Aboriginal Students and Numeracy

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Aboriginal Students and Numeracy


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Abstract

By identifying cohorts of Aboriginal students who were experiencing success as mathematics learners, this project examined schools for combinations of effective numeracy teaching, innovation, responsive management, and community involvement/partnerships that may have been contributing to this success. Case studies of those students and their schools focused on qualitative and quantitative evaluation of student achievement and qualitative analysis of the influence of student, teacher, school, community and school/community context on achievement.

Student achievement was examined from external perspectives, such as performance against National Benchmarks and also from internal perspectives; achievement described as the extent to which schools meet the educational needs and expectations of their communities.

Findings indicated that in schools where Aboriginal students, as a group were achieving best in mathematics, this achievement was apparent according to both internal and external measures. In these schools, classroom and numeracy teaching strategies tended to be language focused and culturally inclusive/responsive. School leadership structures and whole-school culture were also culturally inclusive/responsive to the needs of Aboriginal students and their communities, which enjoyed real influence in school decision-making. These conditions appeared pre-requisite to success, as the employment of numeracy teaching strategies aligned with concrete/visual and immersion approaches tended to be successful only when they were in place.

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Paul Watson, Gary Partington, Jan Gray & Les Mack, March 2006
I. Executive Summary

Aboriginal students’ performance in mathematics is below State and National averages at every level of schooling.

Many Aboriginal communities across Australia have expressed a desire for their children to be able to meet mainstream achievement standards and to be fluent in the ‘secret language’ (which includes numeracy), which is the language of power and influence in Australian society. However, achievement has been found to be a problematic term, in regard to the proposition that schools should meet the needs of the communities they serve.¹

Numeracy Achievement was examined from two perspectives:
• According to the identified needs of individual communities (internal measures)
• According to external measures

There may sometimes be tension between these two perspectives, as different communities sometimes have different priorities for what sort of achievement they want for their children.

Communities’ definitions of achievement varied across a range of desired outcomes, such as:
• skills for University (eg. education/management/politics)
• skills for VET courses (eg. small business operation, trades)
• development of the whole child
• attainment of Aboriginal knowledge in an Aboriginal context
• schools providing students the opportunity to demonstrate their abilities and achieve adequate qualifications to gain real employment

Where communities felt that students were achieving well by their own standards (ie; the school was meeting the needs of its community):
• The school and its classrooms were more culturally inclusive/responsive
• There had been consistent and strong leadership, with clear goals and processes fully supported by the Aboriginal community, over a number of years (5-10)
• The Aboriginal community had real influence in decision making, including purposeful recruitment, and therefore:
• There were committed teachers (including Aboriginal teaching staff), who knew their students and also had knowledge about their communities
• School and community were less separate

Schools where Aboriginal students were achieving well according to community standards were generally also those where students were achieving well by external standards. However, it may be simplistic to look at performance against benchmarks from a whole school, whole State, whole nation, or single Year perspective, especially in schools with transient populations or erratic student attendance.

¹ Heitmeyer (2001)
By external and internal standards, where schools and communities were less separate, Aboriginal students were achieving better than Aboriginal students elsewhere. Their performance was also comparing quite favourably with all students, in terms of achieving above National benchmarks or State/Territory averages (external standards), but not necessarily in all classes.

*Individual* Aboriginal students were having success in mathematics in some schools that made attempts at being culturally inclusive, but where reflections of clear social divisions and racism between Aboriginal and non-Aboriginal people in the wider community persisted. These students were sometimes compensated by other factors, such as:

- living in homes where there is strong and/or academic support for school learning
- having great individual teachers who are inclusive and strongly supportive
- just being brilliant students

Schools where Aboriginal students, as a group, were achieving better in numeracy by external and internal standards were also generally those where Numeracy teaching strategies were:

- Culturally inclusive/responsive and
- Language focused

The use of concrete/visual and immersion strategies appeared to be part of effectiveness in some cases but not in all.

Communities where schools came close to meeting community-defined needs were often those that had been in a position to demand it. In some cases strong leaders had initiated a major consultation/change process.

The best way for schools to meet the needs of communities appears to be for communities to have the capacity to identify their own specific educational needs, and to design, manage, deliver and assess programs in the way that they see as most appropriate and effective for their children. To achieve this they need principals who are strong leaders, responsive to their needs, who have their full confidence. These leaders may not be Aboriginal, but often are (or become) part of the community.

Successful Aboriginal mathematics learners are the result of sound School and Teaching Practice, which may be less about specific numeracy teaching strategies than about:

- Schools that value kids and involve/respond to/reflect community values, language, knowledge and ways
- Teachers who value kids and involve/respond to/reflect community values, language, knowledge and ways in their teaching practices

This means that the best schools and teachers for Aboriginal students are those which care enough about kids and communities to involve parents/carers, elders and other community leaders in schools, school decisions and teaching; learn about and respond to their needs and reflect these processes in their practice and curriculum.

These processes are the essence of Sound School and Teaching practice for Aboriginal students and in their absence, specific numeracy teaching strategies may have limited impact on the development of Aboriginal students as effective mathematics learners and effective practisers of numeracy.
Where this sound school and teaching practice does occur, numeracy teaching practices which are culturally inclusive/responsive and have a language focus are likely to be evident. Numeracy teaching strategies that focus on immersion or concrete/visual stimuli may be effective, but this is not necessarily the only approach that will be effective and it is not likely to be effective in isolation.
II. Glossary

Aboriginal/Indigenous: Local protocols, preferences and terminology vary across Australia. However, as a Western Australian project, the Aboriginal Education and Training Council of Western Australia has requested that the term ‘Aboriginal’ be used for the purposes of this document. This does not seek to exclude Torres Strait Islander people, some of whom have been involved in the study, or to devalue regional or local name or group preferences. Although the terminology used in documentation has been adhered to for ethical purposes, the term Aboriginal is generally used and should be interpreted here as including all Indigenous people of Australia.

Aboriginal mathematical knowledge: Knowledge related to making judgements in Aboriginal society (broadly speaking) that may be aligned with strands (or clusters of “Learning Outcomes”\(^2\)) in mathematics curricula. In specific contexts this may be done formally, as in one community, where specific, detailed knowledge relating to kinship structures and concepts involving “land and place” are formally aligned and taught with the strands Number and Space respectively, in a structured way. The extent to which this can be achieved by individual teachers and schools may be limited by their willingness to develop their own knowledge base and to involve Aboriginal teachers and elders in curriculum development and teaching. It may also be limited by the complexity of Aboriginal knowledge in the community (as affected by colonial disruption and oppression) and the depth of understanding by mathematics curriculum developers (Aboriginal and non-Aboriginal) of ways that Aboriginal knowledge can be aligned with mathematics curriculum.

AIEW: This acronym is used throughout the document to denote school staff members officially classified as non-teaching staff; variously titled Aboriginal and Islander Education Workers (AIEWs), Aboriginal and Islander Education Officers (AIEOs), Aboriginal Teacher Assistants (ATAS) and Aboriginal Education Assistants (AEAs). It should be strongly noted that, despite this classification, teaching is a necessary function of their role, often with individual students or small groups. They also have many other roles, which may depend on the scope with which schools and teachers utilise their valuable skills. These roles sometimes intersect with perceived or actual roles of Aboriginal Liaison Officers. Some AIEWs object to being referred to as Teaching Assistants or Teacher Aides, as they feel this undervalues their skills, role and status as specialists in their function and field. Non-recognition in schools and classrooms of Aboriginal English as a valid dialect of Standard Australian English often contributes to this undervaluation; Aboriginal staff working in classrooms are often not acknowledged for their role in both linguistic and conceptual translation and interpretation.

ASSPA: Aboriginal Student Support and Parent Awareness program, where:

“Commonwealth per capita funding is made available to Committees comprising:

- the parents of Indigenous preschool students
- primary and secondary school students
- representatives of their preschool or school; and
- community representatives

\(^2\) Curriculum Council (WA) (accessed 2005)
These Committees decide on and undertake activities, which will enhance educational outcomes for Indigenous children, and which involve Indigenous parents in educational decision-making”.

**ATAS:** (changed to ITAS in 2005) Aboriginal (Indigenous) Tutorial Assistance Scheme. This program provides tutorial support for Aboriginal students to a maximum of one hour per subject per week.

**ATSI:** Abbreviation for ‘Aboriginal and Torres Strait Islander’

**Best Practice:** this can be generically defined as:

“An activity or procedure that has produced outstanding results in another situation and could be adapted to improve effectiveness, efficiency, ecology, and/or innovativeness in another situation”.

In education, a definition is elusive, as:

“Individuals and groups within the same institution often have very different and even conflicting views of ‘best practice’ in teaching and learning”.

**Bilingual/bicultural:** able to function culturally and linguistically in two cultures. In the context of this study, this means that school culture and school language are often different to home culture and language and SAE is not the first language/dialect of Aboriginal students. This is equally valid in terms of distinct Aboriginal languages and Aboriginal English or Kriol, which are dialects of SAE. Students often must learn to code-switch (change between linguistic genres) from “home talk” to “school talk” (SAE) when they come to school; a skill which is sometimes explicitly taught in schools. However, the extent to which teachers accept the use of Aboriginal English in classroom/playground contexts is variable. Some Aboriginal students are multi-lingual/dialectic; speaking several distinct languages and dialects (SAE may come fourth or fifth).

**Bilingual/bicultural education:**

Bilingual Education is the use of two languages, one of which is English, as mediums of instruction for the same pupil population in a well organised program which encompasses part or all of the curriculum and includes the study of the history and culture associated with the mother tongue. A complete program develops and maintains the children's self-esteem and a legitimate pride in both cultures….Much debate about bilingual education has taken place between those who see bilingual education merely as an effective way of developing literacy in English ('transfer' model of bilingual education) and those who see bilingual education as being an important means of maintaining Aboriginal language and culture while also enabling the acquisition of literacy in English (a 'maintenance' model of bilingual education).

**Two-way or Both-ways** schooling takes this further:

a strategy to help make the matter of choice real in both worlds; to provide opportunity for the primary Aboriginal identity to stay strong, though changing, and these continue to be the source of inner strength and security necessary for dealing with the Western

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3 Department of Education, Science and Training (viewed 2004)
4 The Interoperability Clearinghouse Glossary of Terms (accessed 2005)
5 Luck, Jones, McConachie & Danaher (2004)
6 Reconciliation and Social Justice Library (accessed 2004)
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world....Aboriginal people today are increasingly interested both in being empowered in terms of the Western world and in retaining or rebuilding Aboriginal identity as a primary identity.\footnote{Harris (1990)}

**CDEP:** Community Development Employment Program.

In this program, unemployed people are engaged working on community projects in mainly unskilled, but occasionally skilled roles.

**Concrete/visual:** this describes numeracy teaching strategies that reinforce the development of concepts by the use of visual images and manipulation of materials to encourage discovery of meaning, or as a precursor to oral or written representation of conceptual knowledge.

**Culturally inclusive/responsive:** Culturally Inclusive should mean that instruction and other interaction with Aboriginal (and other culturally different students) “recognise(s) the specific learning needs, preferences and styles of (these) learners”.\footnote{McLoughlin (1999)}

Inclusive teaching, curriculum and schools “acknowledge(s) multicultural realities” and are “driven by equity and social justice.” They should also:

“develop… a conceptual framework for interpreting culture in the curriculum and for countering racism by identifying and distinguishing between human relations, race relations and human rights approaches.”\footnote{Racism No Way (2002)}

The intention is accurate and clear. The term however has become a little trite through over-use. On the websites of State/Territory Education Departments it is often prominent, claiming that the organisations have a culturally inclusive approach. Perhaps the Management/Administration sections of these large bureaucracies are culturally inclusive places, perhaps their (whoever they are) intention is for schools to be culturally inclusive places, but many schools are not. Consequently, the term ‘culturally inclusive/responsive’ has been chosen to allow the definition to differentiate between environments that merely do the obvious culturally inclusive things they are supposed to do, and those that actively and positively respond to the world views, knowledge and experience of Aboriginal students and their communities; including them as valid.

**Effective Teaching and Learning:** It has been noted that Aboriginal parents’ and communities’ aspirations for their children’s education are for them to be able to achieve academically at a similar level to other students, therefore enabling them to achieve equitable ‘life chances’, in terms of choice in vocations and employment and income-earning potential. Although conflicting definitions of achievement will be examined more closely later (see **VII Numeracy Achievement**), ‘Effective Teaching and Learning’ can be defined as a communication of ideas among teacher(s) and student(s), usually in a classroom setting that results in achievement (by any definition). This often neglects to recognise that learning should be a multi-directional process; students learning from teachers and other students, and teachers learning from students and other teachers.

**ESL:** English as a Second Language

**Getting It Right or GIR:** The Getting It Right Literacy and Numeracy Strategy (GIR-LNS or GIR) is a Western Australian government commitment to provide for the training and
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placement of specialist teachers, to support classroom teachers in ‘selected’ primary and district high schools. Those trained as numeracy specialists assist in diagnosing the needs of students who are struggling and provide Numeracy support programs to meet their learning needs. It tends to concentrate on the early Years, and

targets certain groups with levels of literacy and numeracy that lag behind those of the general population, in particular: Aboriginal students; boys; students with a language background other than English and students in rural and remote locations.\(^{10}\)

**Immersion Strategies:** teaching strategies which aim to provide a physical learning environment, which is rich in information (literal or numerical) and opportunities to explore ideas.

**K-2, K-7, K-10, K-12:** These abbreviations refer to grouped Years of schooling, e.g. Kindergarten to Year 2 (K-2), Kindergarten to Year 7 (K-7), etc.

**Language focused:** describes teaching strategies which explicitly deal with the meanings embedded in language (particularly where the language of instruction is not children’s first language).

