms of measurement, they are neither acknowledged nor valued in the national curriculum.

Similarly, the prepositions found in Pitjantjatjara are limited to approximately six in comparison with approximately 64 in Standard Australian English. Where these differences in language are so extreme, coming to learn many concepts, mathematical or otherwise, is challenging as students' home language fails to resonate with the language of instruction and hence many key ideas are unable to be grasped due to the differences in the structures of language.

Many of the local languages and dialects are shaped by the environments but also shape the ways of seeing and acting in the social world. When the home language does not have the language structures that are an integral part of the school curriculum, it becomes an imperative for teachers to build ways of understanding and respecting home languages in order to support the transition from home languages to the school/mathematics language.

Balance Between Common Curriculum and Life-skills

When the differences between Indigenous and non-Indigenous worldviews, epistemologies, and knowledge frameworks form such a chasm, questions about the

appropriateness of a National Curriculum should be asked. In this case, what can be observed is that remote Indigenous students are performing significantly below the national average. However, scores belie the real issues – social, economic, as well as educational. In this scenario, remote Indigenous students are most at risk of leaving school with very low levels of literacy and numeracy, or worse still, being illiterate and innumerate. During our time in Central Australia, an employer approached one of us with regard to a graduate of the school. This student, who was now in his mid-twenties, had applied for work but the only sight word he recognised was his name. While this may be an extreme example, it highlights the difficulties school graduates have when seeking employment and/or on being placed in a work situation. Being illiterate and innumerate severely limits the possibilities of employment and employability. Such outcomes can be seen as a product of the complex mixture of curriculum, pedagogy, and attendance which in turn is a complex mixture of social and cultural factors.

A national curriculum may offer consistency across the nation through affordability of, and hence access to, curriculum resource materials. It also has the potential to ensure that all Australians are exposed to a rich and deep curriculum, particularly those students who traditionally have been offered a restricted curriculum based on their social, cultural or geographic location. It might also be used to ensure, via some accountability measures, that teachers are offering the best curriculum to their students. As many Aboriginal education activists are espousing, too many Aboriginal students have been exposed to a deficit curriculum and pedagogy that has effectively locked them out of education and, ultimately, work. But is this sufficient for justifying a common curriculum? The goals of the nationally documented curriculum may fail due to the inability to reconcile the intended curriculum with the enacted and experienced curriculum.

While the Australian Curriculum may help in some ways to offer a standard, high-stakes curriculum to all Australians, and most notably, to those most at risk of poor education provision and outcomes, it is a framework for knowledge production. Much still rests with the individual teachers. The Australian Curriculum in mathematics does not offer a 'way' to teach school mathematics. Herein, is a very significant variable in terms of quality education provision that has not been explored in the document. The pedagogical framing of the knowledge structures outlined in the document may offer hope, or doom, for learners. While teachers may have the content prescribed in terms of 'what' they teach, there is still considerable scope for 'how' that knowledge is taught. The experienced curriculum becomes a much more substantial issue in terms of equity and outcomes for the students.

Fogarty (2010) describes 'place based pedagogies' that enable a greater connection between the lived experience and aspirations of Indigenous students and their communities, and schooling and work. He suggests that a "pedagogical framework is needed to enable the inclusion of Indigenous knowledge in pedagogic design and a connection between this knowledge and Indigenous development realities in remote communities" (p.218).

For example, addition of fractions may be taught as rote manipulation of numbers in one context, or using concrete resources to represent the addition process by another. Still others may use 'place based pedagogies' and draw substantially on community activities to provide examples of where and how fractions are used in everyday lives so that the knowledge can be made relevant and meaningful. In so doing, that teacher may create very different opportunities for learning the same content knowledge. Teachers will have considerable scope in how they might bring about equity in their classrooms. It may not be in terms of intended learning as indicated in the Australian Curriculum but through their pedagogical processes, where cultural, linguistic or geographical diversity can be built into the lives of mathematics classrooms.

In this chapter, we have sought to raise a number of issues. First is that too many remote Indigenous students leave school functionally illiterate and innumerate at a cost that is economically disproportionate with those of their urban peers. Assuming students continue to attend school regularly in order to build and maintain mathematical knowledge structures and processes as they progress through school, their capacity to engage with many mathematical concepts and processes is hindered on two key fronts. First is the literacy of mathematics, which includes the language of mathematics, and second is the ways in which the pedagogical processes including teacher-student interactions are undertaken in the classrooms. Many of these practices are dissimilar to those of the home and hence lock students out of participating effectively in the classroom. Coming to learn mathematics is as much about cultural induction as it is about the mathematics per se. In cultures where the gap between the home culture and that of the school is not significant, then the work of the teacher is somewhat easier than where the cultural gap is a chasm as is in the case of many remote Indigenous communities.

It is at this point the question of how a national curriculum may serve remote Indigenous students must be asked. While this group of students are the most likely to fail on national measures of achievement, they represent one end of the educational continuum. Other social, cultural and linguistic groups located in various sites around the nation experience some or more of the issues addressed in this chapter, albeit to differing extents. In these circumstances, it is important to consider how a national curriculum can meet the needs and backgrounds of the

diverse groups in this country. Having a curriculum that describes the intended learning for all students is one thing. Ensuring that the intended curriculum is enacted and experienced by students in ways that, despite their variation, ensure learning is maximised for each and every student, is another. Equity in provision does not guarantee equitable learning outcomes. The quality of the enacted curriculum is most likely to bring about improvements in learning outcomes; teachers, schools and systems must address this aspect of curriculum if there are to be changes to the possibilities of learning mathematics for all Australian students.

If the purpose of formal schooling is to prepare citizens for the world beyond schools in terms of knowledge production and dispositions for mainstream society, then all students must have access to the knowledge systems that empower them and enable them to make successful transitions into the world. A robust national curriculum is essential to enable and promote high expectations and equity in access. And whilst the National Professional Standards for teachers offers an attempt to ensure equity in teacher quality, governments must do more to address disadvantages for teachers created through geographical location and distance. Quality teachers who are able to develop appropriate practices that will enable students to enter into the world of school mathematics successfully are needed in remote sites. This is the next step in the process of enabling all Australian students success in school mathematics regardless of their language, cultural background, gender or geographical location.

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