

THE DILEMMAS OF INDIGENOUS EDUCATION: THE PASSION FOR IGNORANCE

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Within the Australian context there is a significant gap between those students who perform well in the standardised national testing schemes and those who do not. Those most at risk of poor performance are indigenous students, and those students who live in remote and isolated communities. Recent years has seen a growth in research projects that seek to address the falling performance of indigenous students. These projects are founded on particular ideologies. This paper explores the dilemmas of working in this field of educational reform. The imperative of educational success is juxtaposed with the implications of cultural subversion.

The passion for ignorance: having ignorance allows us to lead the lives we do (Willis, 2002).

I was remarkably taken by these words of Sue Willis (2002) as she wrote of the anomalies that appear in the teaching of counting. Her examples showed how despite evidence to suggest that the taken-for-granted approaches in the teaching processes associated with counting were violated by what children could do, this was largely ignored. This ignorance, she argued, allowed educators to get on with their job of teaching. In her case, she found that some Indigenous students could recognise collections of objects without counting and yet they were not seen as counters since they could not do the one-to-one correspondence that is the marker of the successful counter. One-to-one counting and rational counting strategies are clearly identified in many curriculum documents and testing regimes as the marker of a successful counter and yet some children did not demonstrate these key principles of counting but could tell how many were in a collection. For students in the latter group, they were frequently constructed as failed learners since they did not undertake what were seen as prescribed indicators for successful counting despite the fact that they could recognise how many items were in a group. For Willis, what was key to her argument was that as educators we fail to recognise anomalies such as these as they violate our taken-for-granted wisdom in how mathematical ideas (in this case, counting) are developed. In so doing, it helps to preserve the status quo, enables teachers to move in ways set by syllabus documents and not need to look outside the box. In these cases, the counting process as defined by curriculum becomes a regime of truth that allows educators to ignore violations of those truths. In so doing, there is a risk of positioning those violating the taken-for-granted norms to be positioned as marginal. In contrast, by recognising that the process does not work for all children means that something needed to be reconsidered with regard to such regimes of truth. However, school wisdom has not prepared educators for how to deal with such examples or where to move with these issues as they appear. Being ignorant of these anomalies

enables the educator to avoid such issues and move on with the task of teaching. In many cases, teachers are ill-prepared to deal with anomalies such as those cited by Willis and the task of teaching is made much easier by ignoring such abhorrent patterns. However, the key question then becomes one of “To what effect does such ignorance have on the labelling of, and subsequent success of, students who violate curriculum norms”.

The focus of this paper is to analyse contemporary approaches to Indigenous mathematics education within Australia. Despite considerable money being spent on interventions and research into ways to improve the educational outcomes for Indigenous Australian learners, there has been limited success. In terms of education, there have been some identified case studies that go against the national trends, but overall, the educational outcomes for Indigenous Australians are very poor. The issues are very complex and cannot be reduced to simple innovations in curriculum or pedagogy since issues of culture, health, geography, absenteeism and language impact on the potential for school learning alongside the overall relevance of western curriculum to the lives of Indigenous learners and their communities.

In this paper, I explore issues of Indigenous success in mainstream schooling as identified in the current testing regimes across the nation. This is supplemented with a discussion on the dilemmas of working in this field.

INDIGENOUS AUSTRALIA: A BACKGROUND

Within the Australian context, one of the most important and pervading educational issues is the education of the Indigenous children. Raging a much more silent apartheid than South Africa, Australia (as a nation) has an appalling record in the treatment of our indigenous people. 2007 makes the 40th anniversary of the referendum in which Indigenous Australians were recognised as a people who could have voting rights. Prior to this time, they did not appear on census collections or had the right to vote. In the following 40 years, there have been little gains for Indigenous people – their life expectancy is 17 years less than non-indigenous people with the largest differences in death patterns occurring between the ages of 35-44 and 45-54 where indigenous people were 5 times more likely to die than non-indigenous people (Trewin, 2005). Issues of employment and standard of living are other markers of the issues confronted by Indigenous Australians. Indigenous people (13%) were 2 ½ times more likely to be unemployed than non-indigenous people (4.6%) and the gross household income for Indigenous families was 59% of that of non-indigenous families (Trewin, 2005). Approximately 20% of Indigenous males have been arrested and/or served time in jail and represent 24% of the national prison population (Australia Bureau of Statistics, 2007). Adjusting for age and other factors, indigenous people were 13 times more likely to be incarcerated than non-indigenous people in 2006 (Australia Bureau of Statistics, 2007).