**Mainstream:** This term varies in its application and interpretation in the discourse of Australian education policy and practice. It is generally used to describe an educational context that does not differentiate between cultural groups, but caters to the majority. In schools, this can be just one of several contexts operating. The fact that it is used (at least in the vernacular) leads towards a supposition that Aboriginal students are often seen as functioning outside the mainstream, but that there is an expectation that they will ultimately join it; a supposition that is assimilationist in intent. Consequently, it has been used in this document to describe a student body and a teaching/learning culture that does not specifically cater for the needs of, and in practice often excludes Aboriginal students.

**Non-Aboriginal, white:** These terms are used variously to describe members of the dominant Australian culture. Apologies should be accorded to some non-Anglo and non-Indigenous Australians, especially those who are considered or consider themselves members of that dominant culture or perhaps don’t believe there is one. Use of the elastic and inaccurate term white Australians, often refers to the majority (becoming less so with time) who identify as being of European descent.

**Numeracy or mathematics:**

Numeracy is the effective use of mathematics to meet the general demands of life at school and at home, in paid work, and for participation in community and civic life….\(^{11}\)

Sometimes numeracy is referred to in terms of how ‘mathematically literate’ someone is.\(^{12}\)

The development and assessment of numeracy is often embedded in mathematics curriculum. For example, in the Curriculum Framework (WA)\(^{13}\), the ‘Working Mathematically’ strand of the mathematics Learning Area aims to develop students who can “use mathematical thinking

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\(^{10}\)Curriculum Directorate, Department of Education and Training (Western Australia) (viewed 2004)

\(^{11}\) MCEETYA (1996)

\(^{12}\) Danbury Public Schools (accessed 2005)

\(^{13}\) Curriculum Council (WA) (accessed 2005)
processes and skills in interpreting and dealing with mathematical and non-mathematical situations.” Other strands aim to develop students who can:

- appreciate the role mathematics has had, and continues to have, in their own and other communities,
- describe, compare, evaluate, plan and construct,
- deal with data and situations in which uncertainty is involved,
- describe and analyse,
- understand,
- describe and reason.

Since assessment of numeracy achievement is embedded in mathematics assessment, the terms can often be used interchangeably regarding assessment in educational settings, as they will be in this report.

**Professional practice:** The practical teaching component of Tertiary courses which provide Teacher Education.

**SAE, Aboriginal languages, dialects, Aboriginal English:**

SAE: Standard Australian English

Aboriginal English: dialectic variations of SAE spoken by most Aboriginal Australians, which may incorporate “significant grammatical variation from standard English and many Aboriginal words and concepts.” It may also operate “according to Aboriginal rather than European conventions with respect to the way in which interactions and speech events should be conducted.”

Aboriginal languages/dialects: distinct languages and their dialects, spoken by various ‘language groups’ of Aboriginal Australians, often in remote communities. Some Aboriginal children have an Aboriginal language as their first language, but may also have facility in another language or other dialects as well as in Aboriginal English. This means that for learning purposes, SAE may sometimes be a third or fourth language or dialect.

**SIDE:** School of Isolated and Distance Education

**State/Territory Testing Against National Benchmarks:** This term refers to various State and Territory testing for Literacy and Numeracy skills, over which National Benchmarks, or ‘acceptable standards’ of Numeracy and Literacy are imposed. These were adopted by all Australian Education Ministers in 1999, as part of an effort to improve the educational outcomes of all Australian children. The Western Australian Literacy and Numeracy Assessment (WALNA) is the instrument framework used across Western Australian schools. Similar instruments used in other States and referred to in the study include the ‘Basic Skills Test’ in NSW and ‘Multilevel Assessment Program’ (MAP) in the Northern Territory.

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14 Malcolm (1998)
III. Conventions

The following conventions have been applied to the body of this document:

Single quotation marks (‘’) indicate terms identified as specifically pertinent to the context of the research, such as ‘internal’ and ‘external’ (above).

Double quotation marks also indicate direct quotations from reference material when used in a larger stream of text. Longer quotations are separated from the stream of text and indented, but not in inverted commas.

Direct quotations from interviews with respondents conform to the above conventions, but are also presented in italics to distinguish them from quotations from external sources. 

*Italics* are also occasionally used for emphasis.
IV. Literature Review

A review of available Australian and International publications was conducted to examine:

- recommended ‘best practice’ for teaching numeracy to Aboriginal students
- reports of programs and strategies that have resulted in success for Aboriginal mathematics learners
- reports of innovative teaching practices for Aboriginal mathematics learners
- recommended ‘best practice’ for schools with Aboriginal students
- reports of innovative schools where Aboriginal mathematics learners have experienced success

From this literature review, the following summary of likely characteristics of good teachers, good schools and successful Aboriginal mathematics learners emerged. This summary was used to inform the development of research questions and design of interview questionnaires.

Although this Summary might seem to provide an attractive recipe for teachers, student-teachers or teacher-trainers, it should be noted that it was merely developed as a guide, from a range of publications by teacher-practitioners, managers and researchers, few of whom are Indigenous. It should be approached with due caution and in the context of the complete report.

Summary of Literature Review

1) EFFECTIVE TEACHERS OF NUMERACY FOR ABORIGINAL STUDENTS ARE LIKELY TO DEMONSTRATE:

a) General Attitude

- Physical warmth and encouragement
- High and consistent student expectations
- Fairness
- Patience and even temper
- Job satisfaction

b) Values

- Valuing communication
- Knowledge & respect for Aboriginal history, culture & knowledge
- Recognition of what students value

c) Community Orientation

- Willingness to involve parents/community in learning and classroom planning
- Willingness to invite parents/elders into classroom
- Willingness to spend time in homes/community
- Willingness to teach new students about school and school practices
d) **Classroom and Numeracy Teaching Strategies**
(for analysis, these have been sorted for alignment with four categories – see V. Methodology)

- Flexible approach to student-centred and negotiated teaching
- Lack of reliance on ‘busy-work’
- Tasks that scaffold learning; building from student understanding at a variety of achievement levels; focus on what is known, rather than what is not known
- Use of visual imagery to aid concept development
- Encourage and value students taking risks; minimise risk of being ‘right’ or ‘wrong’
- Encourage displays of student understanding
- Encourage and observe mathematical experience through play
- Provision of ‘rich’ learning tasks that are contextually meaningful and embedded in relevant and diverse language
- Provision of a range of tasks that allow students to make some progress and attain some success
- Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics
- Explicit teaching of differences between and valuing of both western and Aboriginal mathematics
- Focus of mathematics on everyday activities in the classroom
- Provision of a wide range of concrete materials
- Encouragement of sharing as an acceptable and desirable aspect of learning
- Student freedom to choose methods of recording that fulfil their needs
- Explicit teaching of differences in learning contexts
- Flexible and regular use of technology
- Provision of a range of learning environments, including outdoors

2) **SUCCESSFUL SCHOOLS FOR ABORIGINAL STUDENTS ARE LIKELY TO DEMONSTRATE THE FOLLOWING ATTRIBUTES:**

- Whole school approach to Aboriginal education
- Strong focus on student hearing, health and nutrition
  (in curriculum & practice – strong partnerships with agencies)
- Strong focus on mathematics in early Years
- Promote literacy in mathematics and numeracy in language
- High and consistent student expectations
• Constant investment in Aboriginal staff
• Encourage input of non-professional teachers; AIEWs and elders
• Encourage sharing of practice
• Aboriginal education is seen as ‘core business’
• Encourage and invite active community involvement, including in decision-making
• Recruitment includes performance dimension (demonstrable responsibility)
• Cooperative staff relationships: de-emphasis on hierarchy, staff freedom to speak and act, multiplicity of roles
• Encourage teachers to work within whole school framework
• Empower, support and encourage teachers to be innovative
• Encourage professional development (PD) and teacher input into PD
• High level of resources (physical and human, including Aboriginal staff at all levels)

3) **SUCCESSFUL ABORIGINAL MATHEMATICS LEARNERS ARE LIKELY TO:**

• Have positive attitudes to mathematics
• Have positive attitudes to school
• Feel confident and in control of their learning
• Feel free to take risks
• See mathematics as relevant to their daily lives
V. Methodology

PURPOSE:

The study intends to make recommendations with implications for communities, schools, teachers, teacher training organisations and policy makers (Governments) which, through improvement of the numeracy achievement of Aboriginal students, will increase the capacity of the Australian Aboriginal community to realise its potential to participate equitably in education, employment and societal privilege.

POSITION

This is an emancipatory study which attempts to propose solutions that will benefit Aboriginal students and their communities. As such, the non-Indigenous researcher offers a position of privilege to Aboriginal voices, which are seen as most qualified to contribute to those solutions.

AIMS: The study was conducted in two Phases, each of which had specific aims.

Phase I Aims

• To identify strategies for mathematics instruction that have been effective with Aboriginal students, primarily in the K-7 groups.
• To explore the social, environmental and institutional contexts within which these strategies have been effective, and suggest how these contexts may have influenced their effectiveness.
• To describe and compare trends in numeracy and literacy achievement for Aboriginal students in the study.
• To propose a model of successful mathematics learning for Aboriginal students in the K-7 groups.

After Phase I, it was felt that the full range of schools necessary to thoroughly inform answers to the research questions had not been included. Research aims for Phase II were subsequently amended to address this deficit.

Phase II Aims

Conduct research into existing mathematics solutions for Aboriginal and Torres Strait Islander students in Years K to 7 and analyse the social contexts of the children for whom the solutions will be developed, with particular attention to the following:

• extension of the study to include remote locations;
• the social environmental and institutional contexts in which Aboriginal and Torres Strait Islander students engage in instruction, including urban, rural and remote schools;
• mathematics teaching and learning strategies that have been successful, including
special mathematics programs;
• organisational reforms and resources currently used in a range of school contexts which have been effective in improving numeracy outcomes;
• current levels of achievement of students within the context of this study;
• evidence of gains made by the schools; and
• development of a model of successful mathematics instruction for Aboriginal and Torres Strait Islander students.

In reporting the findings, attention will be given to:
• clear documentation of the successful numeracy strategies;
• evidence of student achievement of aspects of numeracy;

LITERATURE REVIEW

An extensive review was conducted of Australian and International publications to examine:
• recommended ‘best practice’ for teaching numeracy to Aboriginal students
• reports of programs and strategies that have resulted in success for Aboriginal mathematics learners
• reports of innovative teaching practices for Aboriginal mathematics learners
• recommended ‘best practice’ for schools with Aboriginal students
• reports of innovative schools where Aboriginal mathematics learners have experienced success

From this literature review, a summary of likely characteristics of good teachers, good schools and successful Aboriginal mathematics learners was developed. This summary was used to inform the development of research questions and design of interview questionnaires (see III. Literature Review).

RESEARCH QUESTIONS

Questions for Individual Case Studies

• In what ways and to what extent are the teaching and learning of mathematics effective for Aboriginal students?

• How do teaching factors contribute to the effectiveness of mathematics by Aboriginal students?

• How do contextual aspects of the school management and culture contribute to the effectiveness of the teaching and learning of mathematics for Aboriginal students?
Questions for the overall study

• What teaching factors contribute to the effectiveness of learning of mathematics for Aboriginal students?

• What contextual aspects of classroom and school management and culture contribute to the effectiveness of the teaching and learning of mathematics for Aboriginal students?

• What strategies, programs and policies are likely to improve the effectiveness of the teaching and learning of mathematics for Aboriginal students in a range of contexts and across contexts?

RESEARCH ETHICS

The study has been scrutinised and approval given to conduct research involving human subjects by:

• The Human Research Ethics Committee of Edith Cowan University
• The Strategic Research Directorate of the NSW Department of Education and Training
• Planning and Review Services, Business Planning and Information Division of the
• Northern Territory Department of Employment, Education and Training (DEET)

References which could compromise confidentiality agreements with respondents are identified as ‘Source withheld’. Information relating to these sources has been retained by the authors.

POPULATION

The focus of the study was Australian schools where Indigenous students constituted some portion of the student body and where some or all of those students were seen to be experiencing success in their mathematics learning. Although the focus was on the primary years, secondary schools were also strategically included.

Selection was across all education providers, Australian State/Territory borders and purposefully included urban, rural and remote schools.

SAMPLE SELECTION

Sequence:

• Potential schools were identified through snowballing; referrals and recommendations by professionals in Aboriginal education (representing the different education providers)

• Permission was gained from organisations to contact schools

• Schools were screened by phone interview with principals for:
  o Perceptions of level of achievement
  o Perceptions of programs as successful or innovative
  o Willingness to participate in the research

• Permission was gained from communities to conduct research

• Ten target schools were selected in two rounds of field trips
Aboriginal Students and Numeracy

Considering National and State/Territory government emphasis on the gathering of empirical data, in the form of the ‘State/Territory Tests for Literacy and Numeracy’, it is unfortunate that access to this data is closely guarded. Restricted access by researchers to this information would have been invaluable in sample selection; more easily identifying schools where Aboriginal students were performing best by those standards.

After Phase 1, it was considered that sample selection had resulted in an under-representation of remote schools and non-government schools. Consequently, Phase 2 purposefully selected schools which would result in a broader spectrum of school environments.

Table V.1 The final sample of ten schools

<table>
<thead>
<tr>
<th>Location</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Australia</td>
<td>7</td>
</tr>
<tr>
<td>New South Wales</td>
<td>1</td>
</tr>
<tr>
<td>Queensland</td>
<td>1</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>1</td>
</tr>
<tr>
<td>Metropolitan*</td>
<td>3</td>
</tr>
<tr>
<td>Outer regional*</td>
<td>3</td>
</tr>
<tr>
<td>Remote*</td>
<td>1</td>
</tr>
<tr>
<td>Very remote*</td>
<td>3</td>
</tr>
</tbody>
</table>

* Accessibility/Remoteness Index of Australia (ARIA)15

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Mainstream’ Government schools</td>
<td>4</td>
</tr>
<tr>
<td>Government ‘Community’ schools</td>
<td>4</td>
</tr>
<tr>
<td>Denominational schools</td>
<td>1</td>
</tr>
<tr>
<td>Independent schools</td>
<td>1</td>
</tr>
</tbody>
</table>

**DATA COLLECTION**

Schools were treated as individual case studies.

Principals and teachers were asked to nominate Aboriginal students (preferably a cohort) who were achieving well or had shown considerable improvement in mathematics achievement.

Data regarding the extent and nature of student numeracy (and other) achievement (performance, conceptual understanding and learner-confidence) and the contribution of teachers, teaching strategies, principals, staff relations, school-community relations, school programs, approaches and culture was gathered through:

- Examination of teacher, school and State/Territory-based assessment records
- Semi-structured interviews with principals, teachers, AIEWs, parents/carers, other community members and students
- Informal observation of classroom teaching & learning
- Informal observations of school - community culture

University of Adelaide (1999)
Guenther (2003)
DATA ANALYSIS
The nature and extent of hard data provided by principals and teachers varied. Student performance data was often restricted to School Annual Reports. These were useful in assessing numeracy success, as they contained summaries which often differentiated between groups of Aboriginal and non-Aboriginal students. They also provided other insights into school operations, programs and foci. In some cases access to individual assessment records was provided.

The extent and nature of the numeracy achievement of individual students, groups of students, Indigenous students and the whole school was evaluated through triangulation of:

• quantitative analysis, where possible, of results of both external and classroom-based formal assessment records and reports
• qualitative text analysis of interview transcripts to explore perceptions of the level of student achievement from the range of observers, including principals, classroom teachers, specialist teachers of numeracy, AIEWs, Aboriginal parents/carers, other Aboriginal community members and students
• qualitative text analysis of journal entries relating to classroom observations

The extent and nature of the contribution to achievement of teaching and contextual factors was evaluated through triangulation of:

• qualitative text analysis of interview transcripts to explore perceptions from the range of observers, including principals, classroom teachers, specialist teachers of numeracy, AIEWs, Aboriginal parents/carers, other Aboriginal community members and students
• text analysis of journal entries relating to classroom, playground, foyer, principal’s office, staffroom and community observations

Interpretations of school culture and context paid particular attention to Aboriginal respondents, as it was felt they were in a better position to reflect how these would impact on Aboriginal students.

Text analysis was assisted by QSR N6® Qualitative data analysis software.

A major focus of the study was to identify and evaluate the contribution of specific numeracy teaching strategies to student numeracy achievement. However, it became clear that, despite individual students achieving well, strategies that were often regarded by the profession as ‘best practice’ were not producing effective results for Aboriginal students as a group, where contextual factors did not support the progressive interests of Aboriginal students and their communities.

A review of the literature revealed a number of specific classroom and numeracy teaching strategies which effective teachers of numeracy for Aboriginal students were likely to employ.

To examine whether and how different types of strategies were contributing to effective numeracy learning that was evident in schools, the strategies were assigned to any of four categories (see Table V.2):

1. Numeracy Teaching Strategies which are ‘Culturally inclusive/responsive’:
2. Numeracy teaching strategies which are ‘language focused’:
3. Numeracy Teaching Strategies which align with an ‘immersion’ approach
4. Numeracy Teaching Strategies which align with a ‘concrete/visual’ approach
Table V.2 Alignment of Classroom and Numeracy Teaching Strategies (identified in Literature Review) with any of the four categories.

<table>
<thead>
<tr>
<th>Numeracy Teaching Strategy</th>
<th>Culturally Inclusive/Responsive</th>
<th>Language-focused</th>
<th>Concrete/visual</th>
<th>Immersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible approach to student-centred and negotiated teaching</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of reliance on busy-work</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tasks that scaffold learning; build from student understanding at variety of achievement levels; focus on what is known, rather than what is not known</td>
<td>YES YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encourage and value students taking risks; minimise risk of being either right or wrong</td>
<td>YES YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of range of tasks that allow students to make some progress and attain some success</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit teaching of differences between, and valuing of both western mathematics and Aboriginal mathematics</td>
<td>YES YES YES</td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Encouragement of sharing as an acceptable and desirable aspect of learning</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student autonomy/freedom to choose methods of recording that fulfil their needs</td>
<td>YES YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit teaching of differences in learning contexts</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of a range of learning environments, including outdoors</td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Encourage displays of student understanding</td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics</td>
<td>YES</td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Use of visual imagery to aid concept development</td>
<td>YES</td>
<td>YES</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Encourage and observe mathematical experience through play</td>
<td></td>
<td></td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Provision of a wide range of concrete materials</td>
<td></td>
<td>YES</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Flexible and regular use of technology</td>
<td></td>
<td></td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Provision of ‘rich’ learning tasks that are contextually meaningful and embedded in relevant and diverse language</td>
<td></td>
<td></td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Focus of mathematics on everyday activities in the classroom</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>
A number of the above strategies are presented as aligning with more than one category. The information is represented below showing the range of strategies that can be aligned with each category

1. **Numeracy Teaching Strategies which are ‘Culturally inclusive/responsive’**:  
   - Flexible approach to student-centred and negotiated teaching  
   - Lack of reliance on busy-work  
   - Tasks that scaffold learning; building from student understanding at a variety of achievement levels; focus on what is known, rather than what is not known  
   - Encourage and value students taking risks; minimise risk of being either right or wrong  
   - Provision of a range of tasks that allow students to make progress and attain some success  
   - Explicit teaching of differences between and valuing of both western mathematics and Aboriginal mathematics  
   - Encouragement of sharing as an acceptable and desirable aspect of learning/ peer tutoring /employ a range of grouping strategies  
   - Provide for student autonomy eg. freedom to choose from a range of activities/own methods of recording  
   - Explicit teaching of differences in learning contexts  
   - Provision of a range of learning environments, including outdoors  
   - Encourage displays of student understanding  
   - Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics  
   - Use of visual imagery to aid concept development

2. **Numeracy teaching strategies which are ‘language focused’**:  
   - Tasks that scaffold learning; build from student understanding at variety of achievement levels; focus on what is known, rather than what is not known  
   - Encourage and value students taking risks; minimise risk of being either right or wrong  
   - Explicit teaching of differences between, and valuing of both western mathematics and Aboriginal mathematics  
   - Student autonomy/freedom to choose methods of recording that fulfil their needs  
   - Encourage displays of student understanding  
   - Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics  
   - Provision of ‘rich’ learning tasks that are contextually meaningful and embedded in relevant and diverse language
3. **Numeracy Teaching Strategies which align with a ‘concrete/visual’ approach**

- Use of visual imagery to aid concept development
- Encourage and observe mathematical experience through play
- Provision of a wide range of concrete materials
- Flexible and regular use of technology

4. **Numeracy Teaching Strategies which align with an ‘immersion’ approach**

- Explicit teaching of differences between, and valuing of both western mathematics and Aboriginal mathematics
- Provision of a range of learning environments, including outdoors
- Use of visual imagery to aid concept development
- Encourage and observe mathematical experience through play
- Provision of a wide range of concrete materials
- Flexible and regular use of technology
- Provision of rich learning tasks that are contextually meaningful and embedded in relevant and diverse language
- Focus of mathematics on everyday activities in the classroom
VI. Overview: Aboriginal Students and Numeracy

Aboriginal students’ performance in mathematics is below State and National averages at every level of schooling. Their failure to achieve at levels comparable to non-Aboriginal students has been demonstrated in National and State testing, such as the Western Australia Literacy and Numeracy Assessment (WALNA) program. While development of these testing programs to improve their ‘cultural inclusivity’ is ongoing, they are currently identified as the mainstream benchmark against which Aboriginal Western Australians are, and wish to be measured. Such acceptance of the validity of State/Territory-based test results for Literacy and Numeracy and their application to National Benchmarks is, however by no means Nationally consistent.

Literacy vs. Numeracy

In recent years there appears to have been a shift in the focus (particularly in the level of funding) from being strongly weighted in favour of programs aimed at improving literacy, to include more programs that specifically address numeracy.

Although the focus of this study is clearly Numeracy achievement, it is problematic to exclude Literacy from the discussion, because mathematics and mathematics instruction are culturally-based and language-dependent. Therefore, interviews conducted for this study attempted to discover the extent to which good teachers of mathematics for Aboriginal students explicitly taught the language embedded in learning about mathematical concepts, especially when new concepts were introduced. Literature also suggested that teachers, especially those with cultural backgrounds different from their Aboriginal students, may often assume that students have acquired the language of mathematics which may be more endemic to the discourse found, for example, in ‘white’, middle-class homes than in many Aboriginal homes. This dilemma is acknowledged by the Commonwealth:

Issues relating to literacy need to be addressed in order to achieve improved numeracy levels. The development of Aboriginal students’ understanding of Standard Australian English as the language of mathematics is crucial for achieving numeracy proficiency.

The positional language of number is a good example. Terms like over, above, higher, greater than, more, up, bigger, larger and under, below, lower, beneath, less than, down, smaller are all used, often quite interchangeably, by teachers when talking about number. These terms are only some of the many that may be used to convey two basic meanings about number relations. These terms may be more likely to be used in that inter-changeable way in non-Indigenous households, especially those fluent in SAE and the language and culture of mathematics. When teachers do this unconsciously, while talking about number to young learners of number and language (to whom English might be a second language, or even a third or fourth language/dialect), the assumption that students will appreciate their interchangeability is most likely a poor one. To this confusion can be added a directional one; many of the terms listed above imply that numbers have a vertical alignment, so that, for example, one number is higher than another. This may make some sense when talking about age, as the older you are, the taller you get, at least for most children. It also makes sense when looking at any measurement that is vertical, like the height on a diving board or a wall growth chart, but being able to interpret those (measurement) usually comes after number sense. It makes a little sense when talking about money, especially in the context of playing

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16 O'Brien (2004) Personal communication
cards for money (people sometimes make vertical stacks of coins or gambling chips, although this may be an ethnocentric and limited view). Certainly in western or English language context, to get rich is sometimes seen as amassing piles of cash.

However, when teachers demonstrate consecutive numbers or students are asked to write the numbers from one to ten, they are often instructed to do this in a horizontal, left-to-right direction, in line with western writing convention, but contrary to the above mathematical language conventions. Therefore a number higher than six is actually written beside and to the right of it. Age may be measured by or related to a calendar. Therefore, to get older (and taller), the numbers don’t go up, they go first across the page, then down, then across again and sometimes even behind, as a new page is turned. Other numbers relating to time can also be directionally confusing. The past is said to be behind you and the future ahead, but the numbers on some clocks just go around and around and on digital ones they just appear out of nowhere! Observations made in this study suggest that, although many teachers claim to explicitly teach the language used in mathematics, they are often unaware of the opportunity for such confusion, especially for ESL students. If teaching of number concepts ignores such implicit understandings, then children’s fluency with the language of instruction will have a larger bearing on numeracy development.

This is reflected in the philosophical approach of one school (Site 9), where the focus is predominantly on literacy, rather than numeracy. The belief in this school (and community) is that if students acquire literacy facility, then numeracy will follow. In other words, having language control will allow numeracy to make a whole lot more sense.

The perception of principals of several schools in the study was that Aboriginal students were doing better at numeracy than literacy. This may have been partly true in some cases, where the proportion of students achieving the benchmark for Numeracy was higher than for Writing and Spelling, but lower than for Reading. However, comparison of State-wide data from the Western Australian Literacy and Numeracy Assessment (WALNA) indicates that in most Years, Numeracy has scored lower than Overall Literacy. In 2003, achievement in Overall Literacy and Numeracy was similar for ‘all students’ in ‘all Years’ and for Indigenous students in Years 3 and 5, but lower in Year 7. Average performance over all years from 1999 to 2003, however (see Figure VI.1), shows similar achievement in Numeracy and Overall Literacy, with a trend for Indigenous students to score lower for Numeracy than for Literacy in Years 5 and 7.

State/Territory Testing for Literacy and Numeracy

All States and Territories formulate their own versions of tests for Numeracy and Literacy which are then used to establish progress towards achievement of National Benchmarks. Government discourse maintains that these are the minimum acceptable standard(s)’ of literacy and numeracy for Australian students, ‘without which a student will have difficulty making sufficient progress at school.’ This public stand has formed the basis of specialised funding to address students at risk of not meeting those standards. Aboriginal students are more likely to fall into this category. Only the scrutiny of time will decide whether programs designed to address such inequality resulted in those ‘minimum acceptable standards’ being achieved or surpassed; whether they were set at an appropriate level or merely arbitrary ‘minimum acceptable standards’ of the day.

19 MCEETYA (2001)
According to Luke and van Kraayenoord (1998), this “assessment-driven approach to curriculum”, is based on beliefs that:

1. articulated and consistent National standards and achievement criteria will lead to increased government and school accountability to key ‘stakeholders’ – parents, communities and governments - and that

2. a National system of coordinated State-level standardised achievement tests (and perhaps eventually a single National test) guided by these benchmarks will enable the improvement of the quality of teaching and student achievement in literacy.

In light of the response to the system by schools, the first belief seems valid. Measurement against Benchmarks is sometimes seen as a pass or fail report card for schools. This makes them accountable to governments who allocate funding. At the moment, this appears to be a reverse accountability. School that get a fail are allocated extra funding to address their failings, while schools that pass apparently reap their own rewards. It also makes them accountable to parents and communities, but in a more direct way.