In terms of education, Trewin (2005) cites that Indigenous people represent only 1% of the higher education population even though they are approximately 3% of the overall population. Within these figures, women (63%) represented the greater proportion of indigenous participation (Australian Bureau of Statistics, 2004). Most indigenous students attend public schools – 88% (Australian Bureau of Statistics, 2004). In 2002, 18% of indigenous people over 18 had completed Year 12 (non indigenous is 44%) but these figures vary with demographics – 24% in city areas, 18% in regional areas, and 14% in remote areas. Similar declines in non-school qualifications are evident across the demography. The retention rate of Indigenous students from yr 7/8 to year 12 in 2002 was 38% in comparison with non-indigenous students of 76% (Australian Bureau of Statistics, 2004).

To be successful in white Australia is quite a task for Indigenous Australians when such a range of issues impact on their lifestyles. It is not my intention in this paper to discuss the reasons proposed by researchers (and politicians, welfare agencies, historians and so on) as to why these conditions exist. Suffice to say, for an international audience, the conditions for Indigenous Australians make success in schools a considerable challenge. When issues of health, the justice system and poverty are combined with the relevance of a Western mathematics curriculum being imposed through education systems, the potential for success becomes more evasive.

In the following sections, I raise a number of quandaries that surround working in Indigenous education in Australia. These are moral and educational dilemmas that confront the researcher when working with communities.

DILEMMA ONE: THE DILEMMA OF SUCCESS

While the use of national testing is fraught with difficulties – practical and ideological - the trends in the data arising from these testing regimes show some noteworthy trends in achievement in numeracy. Further, the question as to whether or not the tests actually test for numeracy or mathematics is another contentious issue that cannot be addressed here. Suffice for this paper is that the test is of some aspect of mathematical thinking and learning.

The tests are based on benchmarks which were set where it was envisaged that 80% of Australian students should reach the nominated standard in Years 3, 5 and 7. There is some difference in the education provided by the different states but for the purposes here, they need not be considered. In considering the data in Table One, it becomes very obvious that there is a trend to suggest that as Indigenous students progress through schooling, their achievement in numeracy decreases with each year in schooling in comparison to their non-indigenous peers. The national differences indicate a trend where the percentage of non-indigenous performances remains at or above the set benchmark but the performance of non-indigenous students declines with an increasing difference of almost 10% each two years so that by Year 7 less than half of the Indigenous students are reaching the national benchmarks.

	Year 3			Year 5			Year 7		
State	All	Indig	<i>diff</i>	All	Indig	<i>diff</i>	All	Indig	<i>diff</i>
NSW	95.4	87.6	7.8	91.7	75.4	16.3	75.8	44.5	31.3
Vic	95.5	91.8	3.7	95.4	89.5	5.9	86.9	66.5	20.4
Qld	92.7	78.9	13.8	88.1	65.8	22.3	83.2	54.5	28.7
SA	92.6	74.5	18.1	90.1	69.8	20.3	85.7	55.8	29.9
WA	90.2	64.8	25.4	85.9	51.6	34.3	84.3	46.8	37.5
Tas	91.2	82.4	8.8	89.1	78.7	10.4	80.5	66.4	14.1
NT	86.2	68	18.2	69.6	35.1	34.5	64.8	24.9	39.9
ACT	94.6	92.8	1.8	93.2	81.4	11.8	88.1	62.6	25.5
Aust	94.1	80.4	13.7	90.8	66.5	24.3	81.8	48.8	33

Table One. Percentage of students achieving the numeracy benchmark by state, 2005 (MCEETYA, 2006)

The data in this table raise a number of serious concerns for educators. First is the increasing gap in performance between students. Regardless of the state, the gap in performance increases in each state. However, in some states, the scores and increasing gap is of grave concern. By Year 7, in most states, Indigenous students are well below the 80% benchmark, with most states scoring around 50%. Remembering that this benchmark is a minimal standard, these low scores are troubling.

The context of Australian education needs some explication. Many of the scores in Table One indicate further concerns. In the states of Queensland, Northern Territory, Western Australia and South Australia, there are many Indigenous peoples who live in remote and isolated areas. This geographic isolation compounds their access to education but also impacts on their cultural isolation. These data suggest that the geographical location has a significant impact on the numeracy outcomes of learners. In this case, it would appear that there is a 20% to almost 40% difference in the outcomes between students in metro areas compared with their peers in remote areas of Australia. Separating out issues of indigeneity and geographical location is not possible, but these data allude to a link between the two factors, that is, that for many indigenous students who live in remote locations, their opportunities for success in numeracy are severely limited.

While these figures have come from the national results in 2005, the persistence of the issue can be seen in Table Two. By comparing the data over a period of six years (since the time the data were collected), the perseverance of the problem can be seen.