Private schools depend upon enrolments and fees for part of their income. Anecdotal evidence suggests that competition between these schools can be fierce and measurement against Benchmarks is sometimes used aggressively as a marketing strategy. Competition for enrolments also exists between government schools. Schools that get a fail are accountable to parents and communities, some of whom may take their children elsewhere, seeking better educational opportunities. Governments, on the one hand, discourage such competition by not releasing benchmark data that could identify or compare the performance of different schools; this could lead to a mass exodus from bad schools to good schools, creating logistical problems for education providers. On the other hand, schools are free to disclose their own results. This disclosure seems to be made more openly and completely by those schools that pass the test. These schools, regardless of the education provider, may then experience more competition for enrolments. Anecdotal evidence suggests that at some government schools, for example, high competition for enrolments, influenced by their reputation for high Year 12 (TER) scores, have resulted in allegations of spurious claims by parents that students reside in

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the schools’ ‘catchment area’. Disclosure of positive results in achieving benchmarks could have a similar effect.

The second belief, that such National standardised testing programs “will enable the improvement of the quality of teaching and student achievement in literacy” (and presumably numeracy), is more contentious.

The imposed Testing program involves standardised tests which must, by definition, be all the same. Given that many Australian children are bi-cultural, it is arguably impossible to design any age-appropriate test to suit the ‘learning style’^21, and framed in the context and world view, of the first culture of every Australian child.

The National approach appears to take this impossibility for granted. State/Territory-based testing programs need to be based on assessing literacy and numeracy in SAE, to “allow reporting against…. approved National benchmark standards.”^22 State/Territory design of tests has also historically resulted in questions set in a context which could be vaguely described as ‘mainstream Australia’^23; tests measure how well students are able to perform literally and numerately, in a western context. Inherent in this approach is the assimilationist assumption that Australia is, or will ultimately become, a monocultural society.

Test design may be culturally exclusive if it over-emphasises contexts unfamiliar to many Aboriginal students as well as under-emphasising contexts to which they can more easily relate. Test design may cater more to the ‘cultural comfort-zone’ of monocultural, ‘white’ Australians, while forcing Aboriginal (and other bicultural) students to operate outside theirs. This could be extended to argue that any systemic expectation is assimilationist—and potentially racist—if all Australian students have to respond to question contexts, styles and language that narrowly represent a majority culture view. This is particularly the case if their performance (or degree of conformity) is then measured against a common benchmark. It suggests that Aboriginal people can only achieve our ‘minimum acceptable standards’ if they choose to be like us, because our way is better. After all, in practice, the tests simultaneously gauge students’ SAE language acquisition and the degree to which the presented contexts have become familiar (i.e. the degree of assimilation):

“Student(s)…cannot truly master the language until they have also mastered the cultural contexts in which the language occurs”^24

Some people in the study certainly felt that these tests are ethnocentric. As one community representative observed of the difficulty Aboriginal students have with the tests:

“It's the way that they're written.” (Aboriginal community member/AIEW).

There is an inference that the language of the tests is limiting not simply by being SAE, but that the language is used in ways that make it harder for Aboriginal students to comprehend. It may be seen by some as just another system designed to set Aboriginal people up for failure, or to reinforce ‘deficit theory’ (perceptions in the wider community that Aboriginal people can’t achieve as well as others due to inherent and ‘inferior’ characteristics).

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21 This is a problematic term, because while generalisations are often made, to assume any common learning style for children of a particular cultural group denies individual and sub-group differences within those groups. This can lead to reinforcement of stereotypes that can perpetuate disadvantage.
23 See Glossary
24 Plainfield Public Schools (2002)
More recently, some State/Territory Education Departments have been making some effort to examine test items for cultural, language and gender bias, and to redesign them to better suit (or disadvantage less), students from less ‘mainstream’ backgrounds. To address this dilemma, at least one State/Territory Education Department has tackled the question of the cultural context by attempting to frame tests in the ‘cultural context of the classroom’. Although definition of a ‘classroom culture’ is also problematic because it assumes that all classrooms share a common culture (and language), this seems an imaginative attempt, in a society where many students are bicultural and bilingual, to tackle the dilemma of making the tests more inclusive of children from socio-linguistic backgrounds that might fall outside the definition of ‘mainstream’. Anecdotal evidence, however, suggests that some features of the tests: their emphasis on print medium; dependence on facility in Standard Australian English; ethnocentric questioning style; and ethnocentric focus of question contexts, often make it difficult for Aboriginal students to demonstrate the breadth of their conceptual knowledge.

Beside belief in the benefits of accountability in education and outcomes of improved teaching and student achievement, the attraction of the tests, from a positivist view, remains that they are seen as being rigorous, independent and therefore valid assessments of student learning. And it could certainly be argued that, for Aboriginal students to achieve in higher education, particularly in the areas of high status professions, they would need to be able to perform in those types of tests. After all, the university courses for those professions are likely to have those same characteristics and expectations used above to describe the literacy and numeracy tests, in the absence of radical reform in the higher education sector.

However, a post-modern word of warning suggests that “…the numbers which emerge from any kind of analysis should not be regarded as absolute truth,” and also that “…not everything which is desirable in education is measurable and vice-versa.”

This view therefore supposes that all students should have the opportunity to be assessed in contexts that enable them to demonstrate the breadth of their conceptual knowledge; to express “…educational experiences beyond the National Curriculum, [including] the quality of human relationships and conversations”.

In this study, there were some schools and communities working closely together which were able to apply these principles to ‘internal measures’ of assessment. In ‘two-way’ schools, where one of the languages of instruction is an Aboriginal language (i.e. students’ first language), this was most evident and instruction was therefore able to include the “world view… reflected in (that) language.” To achieve this effectively on a systemic level, however, would not only attract logistical and economic argument, but requires recognition of the validity of world views outside of ‘mainstream’ definitions; recognition that faces resistance from institutional conservatism.

Performance of Aboriginal Students against National Benchmarks

Data presented for Western Australia represents only Government schools, as these data were more accessible. It is not the intention of this paper to compare different education systems or providers. Minor variations may exist between the numeracy achievement levels of

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25 Reid (2004) Personal communication
26 Tanner, Jones and Treadaway (2000)
27 Maden (2001)
28 Kimberly Education District (2000)
Aboriginal students in the different systems in different States and Territories, although MCEETYA (2001) indicates that on a National basis:

Indigenous students were more concentrated in the lower levels of attainment than non-Indigenous students (and) this was the case for all government and Catholic systems in Years 3 and 5, and Year 7 (where available). 29

Therefore, for the purposes of this document, quantitative benchmark data from WA Government schools will be used to represent numeracy achievement of Aboriginal and non-Aboriginal students generally.

Data from the Western Australian Literacy and Numeracy Assessment (WALNA), based on five years’ data for Years 3 and 5 and three years’ data for Year 7 30, indicate that at Year 3 level, the percentage of Indigenous students achieving benchmarks is similar for overall Literacy and for Numeracy. This is around 60% of Indigenous students, compared with around 85% for all (mainly non-Indigenous) students (see Figure VI.2).

Figure VI.2

![Figure VI.2](image)

Figure VI.3

![Figure VI.3](image)

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29 MCEETYA (2001)
At Year 5 level (see Figure VI.3), the percentage of Indigenous students achieving Numeracy benchmarks is slightly lower than, but also similar to the rate for overall Literacy. However, while the percentage of non-Indigenous students achieving benchmarks for all learning areas shows little change, there is a noticeable drop in the number of Indigenous students achieving Numeracy benchmarks (from over 60% to around 54%). This achievement in Numeracy also falls below the overall Literacy achievement, despite an even more obvious drop in those achieving benchmarks for Reading (from around 76% down to about 67%).

At Year 3 and Year 5 levels, many more Indigenous students are achieving benchmarks for Reading than for any other area, while more are generally achieving the benchmark for Numeracy than for either Writing or Spelling. This pattern appears similar for non-Indigenous students.

At Year 7, however, the pattern changes (see Figure VI.4). While the percentage of non-Indigenous students achieving benchmarks drops marginally for all learning areas, the drop-off in Indigenous students’ achievement is more severe, particularly in Reading (from 67% of Indigenous students in Year 5 to 43% of Indigenous students in Year 7 achieving the benchmark).

![Figure VI.4](image)

While these data show the average proportion of WA students achieving the various benchmarks over a period of 3 to 5 years (since testing began), some consistency of performance by these standards in Numeracy is evident for both all students and Aboriginal students, of all ages over the period (see Figures VI.5, VI.6 & VI.7 below). A slight trend for both groups of students at Year 5 and 7 indicates some improvement over time. However before placing any firm interpretation on this trend, development of the tests over that period would need to be examined to determine whether improvements in performance were due to improvements in the tests, in students’ preparation for the tests, or in students’ numeracy learning.

Nevertheless, it appears that the proportion of Western Australian Aboriginal students achieving the Numeracy Benchmark has remained relatively constant over time, floating at around 60% for Year 3 (5 year mean 60.3%), a little over 50% for Year 5 (5 year mean 54.2%) and under 40% for Year 7 students (3 year mean 37.9%). Their performance comparative to all students has persistently decreased as they progress through primary school. However over time, the patterns of fluctuations in Aboriginal students’ performance...
Aboriginal Students and Numeracy

in particular Year groups appear to have generally followed those of all students (see Figures VI.5, VI.6 & VI.7). Over the period, performance of Aboriginal students, as a percentage of all students, has ranged in Year 3 from 65% to 78% (mean 70, Standard Deviation 4.7), in Year 5 from 58% to 67% (mean 63, Standard Deviation 3.7) and in Year 7 (3 years data) from 47% to 50% (mean 48.6%, Standard Deviation 1.6). This indicates that yearly fluctuations or trends in performance are due to factors not particular to Aboriginal education; that Aboriginal students are at least holding their ground, compared to other students, but that disadvantage is not being addressed effectively.

Figure VI.5

Figure VI.6

Figure VI.7
Western Australia compared to the National Picture

In 2001, WA Year 3 students (both Aboriginal and all students) achieved the Numeracy benchmark at similar rates to the respective National averages, while WA Year 5 Aboriginal students achieved marginally above the National average for Aboriginal students, largely due to a much lower proportion of Aboriginal Year 5 students achieving the benchmark in the NT (see Figures VI.8 & VI.9 below). The proportion of all students achieving the benchmark was also considerably lower in the NT, probably due to the much higher proportion of Aboriginal students forming that group.

**Figure VI.8**

**Figure VI.9**

**It should be noted that data presented in Figures VI.8 & VI.9 is from the Federal Steering Committee for the Review of Government Service Provision (2004) and is presented there with 95% confidence intervals for interpretation.**

---

Variation in school-starting ages between States and territories was examined as a factor in achievement. The inclination was initially to take care when comparing WA or Queensland figures with National results, particularly at the Year 3 level. For example, in 2001, WA Year 3 students, by the time they were tested, had 2 years 7 months of schooling, comparable with Queensland students (2 years 8 months), but different to all other States and territories, where students had on average 3 years 6 months of schooling.

However, as can be seen from the above figure, at the Year 3 level, Indigenous students in both WA and Queensland compare quite favourably with the National performance average for Indigenous students, but still well below both National and State averages for all students. It is not until Year 5, particularly in the NT, SA and QLD, that Indigenous students slip well below the National average for Indigenous students.

It is notable from Figure VI.9 above that in all States and Nationally, Indigenous students achieved less well than other students at both Year 3 and Year 5. However, in Tasmania, Year 3 Indigenous students achieved above the National average for all students. Closer investigation of this result is warranted, but was not possible within the limits of this study.

Care should also be taken in interpreting the above information, in the light of differing proportions of Indigenous students in various States and Territories. This information is presented in Figure VI.10.

Figure VI.10

Pressure from State/Territory governments for schools to conform by meeting standards as applied by these tests seems more evident in schools under more direct control of those governments. Schools having more autonomy seem more likely to regard these tests as a tiresome but necessary exercise, which is sometimes tied to accessing funding. Their main purpose may be seen as exposing students to the type of print-based and ethnocentric procedures that they will just as unavoidably encounter should they progress to further study in VET or University. However, regardless of whether schools see them as particularly useful or informative of their students’ achievement, they are aware of the high(er) value placed on these results by governments and the wider community, and the influence this has on
perceptions of their schools’ success (and Aboriginal people’s success), from the outside (and from members of their own communities).

In interpreting performance against Numeracy benchmarks, it may be problematic to look at achievement from a whole school, whole State, whole nation, single Year or cultural group perspective because:

- In some communities attendance is still a big (and to some degree, separate) issue; testing is conducted for whichever students happen to be present on that day. Achievement by students who are regular attendees may need to be looked at separately.

- In some communities students’ duration at the school is seen as a strong factor in achievement. Before judging schools or communities, data may need to be examined for students who have been there long enough for the school to have an effect, especially where students from non-achieving backgrounds are welcomed.

- In communities where students show improvement, a culture of success is developmental; achievement may need to be looked at longitudinally

- There is still much room for improvement of the cultural inclusivity of the tests and testing methods. This may restrict the validity of comparisons between cultural groups

- Anecdotal evidence suggests that the conditions under which tests are administered is variable, especially among schools which may be competing for enrolments and status

**Classroom-Based Assessment**

‘Classroom-based Assessment’ takes varied forms throughout the country, due to the diversity and to some extent, varying levels of autonomy of schools and education providers. Assessment frameworks such as the ‘Outcome Statements’ developed in WA leave ample room for individualised approaches to the form, context and content of assessments that may be developed to suit particular groups of students. While the ‘Positivist School’ of thought may see this as introducing unnecessary subjectivity which may cloud accurate interpretation of results, ‘Post-Modernists’ would disagree. They would support this approach because it allows more room for students from diverse backgrounds to demonstrate their mathematical knowledge, rather than their knowledge of how mathematics should be applied in a mainstream setting.

It would appear fortunate then, that students are assessed, to some extent, from both these perspectives; through Classroom-based Assessment and through State/Territory Testing Against Numeracy Benchmarks. However, observation of mathematics teaching across the range of schools in this study suggests that the ability (or willingness) of teachers to effectively frame their teaching and assessment in contexts that will include Aboriginal students is extremely variable (and these were reported to be the best schools for Aboriginal students).

Where school and Aboriginal community were more separate, the context of Aboriginal students’ lives outside the school often seemed something quite remote from the understanding of most non-Aboriginal teachers. This appeared to be regardless of whether Aboriginal students were a minority or a majority in the school. These communities were
often characterised by observable socio-cultural divisions (racism) and were generally where the Aboriginal community existed as a minority community within/alongside the ‘White’ community. In such communities, where Aboriginal students were a majority in the school, this appeared to be a result of a majority of ‘white’ parents sending their children elsewhere, because this was an ‘Aboriginal school’. The majority of non-Aboriginal staff in these schools appeared to align themselves more closely with the ‘white’ community and so unavoidably became party to that division. This could not help but inhibit the development of relationships between staff, students and parents and thus form barriers to teachers developing any depth of understanding of the socio-cultural background of Aboriginal students. In such environments, efforts by teachers to frame teaching, learning and assessment in familiar contexts are more likely to be variable, ill-informed or tokenistic, effectively removing some of the subjective advantage inherent in classroom-based assessment.

Performance of Aboriginal Students in Classroom-Based Assessment

The Numeracy Achievement of Aboriginal students in WA, as painted through classroom-based assessments against Specified Levels for Age Group\textsuperscript{32}, shows a similar picture of disadvantage. In WA, students are assessed by classroom teachers according to achievement targets, or specified outcome levels in numeracy, which are considered essential learning for the next phase of schooling. By Year 3, they are expected to achieve Level 2, by Year 5, Level 2 and some aspects of Level 3, by Year 7, Level 3 and by Year 10, most aspects of Level 4. For 2002, Figure VI.11 shows that using this measurement tool, performance of Indigenous students compared to all students was similar to the picture shown by Numeracy Benchmark data in Year 3, considerably better than the Benchmark results in Year 5 and marginally better in Year 7. The data below also includes Year 10 students, for whom the picture is worse (the proportion of Aboriginal students achieving Specified Levels is about half that of “all WA students”).

Figure VI.11

<table>
<thead>
<tr>
<th>Year/specification level</th>
<th>All students</th>
<th>Indigenous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 3/2</td>
<td>120</td>
<td>80</td>
</tr>
<tr>
<td>Year 5/2</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>Year 7/3</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>Year 10/4</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Implications of Lower Performance

Persistent low performance in mathematics engenders and perpetuates negative perceptions of Aboriginal students’ potential to achieve comparably with non-Aboriginal students in

\textsuperscript{32} Department of Education and Training (accessed 2004)
Aboriginal Students and Numeracy

Educational and vocational settings. These negative perceptions can pervade both Aboriginal and non-Aboriginal community and student expectations, and, importantly can influence beliefs, pedagogies and practices associated with teaching and assessing mathematics.

Poor performance by Aboriginal students in mathematics continues despite apparently extensive efforts by teachers and education authorities to redress it. For change to be successful, it must be implemented with sensitivity to the socio-historical and cultural contexts in which Aboriginal students live and work.
VII. Target Schools

The following lists of schools involved in the study include Government schools, Government (community-governed) schools, Catholic schools and Independent Aboriginal schools in a range of geographic, demographic, socio-cultural and socio-economic environments and across four Australian States/Territories.

Schools included as Case Studies in Phase I
(for ethical reasons, names and locations of schools have been omitted)

Table VII.1

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>Classification</th>
<th>Accessibility/Remoteness Index*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td>K-7</td>
<td>Remote</td>
</tr>
<tr>
<td>Site 2</td>
<td>K-7</td>
<td>Outer regional</td>
</tr>
<tr>
<td>Site 3</td>
<td>K-7</td>
<td>Metropolitan</td>
</tr>
<tr>
<td>Site 4</td>
<td>K-11</td>
<td>Outer regional</td>
</tr>
<tr>
<td>Site 5</td>
<td>K-6</td>
<td>Metropolitan</td>
</tr>
</tbody>
</table>

* Accessibility/Remoteness Index of Australia (ARIA)\(^{33}\)

Schools included as Case Studies in Phase II

Table VII.2

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>PROVIDER</th>
<th>Accessibility/Remoteness Index*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 6</td>
<td>K-10</td>
<td>Very Remote</td>
</tr>
<tr>
<td>Site 7</td>
<td>K-11</td>
<td>Very Remote</td>
</tr>
<tr>
<td>Site 8</td>
<td>K-7</td>
<td>Inner regional</td>
</tr>
<tr>
<td>Site 9</td>
<td>K-12</td>
<td>Metropolitan</td>
</tr>
<tr>
<td>Site 10</td>
<td>K-10</td>
<td>Very Remote</td>
</tr>
</tbody>
</table>

University of Adelaide (1999)  
Guenther (2003)
CASE STUDY 1

SITE 1 CONTEXT

In this mining town, most of the population were non-Aboriginal, itinerant and male. Many workers were flown in and out daily from the Capital city. Others lived in the town on a temporary or semi-permanent basis, as did most in the service industries. There were some non-Indigenous permanent residents, probably some in the mining or service industries, but most probably in business.

Infrastructure was consistent with making employees (and in a minority of cases their families) as comfortable as possible. Most commodities and services available at any regional centre were available here. The cost of living was probably quite high, but so were wages, at least in the mining industry. The shopping centre, the hub of the town, had a well-stocked supermarket and a few specialty shops.

The primary school was located adjacent to the shopping centre. The design was very much for surveillance, but this may have been incidental to the school’s actual operation. Classrooms were arranged in a quadrangle, at the head of which was the two storey administration block. The administration and principal’s office overlooked the classrooms with the recreation area in the middle. The wall opposite had a student-designed mural with Aboriginal motifs.

The high vantage point of the school administration centre had provided the previous principal with the opportunity to observe parents congregating, coming or going from the shopping centre. He apparently used this to advantage on many occasions, as an opportunity to walk across and speak to parents, especially if they were those who seldom came to the school, and/or whose children had been absent or experiencing difficulties at school. This opportunity was apparently not taken by the current principal, who had previously served as deputy principal, and whose approach to parents and the community was perceived to be less personal/personable than her predecessor. It was hard to tell if gender was a factor in the degree of her acceptance. The AIEW, however, now appeared to perform this liaison, and the deputy-principal, who was also the numeracy specialist, also spent some time contacting parents/carers in this way, in company with the AIEW. There was little interaction outside of school between Aboriginal and non-Aboriginal personnel or parents.

Despite the somewhat oppressive appearance of the school structure, the staff and student body seemed happy enough, although the students seemed not overly exuberant. It was a quiet school.

Aboriginal or Torres Strait Islander (ATSI) students made up less than 20% of the student population. These students were locally referred to by staff as either belonging to a group known by the name of their language group, which will be referred to as ‘Pindu’, or to a group referred to locally as ‘mainstream’.

The Pindu were regarded as leading more traditional lifestyles. Although the researcher was unable to interview any Pindu respondents, the impression was that they were probably more multi-lingual/dialectical, more prone to cultural/ceremonial obligations and therefore probably more mobile. Children may have been less likely to reside in fixed dwellings, may have had more significant health problems, attended less consistently and certainly achieved less well
in school than the mainstream group, whose families usually lived in town, may have been more likely to work in town or at the mine and may have had higher disposable incomes. Mobility may still have been a factor influencing mainstream students’ education, but less so than for the Pindu. The distinction between the two groups was not evident in printed material such as the school annual report, or school newsletters, despite clear contrasts being drawn when staff discussed Aboriginal students’ achievement or performance, which often lead to further distinctions based on school attendance patterns. Although Non-Indigenous staff more frequently made the distinction between the two groups, Aboriginal staff and other community members (who aligned more closely with the mainstream group) did also. The difference was that non-Indigenous staff tended to regard Pindu low achievement as absolutely (in the literal sense – absolving of blame) and directly attributable to non-attendance which represented a fundamental constant in an habitual on-again-off-again relationship between schools, teachers and Pindu students. In other words, it was a problem for the school and for teachers, as it limited their ability to do their job properly and also (but not necessarily therefore) reflected badly on school and class performance indicators. Aboriginal staff and community members, however, were more likely to recognise non-attendance as an issue that was a problem for students and families; one which the school needed to put more resources towards addressing.

STUDENT ACHIEVEMENT

1. **By external standards (State/Territory testing against national benchmarks)**

Results published in the 2003 School Report presented results of students by categories such as whole school, gender, Language Background Other Than English (LBOTE) and Aboriginal or Torres Strait Islander (ATSI) It was understood that LBOTE did not include ATSI students, but this distinction may be problematic, as most ATSI students have Aboriginal English as their first language/dialect.

The pre-2000 MCEETYA definition of a LBOTE student included “an Indigenous student for whom English is not the first language”\(^{34}\). This was amended in 2001 to include LBOTE students as “those who answered 'Yes' to the question: 'Does anyone speak a language other than English in your home?'”\(^{35}\). In 2004, the National Indigenous Postgraduate Association Aboriginal Corporation (NIPAAAC) expressed belief

that Aboriginal and Torres Strait Islander students for whom English is a second or other language should be included in a scheme that determined LBOTE or NESB (Non-English Speaking Background) groups which are most likely to experience educational disadvantage.\(^{36}\)

It appears that the onus of definition often lies with Aboriginal students themselves and relies on their knowledge of language classification systems. Clearly in the interests of equity and consistency, some clarification is required regarding just whom should be included under this definition.)

Table VII.1 Site 1 compares whole school results to those for Aboriginal or Torres Strait Islander (ATSI) students in the school in 2003. Two parameters are presented: the proportion of students who achieved National Benchmarks\(^{37}\) (columns B & F) and the proportion of

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\(^{34}\) MCEETYA (~2000)
\(^{35}\) MCEETYA (2001)
\(^{36}\) Our Universities (2004)
students whose results fell in the range that coincided with the achievement of 80% of all students tested in the State/Territory (columns C & G). Also included is the number of students who achieved better than 80% of all students tested in the State/Territory. This helps to explain differences in columns C & G and it is telling that there were no ATSI students who achieved above the 80% range, in any Year or in any learning area.

Table VII.1 Site 1: 2003 State/Territory Testing for Literacy & Numeracy: Results x Learning Area x Year Level x ATSI / non-ATSI

<table>
<thead>
<tr>
<th>LEARNING AREA</th>
<th>YEAR LEVEL</th>
<th>WHOLE SCHOOL</th>
<th>ATSI students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. of Students</td>
<td>% above benchmark</td>
</tr>
<tr>
<td>NUMERACY</td>
<td>3</td>
<td>31</td>
<td>77.4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>26</td>
<td>84.6</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>25</td>
<td>72.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AVERAGE</td>
<td>78.0</td>
</tr>
<tr>
<td>READING</td>
<td>3</td>
<td>31</td>
<td>90.3</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>26</td>
<td>88.5</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>25</td>
<td>76.0</td>
</tr>
<tr>
<td>WRITING</td>
<td>3</td>
<td>31</td>
<td>80.6</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>26</td>
<td>88.5</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>25</td>
<td>84.0</td>
</tr>
<tr>
<td>SPELLING</td>
<td>3</td>
<td>31</td>
<td>64.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>26</td>
<td>84.6</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>25</td>
<td>88.0</td>
</tr>
</tbody>
</table>

Given the small numbers of Aboriginal students, it was difficult to draw conclusions based on the percentage who achieved benchmarks. However, the rate was well below State averages for Indigenous students in all learning areas, with the exception of Year 3 Writing (see Figure VII.1 Site 1).

For Year 3 ATSI students, two of the six achieved benchmarks in Numeracy, three of five achieved benchmarks in Reading, two of three in Writing and two of six in spelling.

Aboriginal students at this school were achieving less well than Aboriginal students across the State/Territory, at all levels and in all areas, except for Year 3 writing (see Figure VII.1 Site 1).
Figure VII.1 Site 1

Table VII.2 Site 1 represents numbers and proportions of ATSI students who had achieved National Benchmarks in Numeracy over five years of testing

Table VII.2 Site 1

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of ATSI students</td>
<td>% over benchmark</td>
<td>No. of ATSI students</td>
<td>% over benchmark</td>
<td>No. of ATSI students</td>
<td>% over benchmark</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>n/a</td>
<td>2</td>
<td>100%</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>50%</td>
<td>1</td>
<td>100%</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>7</td>
<td>n/a</td>
<td>n/a</td>
<td>0</td>
<td>n/a</td>
<td>3</td>
<td>33%</td>
</tr>
<tr>
<td>total</td>
<td>2</td>
<td>50%</td>
<td>3</td>
<td>100%</td>
<td>5</td>
<td>40%</td>
</tr>
</tbody>
</table>

As students are tested every two years, it is easy to assume that it would be possible to chart progress of the body of Indigenous students over time e.g. the 100% of Year 5 students who achieved the Benchmark in 2000 could be followed through to those same 100% of students who achieved the Benchmark at Year 7 in 2002. However, in this case the group comprised only one student (who may or may not have been the same student). Although access to
individual student records was not available for this group, tracking individual achievement is feasible. However a combination of low numbers of Aboriginal students and qualitative data indicating high student transience and inconsistent patterns of attendance, make longitudinal interpretation of the above data hazardous.