	Year 3			Year 5			Year 7		
	All stud	Indig	Diff	All stud	Indig	Diff	All stud	Indig	Diff
2000	92.7	73.7	19	89.6	62.8	26.8	-	-	
2001	93.9	80.2	13.7	89.6	63.2	26.4	82	48.6	33.4
2002	92.8	77.6	15.2	90	65.6	24.4	83.5	51.9	31.6
2003	94.2	80.5	13.7	90.8	67.6	23.2	81.3	49.3	32
2004	93.7	79.2	14.5	91.2	69.4	21.8	82.1	51.9	30.2
2005	94.1	80.4	13.7	90.8	66.5	24.3	81.8	48.8	33

Table Two: Percentage of students achieving numeracy benchmarks by subgroup (MCEETYA, 2006)

These data indicate that there is a constant trend for the performance within a year level and the increasing difference across year levels over time. The national data over time is relatively stable suggesting that the problem is entrenched and that the 2005 may represent consistent trends.

Recognising the stability and depth of the issue of under-achievement in numeracy for Indigenous students requires educators to move from positions ignorance to one that recognises the failure of the system to cater for the learning needs of these students. Clearly the practices that have been enacted in the past have met with considerable failure. Holding on to failed practices ensure reproduction of poor outcomes. The position taken by Willis when confronted with behaviours that violated the taken-for-granted practices upon which school mathematics enabled a reconceptualisation of thinking mathematically. By gaining insights into other ways of thinking and working mathematically provides a platform for a new agenda in the learning of mathematics by Indigenous communities.

When considering success in school mathematics for Indigenous students, particularly those in remote areas, the dilemma becomes one of the prioritising of mathematics and the implications of learning mathematics in those communities. How relevant are particular forms of knowing mathematics, what forms or aspects of the mathematics curriculum are needed or should be included in curriculum for the students or should the expectation be one where they are exposed to the same curriculum as their urban counter parts.

DILEMMA TWO: INCLUSION OF INDIGENOUS CULTURES IN SCHOOL MATHEMATICS

Is mathematics an endeavour in its own right? If so, how does this view rest with cultures or social groups for whom the practices of school mathematics are not part of their cultural systems. If school mathematics is taken to be a social practice, then it has been shaped by history, culture and practices so as to take a particular form, and value different aspects and outcomes. The dilemma then becomes one of aligning two very different social practices – that of school mathematics with that which those that students bring from their homes and communities. In some cases, there are elements of Indigenous cultures that will align with the practices of school mathematics but there will be differences that have been shaped by the contexts in which they have developed. The task of education thus becomes one of bridging between the different ontologies so that students can come to learn school mathematics. Part of this learning is as much about mathematics as it is the social practice of mathematics.

In their comprehensive study of community numeracy practices, researchers (Rennie, Wallace, Falk, & Wignell, 2006) reported a number of disjunctions between community and school practices. They contend that community activities are dominated by cultural knowledges whereas school is dominated by curriculum knowledge. They argue that the knowledge in the community ‘was not written and it was never forgotten’... ‘knowledge in schools was largely of the text book kind ... it was written and recorded’ (p.10). These differences pose conundrums for school mathematics where the social practices are often about writing and recording, and where the textbook often takes a prime position. In working in Indigenous communities the process of recording knowledge becomes one that may be antithetical to indigenous ways of working.

Harris (1990) in her studies of Indigenous concepts noted that some indigenous people talk of the “everywhen” and that there is a stronger focus on history rather than forward looking. Similarly, others have noted that indigenous community knowledge rarely focuses on the future whereas schools talk about the future – going to work, preparing for Year 12 and so on (Rennie, Wallace, Falk, & Wignell, 2006). Community knowledge and activities were strongly connected to people, place and artifacts in that community whereas school activities were centred around the teacher and students. In coming to learn mathematics, this sense of time and place create another conundrum for teachers as they reconcile whose sense of time and place takes priority, whose sense is the legitimate account, and how differences can be reconciled or addressed.

The ethnomathematical approaches that seek to identify the ‘frozen mathematics’ (Gerdes, 1986) in cultural activities has been taken up in the work of Harris (1990; 1992) who sought to identify the mathematics in Aboriginal activities. In her keynote address, she sought to identify the hidden mathematics in Aboriginal artworks. Such an approach has been heavily criticized by Dowling (1993) who argued that this type

of work subjugates the indigenous activity (spiritual representations) for a mathematical activity. The intentions of approaches such as Harris' have to identify the mathematics in cultural activities in order to provide legitimation of those activities so as to illustrate the indigenous people are capable of undertaking the mathematics of school activities.

In contrast, the work of Watson (1988) has taken a more grounded approach so that the researchers work with communities to develop a both-ways approach to learning where the cultures of both the Indigenous communities AND school mathematics are integrated into learning. Watson, working with the Yirrakala community identified indigenous ways of knowing and these became a legitimate part of the school curriculum. For example, mapping processes undertaken by the Yolgnu people were part of the curriculum. Their 'singing the land, signing the land' was a way that they mapped their lands where significant historical and cultural events were used to mark the land.