2. Classroom-Based Assessments - 2003

Table VII.3 Site 1 - Kindergarten - Physical Development

<table>
<thead>
<tr>
<th></th>
<th>% Below</th>
<th>% At</th>
<th>% Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole School</td>
<td>5</td>
<td>95</td>
<td>0</td>
</tr>
<tr>
<td>Indigenous students</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure VII.2 Site 1

Table VII.4 Site 1 - Kindergarten - Social Development

<table>
<thead>
<tr>
<th></th>
<th>% Below</th>
<th>% At</th>
<th>% Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole School</td>
<td>38</td>
<td>54</td>
<td>8</td>
</tr>
<tr>
<td>Indigenous students</td>
<td>75</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>
Aboriginal Students and Numeracy

Figure VII.3 Site 1 - Kindergarten - Social Development

Whole school mathematics

Table VII.5 Site 1 - NUMBER STRAND – Whole School

<table>
<thead>
<tr>
<th></th>
<th>% Below</th>
<th>% At</th>
<th>% Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole School</td>
<td>28</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td>Indigenous students</td>
<td>77</td>
<td>19</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure VII.4 Site 1 - NUMBER STRAND – Whole School
Aboriginal Students and Numeracy

Table VII.6 Site 1 - SPACE STRAND – Whole School

<table>
<thead>
<tr>
<th></th>
<th>% Below</th>
<th>% At</th>
<th>% Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole School</td>
<td>20</td>
<td>75</td>
<td>5</td>
</tr>
<tr>
<td>Indigenous students</td>
<td>71</td>
<td>29</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure VII.5 Site 1 - SPACE STRAND – Whole School

![Graph showing SPACE distribution for Whole School and Indigenous students]

Table VII.7 Site 1 - MEASUREMENT STRAND – Whole School

<table>
<thead>
<tr>
<th></th>
<th>% Below</th>
<th>% At</th>
<th>% Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole School</td>
<td>21</td>
<td>71</td>
<td>7</td>
</tr>
<tr>
<td>Indigenous students</td>
<td>77</td>
<td>23</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure VII.6 Site 1 - MEASUREMENT STRAND – Whole School

![Graph showing MEASUREMENT distribution for Whole School and Indigenous students]
Table VII.8 Site 1 - CHANCE AND DATA STRAND – Whole School

<table>
<thead>
<tr>
<th></th>
<th>% Below</th>
<th>% At</th>
<th>% Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole School</td>
<td>20</td>
<td>75</td>
<td>5</td>
</tr>
<tr>
<td>Indigenous students</td>
<td>71</td>
<td>29</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure VII.7 Site 1 - CHANCE AND DATA STRAND – Whole School

2. **By internal Standards (interview data)**

Teachers gave the impression that Aboriginal students were having success as mathematics learners, as evidenced by “eagerness to participate” and “improvement in ... achievement,” in teacher-based assessments and observations. These views were shared by both classroom teachers and the numeracy specialist. This impression, however, was qualified by reference to three groups of students, identified as either “performing on a par with others in the class”, “at the lower end” or “still struggling”. The absence of reference to categories at the upper end of the scale was glaring.

The principal was sure mathematics had improved across the school, but could only assume that this was the case for Aboriginal students.

The AIEW thought kids were having their “individual successes”, but wasn’t confident that the Pindu were getting much from school, due to only attending school “if there's not anything that's happening (the inference concerned cultural obligations)”. In fact her impression was that some Pindu kids were quite number-confident with money, but did more of this learning outside of the school than inside.

The Space Strand was seen as one area that Aboriginal students found easier, due to it being:

> one strand that doesn’t rely so much on being able to read and write and know all the numbers in order and that kind of thing, [where their] lack of literacy is not holding them back, [but also because they] have a good awareness of ... Space and their relationship to other people, they kind of have that with-it-ness [sic] of knowing where everyone else is at the time.
Expectations for lower primary Aboriginal students were higher than for upper primary, although “there was definitely improvement from January to July, in those (upper) Year levels”. They were “constantly tested and they were showing improvement”.

Reasons for this achievement were seen as “more hands on learning” and “always asking the why question, why do they think that’s the answer, why don’t they. Because by doing that, you can actually find out where the missing link is and where the misconceptions are.”

This school has been targeted for numeracy assistance by employing a numeracy specialist who has undergone ongoing intensive professional development in numeracy teaching strategies, assisted classroom teachers to improve their mathematics teaching skills and closely monitored and assessed student progress. The program was full of concrete/visual strategies and the monitoring/assessment component was a great idea; quiet kids didn’t get forgotten. Staff were excited about it. Improvement in the mathematics knowledge and mathematics-teaching confidence of classroom teachers was evident and hopefully it will eventually pay off in lifting the numeracy achievement of the Aboriginal student body. However, at the time, Aboriginal students as a group in this school were not achieving well by any standards.

**Contextual Analysis**

This school made some attempt to be culturally inclusive, but apparently within the limits of discrete structures provided for by extra funding that could be accessed for this purpose. For example, the ASSPA committee was active in running a breakfast program, which, together with ATAS tutoring, took place in a learning support centre which was specifically for Aboriginal children. The school employed an AIEW, whose role included delivering ASSPA programs (eg. breakfast and dental hygiene in the learning support centre) and classroom support. Although ASSPA membership was healthy and growing (9 to 16 members), the AIEW was seen by the community as the mainstay of the ASSPA committee and function. The AIEW also provided classroom support by working with individual students and small groups when requested and conducted homework classes after school in the learning support centre.

There was limited interaction between Aboriginal and non-Aboriginal personnel or parents outside the school and the AIEW was ambivalent about the level of consultation occurring inside the school:

Interviewer: *So do you have much say in how the school goes about things?*

AIEW: *I'd say just below [a lot] I'd say.*

Interviewer: *Is this when you've got a lot to say and no one listens [laughing]?*

AIEW: *[laughing] very much, very much so*

Interviewer: *Would you like to have more say ...?*

AIEW: *No. I'm quite happy in the way things are going.*

An Aboriginal Studies component for school curriculum was being developed by a non-Aboriginal teacher with experience in Aboriginal Education. However, at the time of interview, the AIEW knew little of it and did not feel she had been consulted regarding its content or delivery.
CONCLUSION

The small numbers of Aboriginal students made drawing any conclusions about the effectiveness of the numeracy teaching in the school tenuous. Similarly, small numbers and mobility of Aboriginal students (particularly the Pindu) confounded attempts to track student progress over time, or to be sure whether a representative sample of Aboriginal students were present during the case study or during State/Territory Testing. Nevertheless, despite being recommended for inclusion in the study, Aboriginal students, as a group in this school could not be regarded as successful numeracy learners.

In this school, attempts at cultural inclusivity appeared ineffective in improving outcomes or the overall school experience for Aboriginal students; perhaps not surprising as, in a community as divided as this one, they were largely swimming against the tide. Divisions were everywhere, particularly black/white divisions and Pindu/mainstream divisions. In a rural town dominated by single white men, black people did not seem to feel included. To a lesser degree, this appears to have been reflected in the school culture. It is also implicated in the performance of, and probably contributes to the attendance patterns of Aboriginal students, particularly the Pindu, who appear to be even more marginalised than the Aboriginal mainstream group.
Aboriginal Students and Numeracy

CASE STUDY 2

SITE 2 CONTEXT

This school lay in the green belt (higher socio-economic area) of a regional centre and less than 10% of its approximately 400 students were Aboriginal. There was much evidence outside the school of well-established socio-cultural divisions in the community. There were not many Aboriginal students, but those here were reported to come from more affluent, politically active, educated or professional parents, in comparison to other nearby schools.

According to the principal, it was seen as a desirable school by the Aboriginal community:

*The school actually has got a good reputation in town and we often get kids out of boundary... there's been quite an influx.*

It was not clear, however whether perceived ability or background of Aboriginal students was a factor in whom the school accepted from “out of boundary”.

The principal also considered that the school had a “reasonably functional” ASSPA committee, who “work hard to celebrate Aboriginal culture in the school”. He believed there was a “good cohort of teachers”, but that across the staff there was “not necessarily an understanding of Aboriginal culture” and “no consistent understanding or purpose” regarding Aboriginal education.

This principal had introduced some changes that were culturally inclusive. Aboriginal Studies was included in the curriculum and the school was involved in a Conductive Hearing Loss project, in partnership with other agencies. There was evidence of Aboriginal designs or realia in some classrooms, but not generally around the school.

Numeracy was not included in the identified priorities for the current year, but had been in the previous two years (Working Mathematically/Number).

First impressions were that it was a relatively information-rich, relaxed and friendly learning environment. The few Aboriginal students seemed mostly at ease, although later impressions revealed recent events involving student, staff and parent racism directed at Aboriginal students. Despite this, neither the principal nor the staff were aware of the existence or availability of their organisation’s Anti-Racism Policy, despite the current school development plan espousing a commitment to “ensuring a school tone of tolerance and equity that promotes social justice for each of its members”.

Most staff seemed generally motivated and the principal, though new in the position, seemed reasonably well regarded. Towards the end of his first year, however, some staff had still seemed reluctant to approach him with concerns regarding racist actions by other staff, apparently unsure of his stance and authority. He had apparently made efforts to bring about some positive changes in school culture, but had encountered resistance (from some staff and parents). This resistance had caused him to be more tentative in recent attempts to implement change. In the previous year, this principal had been the at another school the researcher had visited recently, where he had been highly regarded by staff and the Aboriginal community and was considered to some extent, proactive in encouraging communication between school and community and in attempting to involve Aboriginal parents and carers in the school.
One observed student Year group had an excellent teacher who was also the Aboriginal Studies coordinator for all of the Year group. Although her level of knowledge in this area appeared to be limited, she showed some respect for Aboriginal history, culture and knowledge.

The teacher of another observed Year group, in which both of the Aboriginal students achieved the numeracy benchmark, was also the ‘Aboriginal Studies’ coordinator for all of the Year group, but was evasive when asked about how she went about that task.

Two AIEWs were employed part time, but neither was available for interview.

**STUDENT ACHIEVEMENT**

1. **By external Standards (State/Territory Testing against National Benchmarks)**

Aboriginal students were achieving the Numeracy benchmark in some classrooms.

The small proportion of Aboriginal students (7%) made it difficult to draw comparisons, as there was a total of only three Aboriginal students in each of Year 3 and Year 5 and five Aboriginal students in Year 7. In the classrooms nominated for observation, there were two Aboriginal students in Year 3 and one in Year 5 (both Years 3 and 5 were streamed into multiple-Year classrooms).

**Year 3**

In 2003 all (three) Aboriginal students (100%) scored above the National Benchmark for Numeracy and within the range of 80% of all students in the State/Territory.

- The average Test score for Aboriginal students was below the average for all Year 3 students in the school (17.7 vs. 19.3).
- The average Test score for Aboriginal students was well above the average for Aboriginal students in the State/Territory (17.7 vs. 9.9)
- The average Test score for all students was well above the average for all students in the State/Territory (19.3 vs. 15.9)

In summary, in numeracy, Year 3 Aboriginal students at this school all achieved the benchmark. They performed much better than other Aboriginal students across the State, but less well than other students in Year 3 at this school, who performed much better than non-Aboriginal students elsewhere. They achieved quite well, with stiff competition in a high-achieving student group.

**Year 5**

In 2003 one out of three Aboriginal students (33.3%) scored above the National Benchmark for Numeracy and within the range of 80% of all students in the State/Territory.

- The average Test score for Aboriginal students was well below the average for all Year 5 students in the school (10.7 vs. 21.8).
- The average Test score for Aboriginal students was below the average for Aboriginal students in the State/Territory (10.7 vs. 13.7)
- The average Test score for all students was above the average for all students in the State/Territory (21.8 vs. 20.8)
In summary, in numeracy, one Year 5 Aboriginal student at this school achieved the benchmark, while most did not generally achieve well; much less well than other students in a quite average group.

**Year 7**

In 2003 three out of six Aboriginal students (50%) scored above the National Benchmark for Numeracy and four out of six on or within the range of 80% of all students in the State/Territory.

- The average Test score for Aboriginal students was well below the average for all Year 3 students in the school (17 vs. 22).
- The average Test score for Aboriginal students was above the average for Aboriginal students in the State/Territory (17 vs. 15.8)
- The average Test score for all students was below the average for all students in the State/Territory (22 vs. 24.6)

In summary, in numeracy, some Year 7 Aboriginal students at this school achieved the benchmark, while on average the group performed less well than other students, slightly better than Aboriginal students elsewhere, in a quite average group.

2. **By internal Standards (interview data)**

In some schools where only a minority of Aboriginal students were having success as mathematics learners, teachers, when asked about achievement by Aboriginal students, were more likely to speak in terms of increases in “participation” and “enthusiasm” for doing mathematics. Those terms were not used here, possibly suggesting higher teacher expectations and higher subjective evaluation of the level of student achievement.

The principal was confident that he had set the structures in place that should have encouraged successful learning for all Aboriginal students:

> a good cohort of teachers, a cohort of parents, parent support, a good AIEO and an ASSPA committee that's reasonably functional and one that works hard and celebrates Aboriginal culture in the school.

However, he was not confident that these conditions were resulting in successful Aboriginal mathematics learners:

> Aboriginal education? It should be happening in the classroom but it doesn't. There is quite a good cohort of teachers who do value it and are doing things within Aboriginal education. Others are probably doing [less] I think ... and that's being addressed [in] 2003.

The Year 5 teacher was confident that her teaching was contributing to the success of the one Aboriginal student in her class who, despite being “absent to a degree”, was achieving well at Year 5 level:

> because I've only got one Aboriginal child in my class this year. Did have two but one's left and both have been quite competent Year 5....They tend to learn more hands-on which lends itself a bit more to measurement and space activities where [we] actually make, measure and actually do things but this little fella also seems to be able to pick up a lot of ... concepts from just written work and calculations.
This student’s progress was evidenced by:

his results, his questions when he doesn't understand, which is great. He works well in
groups when we do collaborative maths or group maths, his ability at problem-solving is
quite good so the results that…and I'm not a person that does a lot of tests, I'd rather do
my assessment on a daily basis while they're actually working so just from my
observations and talking to him his understanding of maths is quite good.

However, she recognised that this achievement was not consistent throughout the school:

a lot of our students that have been identified as having learning difficulties are
Aboriginal children - numeracy and literacy usually....I've had a range over the years of
children who have been quite weak at maths and quite capable.

The interviewed Year 3 teacher also believed her teaching was contributing to success for the
(two) Aboriginal students in her classroom, both of whom had scored over the benchmark for
numeracy.

Interviewed Year 3 students appeared to like mathematics, and reluctantly admitted to being
good at it, but at this stage had limited understanding of what mathematics was about or its
relevance.

Different Strands

Some teachers found the number strand especially more difficult to teach; “things like long
multiplication, division, those sort of things that they may not find as purposeful”, but felt that
these generalities also applied to other students.

Some teachers also found the ‘working mathematically’ strand more difficult to teach.

Number [is] difficult and the working mathematically side that encompasses all the
strands, so sometimes I find it hard to teach 'cause it's such a big concept....Working
mathematically is how you approach mathematics and the reason for using mathematics
and being able to work things out in a mathematical way.

a lot of the time working mathematically...go[es] hand in hand with number. It goes
across all strands but more hand in hand with number so if you can't break number down
[in]to little bit[s] then you have trouble using that mathematically to apply it to solve
number problems, so...you've really got to have those small skills before you can have the
big skill.

The Year 3 teacher “definitely” found the ‘Chance and Data’ strand and “probably” found
the concrete side of measuring activities easier to teach.

Expectations

School-wide expectations for a high proportion of Aboriginal students to achieve the
benchmark were not high, but longitudinal performance was seen as encouraging. The
principal was ambivalent about his expectations for Aboriginal students, finding at this school
a “greater percentage of Aboriginal students above the numeracy benchmark than [he] expected, based on experience”, but also stating that he expected all Aboriginal students to be
successful mathematics learners.
Aboriginal Students and Numeracy

FACTORS INFLUENCING SUCCESS

Staff factors

The non-Aboriginal Year 5 teacher demonstrated many of the following characteristics suggested by the Literature Review, which “good teachers of numeracy to Aboriginal students are likely to demonstrate” (see III. Literature Review):

- Physical warmth and encouragement
- Fairness
- Patience and even temper
- Job satisfaction
- Valuing communication
- Recognition of what students value

However, she may not have demonstrated consistently high student expectations.

Although her knowledge may have been limited, she showed some respect for Aboriginal history, culture and knowledge and had accepted responsibility this term for “doing Aboriginal studies across the whole program” for Year 5.

She also showed she was student focused/culturally inclusive to some degree, tending to “adjust [her] teaching to the child”. For example:

with the literacy it's like chopping up sentences and finding age-appropriate stuff at the right level which is really difficult especially in reading - finding simple books that aren't baby books and also culturally relevant books.

This was made easier by having “a great package here...for literacy [and being] quite well resourced ... in Aboriginal studies, [with] lots of books and tapes”.

Although she admitted finding it more difficult to teach division and “those sort of things that they may not find as purposeful”, her awareness and intention were clear: “making it purposeful is what I try and do with most things if I can”.

She had developed a relationship with community members who have occasionally been involved in learning in the classroom. This type of community involvement was apparently unusual in this school and school/community context:

I have had parents. I did have a grandma in that came in and taught the kids some local language and there's also another grandmother of the children who comes in and sings songs and tells stories.

The efforts of this teacher to get to know her students and cater to their individual needs were also reflected by the fact that in this class in 2003, 97% of all students achieved the Numeracy Benchmark.

The principal (as mentioned earlier) was well regarded by the Aboriginal community at his/her previous school, for being culturally inclusive. In this, his first year at this school he had been active in supporting ASSPA and the promotion of Aboriginal Studies in and throughout the curriculum. He seemed very approachable, although all staff did not share this view. He had encountered considerable resistance from some staff members and parents to attempted changes in school culture.
Socio-economic factors

At the risk of sounding dismissive of efforts by the students, school and staff that may have contributed to effective learning, the impression gained from the several staff indicates that the parents/carers of Aboriginal students in this school tended to be of a higher socio-economic status, more highly educated and more active in supporting their children’s learning than those of Aboriginal students at other schools in the area. Some of these factors could be significant indicators of student success, as indicated by Rindone (1988)\(^{38}\), who found among successful Indigenous American graduates that,

[although] socio-economic status bore little or no correlation to achievement motivation and academic achievement…. [and] parents generally had low educational levels, …. parents and family members were the driving force in their desire to achieve.

However, at this school only some Aboriginal students were achieving well and analysis of the home circumstances of individual students was not within the scope of the study.

CONCLUSION

This school provides an environment where there is some good teaching and relatively new leadership with a good track record in working with Aboriginal communities and good intentions. The wider community shows characteristics of racism and social division between Aboriginal and non-Aboriginal communities, which is partly reflected in the school community. This helps to explain why the principal, though new to the school, has encountered resistance from within his staff to attempts to change school culture towards being more inclusive of Aboriginal students and the Aboriginal community. It also partly helps to explain why his recent efforts to implement change appear to have become more tentative. Staff disunity appears to reflect socio-cultural divisions outside the school and this is limiting his effectiveness as a leader.

Promising for the school’s future is the apparent willingness of some teachers and the principal to address disadvantage for Aboriginal students and to make efforts to include Aboriginal students and their community in the school community, by direct involvement and by indirect acknowledgement of their value through curriculum.

In the two classroom groups selected for closer analysis, the few Aboriginal students are achieving well in numeracy (all above the benchmark), however in other classes this appears to not always be the case. The Year 3 group are achieving well, 100% reaching the benchmark, while in other Year levels, Aboriginal students are achieving less well than Aboriginal students across the State/Territory. It is difficult to make assumptions about reasons for the success of this one group with limited understanding of their backgrounds. The teaching in one Year 5 classroom was of an excellent standard and must be considered as contributing to the success of the one Aboriginal student there. However, it is unlikely that these few students have suddenly become successful; they may just be brilliant students with strong motivation from within or from home, for despite the presence of several good teachers, these successful students appear to be a minority among Aboriginal students in the school.

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\(^{38}\) Rindone (1988)
CASE STUDY 3

SITE 3 CONTEXT

This was a large (>500 students) suburban primary school in a metropolitan area. Receiving priority funding as a disadvantaged school, it served a community characterised as predominantly working/unemployed class, low socio-economic status, with other typical social descriptors: cultural diversity, high number of single parent families, relatively high levels of substance abuse, teenage pregnancy, property and violent crime. Thirty per cent of students were Samoan, Tongan and Maori. Fifteen per cent were Aboriginal.

The school was identified in 2002 as one of the “seventy poorest schools in the [State/Territory].”

Some of our families are now moving towards third and fourth generation unemployment. The majority of families live in government housing, and there are a significant number of single parent families and an increasing number of grandparents who have custody of their grandchildren. The student population is transitional with over forty per cent of students leaving and enrolling each year.

(the principal)

The school was also (according to the principal) widely recognised for its “innovative approach to professional development, assessment and reporting.”

The school was surrounded by a high barbed-wire-topped fence. The double gates to the car park were locked during the day, due to previous incidents of breaking and entering into staff cars.

Despite this impression from the outside of an educational outpost under siege in hostile territory, the tone inside the school indicated quite a healthy learning environment. At the student end-of-year performance night, which was staged on two consecutive nights to maximise parent/carer opportunity to attend, students mimed simply-choreographed performances, mainly to popular songs by artists ranging from Christina Aguillera to ACDC. Parent attendance at the performance was healthy. The atmosphere was uplifting, parents enthusiastic and students performing proudly and confidently.

The principal was an energetic innovator, proactive in research and actively involved, both locally and nationally, in organisations concerned with educational leadership. In fact, leading up to the school visit, efforts to locate her by phone suggested that she spent a good deal of time away from the school on official or school-associated business, but this did not seem to detract from her ability to maintain a focused team.

Although a different context to many WA schools, this school was impressive and had some valuable insights to offer. In particular, it appeared that Aboriginal students were doing quite well in their mathematics learning.

This school was characterised by a dynamic principal, dynamic staff and generally enthusiastic and happy Aboriginal students (there were exceptions, mainly due to some students with histories of abuse, disrupted education and behaviour and learning difficulties). The school seemed quite a vibrant learning community, including the active involvement of Aboriginal parents/carers.
STUDENT ACHIEVEMENT

1. By external standards (State/Territory Testing against National Benchmarks)

In testing for Literacy and Numeracy in 2003, Year 3 Aboriginal students achieved above the State/Territory average for all students in Numeracy and also achieved very well in Literacy. These results were unusually high, causing the teaching team to actively reflect more than usual on the conditions that contributed.

Year 5 Aboriginal students however, achieved well below the State/Territory average for all students. Aboriginal students across the State/Territory also achieved less well than usual in this year, so some interrogation of the test format and question types was apparently underway.

The Number strand was still the weakest area and the focus for mathematics programs across the school, but language was seen as limiting performance in formalised testing. Consequently, as preparation for the State-wide testing for Literacy and Numeracy, learning about “doing tests” was included explicitly in the learning program.

2. By internal Standards (interview data)

AIEWs (representing the Aboriginal community)

The AIEWs (1.5 positions) had 65 Aboriginal students to support, and the majority of their time in a learning support role was spent on Literacy. However, they did spend most of their time in classrooms and had the impression that Aboriginal students were participating in and enjoying their mathematics and that therefore they were probably having success. The inference was that if they were finding it difficult, irrelevant or frustrating, they would not be enjoying it. However, this also indicated that AIEWs were not fully conversant with or informed about how well the students were achieving.

- The Aboriginal community saw the school as having a good reputation for its approach to Aboriginal Education, and inclusiveness for Aboriginal students; “we’ve got ... [a] bit more of a fair go”. This included high expectations for academic and behavioural outcomes:
  
  This is our second year here, we swapped from another school to here for education purposes alone... a lot of our Aboriginal kids that were at the previous school are now here and not just Aboriginal but both.

- They saw the commitment of the teaching team as positive:
  
  they had a workshop and it was after hours ...and I thought that's what I'd like to see, it's in their own time, they're not obliged to go but they want to.

- They also saw as positive the ability and willingness of teachers to form relationships with students:
  
  because they're the ones who've actually got to explain to the child and... you've really got to have that connection between the kids so that they listen.

Part of this was seen as due to the youth, flexibility, empathy and local knowledge teachers brought to the school:
The ones that get on the best around here would be the young local teachers. We've got a lot of local and the ones that know the area seem to...have a better understanding of where the kids are coming from....[They don’t] come down on them all the time because that would just turn them off altogether, they wouldn't want to learn.... I've never seen any negativity coming out of any of the teachers....give them a little bit of rope like ... bit of leeway here and there and the kids like and understand ... someone that can talk to them like the(y) understand.

We had that problem last year with some of our kids with that homework centre and we had one of the AP’s [assistant principals] ... as one of the supervisors and when she came in she still had her authority and we had to say to her no, when you come in here now, you lose it so when she lost it, it was better. When we come in we're all equal, you can't come in as being AP of the school and say to the kid blah-blah-blah-blah-blah, this is how we go....it has to be somebody down on their level... not an authority, we need somebody that's going to be there ... really there for the kids....They were alright after that because she was ... she was a really authority person but you took that authority and she was ... she's really a nice person.

• Teaching about how to do tests was seen as an important factor in success (and therefore performance on tests was seen strongly as a measure of success).

• There was seen to be a strong focus on mathematics in the early Years, where the ‘Count Me In 2’ program was seen as positive: “I don't know, it seems to be explained more, easily understood”.

• Aboriginal Studies was included in the curriculum and addressed Aboriginal and non-Aboriginal perspectives regarding history. This was seen as positive.

• School Health programs (Agency-partnerships) included monitoring dental and ear-health.

• The 1.5 Aboriginal teaching (AIEW) staff were working in classrooms every day, were seen as a resource and were consulted by teachers. They also were consulted (to some extent by the principal) through their roles in ASSPA. However, involvement in decision making was seen as limited, “when it comes down to ... like pushing things, I don't know how much push she's [the AIEW] got.” (a Parent)

• The school was seen as well-resourced and staffing levels seen as positive:

  We've got teachers coming out of the woodwork here... wherever you turn there's somebody there so it's really good.

However, involvement of Aboriginal people in professional capacities was seen as less than desirable here and elsewhere:

  my son's 14 this year and I think there's been one [Aboriginal] teacher in all the schools that we've had.... I know [the AIEW]’s training to be a teacher so maybe one day she’ll be here but other than that you need more people around.

• The practice of parents working in classrooms was encouraged. Some Aboriginal parents/carers attended.

Teachers

Teachers did not generally see any particular strands as being easier or harder for Aboriginal students to learn. This seemed to reflect high student expectations and confidence in their own abilities to teach mathematics.
FACTORS INFLUENCING SUCCESS

Factors that contributed to effectiveness in Numeracy learning for Aboriginal students at this school:

a) Dynamic principal – This principal was enthusiastic, innovative, politically active (Principals’ Association, speaking engagements) and had good people skills. Although she was away fulfilling professional commitments frequently, the way in which responsibility was delegated and assumed meant that strong leadership was still apparent in her absence.

*From the day you walk in here as a teacher you are identified as a leader of something* (the principal)

b) Strong numeracy focus - It was the fourth year since introducing a numeracy teaching program with a strong focus on number, called ‘Count Me In’, which began as a departmental initiative that was trialled for the K-2, but later progressed to being used in Years 3 & 4 (‘Count Me In 2’). The school also had an identified numeracy coordinator, who had received access to considerable professional development specific to numeracy teaching.

c) Teaching for the tests - Formal testing did not fit well with the school philosophy, so preparation for the State-wide testing for literacy and numeracy included instruction on how to do formalised tests (this process was seen to some degree as ‘playing the department’s game’).

There was an extra ‘Support Maths Group’ for students from Years 2 to 6 who were considered likely to under-perform in forthcoming State testing. This support group targeted their particular areas of need in mathematics (as identified by previous tests).