In considering the two very different cultural systems, the dilemma becomes one where the researcher and educator need to consider the balance between the two cultural systems, which has greater priority and how to move a curriculum forward.

DILEMMA THREE: LEARNING AS A PROCESS

Learning for many indigenous students is experiential and occurs in contexts where the skills and knowledges would be needed such as hunting or shopping. Learning school mathematics is premised on particular epistemological foundations so that coming to know is shaped by particular views of learning and pedagogy. In many cases, the traditional learning of mathematics is an individual endeavour that is often taught in highly competitive environments. School learning is largely an individualist endeavour where independence rather than collaboration are valued. (Rennie, Wallace, Falk, & Wignell, 2006). In contrast, learning for Indigenous students was a shared responsibility for all of those people involved in the activity (Rennie, Wallace, Falk, & Wignell, 2006).

The role of questioning is an integral part of the teaching process in mathematics classrooms. Early research on questioning highlighted the different forms of questioning where most questions are low level recall questions. Culturally, the questions that are posed by teachers are premised on the notion of checking students knowledge so that the teacher usually knows the answer and is 'testing' students' understandings. In contrast, for many indigenous students, questions are posed as authentic situations where they are seeking to find out information – "how do I get to x?" so that the posing of questions commonly used in mathematics are antithetical to the role of questioning in their communities.

In Indigenous community settings, the passing on of knowledge is through oral stories where elders pass on knowledge to the younger generations. Coming to understand whether the younger generations have understood the teachings is through

questioning but not the ways that are posed in Western classrooms. Questions posed by the young to the elders serves as an indicator to the elders of how much has been understood. This role of questioning is very different from that of the classroom.

In considering the learning environment, the dilemma becomes one of enculturation. Should the learning environment embrace the indigenous ways of working or is the learning environment a process of enculturation into Western ways of working.

DILEMMA FOUR: DEVELOPING AN IDENTITY

For many students, coming to develop an identity is about being a member of a community (or communities). For indigenous students, coming to learning western mathematics presents a rupture between the lifeworlds of the students and the school. It is widely recognized that identity is critical to learning. Coming to foster an identity of a mathematics learner for indigenous students often requires a significant cultural shift. This shift is significant as it is about lifeworlds where representations of quality and relationships are central to the lifeworlds of Indigenous people is juxtaposed with the quantification lifeworlds of Western cultures. Developing an identity of a mathematics learner requires a

DILEMMA FIVE: TEACHER QUALITY

Often remote communities are hard to staff and attract fresh graduates who have little teaching experience and frequently have not worked within indigenous families or remote communities. (Cooper, Baturo, & Warren, 2005). While such attributes could be a strength in that there has been little opportunity for preconceptions to have developed, the experiences of teaching, planning and assessment have been limited for beginning teachers. As such, it is most likely that such teachers will need considerable support in their transition into classrooms from their employing authority.

A WAY FORWARD

In this final section of the paper, a way forward is proposed. Drawing on the considerable work that has been undertaken in building towards equitable mathematics classrooms, a number of strategies are framed. IN considering the significant dilemmas confronted by educational researchers working with Indigenous people, the reliance on ignorance to sustain existing practice must be addressed. The dilemmas noted in the previous section provide some indication of the considerations that must be made by those in the field. They are not necessarily dichotomies and clearly working with communities is critical. Their involvement in determining their forms and outcomes of education is taken for granted. While it has not been possible to raise the intricacies of many of the issues at the chalk face, the dilemmas raise considerations that need to be thought through carefully when working with Indigenous people where the intention is to raise the performance of their children.

More specific changes need to be considered with respect to shifts in reforms and innovations. These are outlined in Table Three below.

	Current	Shift to
Pedagogy	Teacher centred, teacher directed	Student centred, culturally directed
	Skills based, rote and drill, low level	High quality, deep learning
Expectations of learners	Low expectations	High expectations
Assessment	What learners don't know	What learners do know
Curriculum knowledge	Built on Western knowledge structures	Incorporates indigenous ways of knowing
Curriculum processes	Hierarchical knowledge	Build from Indigenous knowledge
Ways of knowing	Linear	Networked
Language	Anglo-centric	ESL approach, language immersion, scaffolding

Table Three. Shifts needed in Reforming Mathematics

Returning to the original comment made by Willis with regard to ignorance enabling the continuation of taken-for-granted practice, the dilemmas raised in the paper pose challenges to some areas of educational reform that need to be considered if ignorance is to be addressed and the success of Indigenous learners is promoted.

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