> *they go in terms 3 and 4 [this year – testing is mid-year] so next year they will then go [in terms] 1 and 2 so they've had a full year of intense support to help them for the [State-wide] test. It's not just for the test, it's for all mathematics but it's to get them ... getting them used to reading questions differently and ... ... I think it's to help them work more independently ... because that's I think ... that's where our kids are identified State-wide of not achieving as well.*

d) Community involvement in reform process – as a capacity-building exercise, this school has undergone (over the past 6 years) a major review of its position and direction, involving extensive community consultation and exploration of models of ‘outcomes-based curriculum’ and ‘individual-centred pedagogy’. School policies and directions actively involved members of the wider school community and the smaller groups within it. The ASSPA committee was strong and active, including two parent helpers who assisted in the homework centre.

e) Purposeful recruitment/staff relations – In this State/Territory, outstanding graduates were identified by a principals’ panel and the most disadvantaged schools had priority picks for those graduates. Consequently, as a disadvantaged school, here they could select the best graduates, based on academic and practicum performance, but also on the basis of interviews. At the same time, more experienced teachers who either wished to transfer, or were forced to, rarely opted for a school in an area like this.
So, why would graduates have wanted to come here to a community that may have had an ‘outside’ reputation as a battleground? It appeared that graduates were selected for their drive, both to teach and to lead; those who sought a challenge and rapid advancement and were prepared to work for it. New graduates arriving at the school were offered, and expected to assume, positions of responsibility almost immediately. For example, one respondent, at the end of her first year out of University was recognized for her excellent pedagogy and had been given responsibility as numeracy coordinator for the school. Although there was some evidence from indicators for success that students of first-year teachers may have achieved less well than those whose teachers were more experienced, this was not always the case and in this context, ‘more experienced’ was defined as having taught at this school for one year and survived (i.e., they have performed well enough to be retained). Based on performance, the best of these teachers were selected and, in exchange for a three year commitment to the school, were offered nomination for promotion to a deputy-principal’s position at the end of their term.

_Eighty per cent of teachers are always in their first four years of teaching, with the school committed to ensuring these teachers receive promotion by their fifth year of service_

(the principal)

The effect of this recruitment program was very obvious. Teachers took on a multiplicity of roles and, not only were they expected to put in hard work and long hours, but many appeared eager to do so. Unlike many primary schools, an hour after students left, teachers were still sitting around the staff room, informally sharing practice. They seemed typically energetic, enthusiastic and committed, but above that, they seemed to genuinely care about their students, take pride in their profession and generally showed an exuberance for their work that was refreshing. They consistently turned up at any celebration of student achievement, from awards nights to football games and staff sick leave absences were between 20% and 30% of the rate at other schools in the area. Significantly, the school also utilised some retired teachers who volunteered to work in the basic mathematics skills area, which was both resourceful and another way of involving the community in the school.

The school took seriously the monitoring and review process for teachers’ performance.

_They know that I’m continually looking at the data to make sure the right resources are in the right place. At the same time there is also a known code that... and I’ve told them this quite often ...that I would not have a teacher teaching in the school that I would not have teaching my own children. So if we find a teacher not being successful we put in a review process... and we’ve removed two teachers and we have one on sick leave at the moment as a result of that. We don’t ignore the problem.... As I said to you this morning I’ve been able to handpick a lot of my teachers. The ones that I bring in here [for review] are the ones that I couldn’t handpick and they came here ...[with] particular issues that were never resolved. One teacher didn’t like children._

(the principal)

The enthusiasm of staff appeared to also rub off on students and was evident in their eagerness to learn and the generally cooperative atmosphere. Parents and Aboriginal staff also shared this enthusiasm about the direction of the school.
The maintenance of harmonious staff relations and a sustained common staff focus was assisted by an ongoing professional development program, which all staff had attended; TRIBES ©, a North American program “which is about improving communication, relationships and inclusion.”

f) Student management and assessment - The school principal had been instrumental in designing (using consultants) an innovative student database that enabled longitudinal monitoring and tracking of individual students and student cohorts by academic achievement (including students’ impressions of their achievement), as well as by ethnicity, gender, special needs (eg. Hearing loss, ADHD) and behaviour/interventions. This included information provided in partnership with other agencies regarding health, welfare and juvenile justice. This software; accessible to administration and teaching staff, enabled close monitoring and had the ability to alert staff to emerging problems. It did not seem to be technology put in place tokenistically, or for the sake of technology, but a useful device that was used purposefully.

In a school this large, in a low-income, culturally-diverse community, student management was seen as vital. The system appeared to be effective at identifying potential hot-spots, changes in achievement or behaviour and other problems for attention, before they became big issues.

It was the fourth year of being ‘smart about the way [they] analyse their student data and group students”. The principal felt they were

   analysing their data much more efficiently, organising the children much more efficiently and thus not wasting resources and time on things that they shouldn’t be teaching.

A willingness to employ this data to reflectively and strategically restructure has been maintained in philosophy and practice.

g) Resource allocation - The principal’s research focus was reflected in resources allocated for in-house action research projects by all teachers working in teams at the different levels.

Deputy principals were allocated 3 hours per week to spend in classrooms with other teachers. This role included teacher-support, but also developed their familiarity with individual students and their needs.

h) Catering to the needs of Aboriginal students and community - Despite the defensive appearance of the school environment from outside the grounds, Aboriginal students seemed to generally feel cared for, included and capable of achievement. This was notable, considering that the school had a 50% student turnover (not including graduates), reflecting not only mobility of families between suburbs, city/country and interstate, but also interactions with juvenile justice and welfare groups. For example, one boy, who had recently arrived from an abusive environment in a rural/remote farming town known for entrenched racial divisions, was experiencing difficulties and proving a real challenge to staff.

The Aboriginal student population had doubled in the past few years, as had the population of Polynesian students. According to the principal, this was due to recognition by the Aboriginal community that the school does things differently and is better equipped to cater for the needs of their children and this applied particularly to children
who were not achieving elsewhere; these parents were choosing schools that treated their children and their community with respect.

i) Recognition/cultural inclusivity – Teachers selected to work in this school were those who demonstrated empathy and expended the time to get to know their students. They therefore knew, through networking with the AIEW (or more intuitively), if students were having difficulties at home and treated them accordingly.

There’s a newer way of doing things and teachers have...created a very hard code about what it is to be a good teacher here and we do not demoralise a child and we do not embarrass anybody in any way and you do not yell unless absolutely necessary so [a] teacher will be really shocked if they hear a peer yelling at a child or a class and I will know about that within five minutes of it happening....Our kids can smell a teacher who doesn’t respect them so if a casual comes in...they can smell it. One, we don’t get the casual back because we’ve been in there all day and two,...children won’t accept them back either. They’re being done over by too many people for it to be actually a daily part of their practice in school as well.

(the principal)

These school cultural practices appeared to align well with those suggested by the literature to work well for Aboriginal students, such as showing mutual respect and no shaming\(^\text{39}\). However, they seem to have not emerged from an Aboriginal Education discourse, but from the discourse of student-focused pedagogy and from a reflexive response to this community.

Despite the visit being close to the end of term and end of year, there was still evidence that classrooms were rich in information and realia relating to diverse backgrounds, including Aboriginal posters and themes. Outside the classroom, there was evidence that Aboriginal culture was valued. Both the Aboriginal and Australian flags were raised daily. There was a mural with Aboriginal motifs (as well as one with Polynesian motifs) and rubbish bins outside classrooms were painted in red, black and yellow.

Past and present Aboriginal perspectives were included in the curriculum, through studies in “Society and Environment”, including local perspectives.

The ASSPA committee appeared to be strong, although its membership pattern seemed similar to elsewhere, as there was little turnover in membership, resulting in the same few parents/carers assuming most of the responsibility for its activities.

The school held a special awards night for the community to celebrate the success of Aboriginal students. Food and awards were provided through ASSPA funds. The majority of teachers turned up to such events, getting involved in such ways as serving food.

There were two Aboriginal members (AIEW) of staff (1.5 positions). However, their task was to support 65 students, so they were spread quite thinly.

There was a homework centre, with ATAS homework classes two days per week for two hours after school. Parents were encouraged to include their children and there were two parent volunteers and two ATAS tutors (including the school numeracy specialist).

This school appeared to take the education of Aboriginal students seriously, without having a strong explicit focus on Aboriginal Education or many special programs for

\(^\text{39}\) Partington (1998)
Aboriginal students. However, there were some strategies to address the needs of each of the major cultural groups in the school.

j) Numeracy teaching strategies - teaching strategies did not differentiate between cultural groups, but used a range of strategies likely to be effective for all students, including Aboriginal students.

Shared accountability was encouraged by explicit explanations of teacher expectations, what was to be taught and how it would be assessed, as well as informal verbal summarization of these issues at the end of lessons.

A constructivist approach, using play, concrete/visual learning and a combination of focus teaching, group work and individual tuition was emphasized for all students.

Students were immersed in information-rich classrooms, where mathematics language was explicitly modelled.

Teachers made some effort to contextualize mathematics for relevance to students’ daily lives.

Outstanding results in State numeracy tests for Year 3 students in 2003 were unlikely to be due to numeracy teaching strategies alone, as this student group were also outstanding in literacy achievement this year.

CONCLUSION

For an urban school, with a minority of Aboriginal students, this appeared to be a good model. The Aboriginal students were happy, achieving and positive about themselves as mathematics learners. Again, the factors in place were a committed principal who was prepared to work closely with the Aboriginal community to develop/create and realise a shared vision and to stick with the job long enough to see it happen. This principal was creative and a good manager; who knew how to get the most out of both people and budgets. As a result, resources were found to carry out an exhaustive and organised consultation with the various communities whom the school served and recruitment strategies had resulted in committed, dynamic and innovative teachers who also worked hard to achieve shared goals. The common focus of school staff and community was also seen as being aided by involvement in the TRIBES © learning communities program.
CASE STUDY 4

SITE 4 CONTEXT

About a mile out of town, on the road to a remote Aboriginal community, lay the old cemetery. The headstones were mostly arranged in three lines on the south side, but a few were scattered, mostly in family clusters, at apparently random sites over the five acre plot. Headstones dated from early 20th century to the 1950s and, as in most cemeteries, showed various degrees of size and ostentation; some indication of the affluence of their inhabitants. Along the north side, in stark contrast, and discernibly separate, was a line of unmarked mounds; vintage unknown, but certainly not recent. These would have been the Aboriginal graves. There were a few graves in a second line nearby, also clearly Aboriginal. Two of these appeared to be children’s graves, as evidenced by elongated shapes, roughly the size of a child, delineated and decorated with a border of upturned, old, vegemite, marmite and ponds cream jars, all of similar size and all white opal glass; such containers were used as packaging during the 1930s. The care with which they had been placed was poignant, despite the occasional one lying on its side; accidentally or indiscriminately displaced, perhaps by an insensitive tourist.

Despite the intervening years since this cemetery had received new residents; despite the quietude in evidence on the streets (there was a notable police presence) and the efforts of the principal to discount recent adverse publicity relating to endemic violence and anti-social behaviour in the town; despite the school having recently received a major State/Territory award for Aboriginal education; despite the evidence that school staff are competent and that many programs and practices in the school are designed to cater for Aboriginal students and despite the presence of one Aboriginal teacher and a healthy number of Aboriginal Education Officers on staff, there was a strong impression that there were (still) deep divisions in this community that “has had a difficult racial history.”

The economic base of this community was rural. Evidence of this was seen in the types of businesses and services operating (eg. rural supplies agency, produce handling facilities) and in the attire and vehicles of non-Aboriginal people going about their business. It was also evident in the logo of the school, which featured an agricultural symbol, despite the school serving predominantly Aboriginal (and non-farming) clientele.

The farming community mostly sent their children to the other school or away to boarding school. The few non-Aboriginal students (approximately 10%) at this school were mainly children of teachers who worked there.

This school, which received priority funding as an outer-regional Aboriginal school, had recently won a major award for excellence in Aboriginal education, so it appeared to be well-regarded within the education system. There was evidence of pride in this achievement; the award and photographs of its presentation were prominently displayed in the principal’s office and the foyer.

The local Aboriginal language was taught in the Languages Other Than English (LOTE) program, although there was some concern in the Aboriginal community that the Aboriginal person who taught it was not well qualified (in a traditional sense) to do so and didn’t teach it accurately.

40 Source withheld
There was evidence of Aboriginal realia outside, in a prominent mural of Aboriginal design. An agreement between the school and Telecom had resulted in telephone booths around the town being adorned with locally produced Aboriginal designs. A local artist had been employed to assist on the project (through CDEP)—and students were also involved. This showed creative use of the program. The school had obviously made efforts to become involved in the town community and to involve Aboriginal community members with the school. However, there had apparently been some resistance to this initiative from the local town council.

The school board had Aboriginal representation and the number of Aboriginal staff was healthy, including one Aboriginal teacher. However, there appeared to be some conflict between this teacher and both the school management and the local Aboriginal community. AIEWs operated in various roles in most classrooms. Some felt under-valued and not consulted enough, especially on important issues, such as teaching and curriculum matters. The ASSPA committee was active, but, as in many schools, tended to be run by the same few parents/carers (some of whom were also the AIEWs), year after year.

In the office, the principal kept two flags, but the Aboriginal one remained folded. It was explained that bureaucratic red tape was keeping it office-bound, as it is an official requirement that two flagpoles are required to fly two flags and funding for a second pole had not been forthcoming. However, there were indications that a contributing factor may also have been systemic resistance from the ‘white’ community to this public affirmation of the school’s position and role.

Aboriginal students from the other school in town described this school (where a family member attended in the secondary program) using an Aboriginal word meaning make-believe or not the “real deal”. They suggested that the school (at least in the secondary section) teaches “the same thing over and over”. This was an important indication that Aboriginal communities are more than passive recipients of education and other services; they are often critically aware of inequities and differences between providers of those services.

**STUDENT ACHIEVEMENT**

1. **By external standards (State/Territory Testing against National Benchmarks)**

Table VII.9 Site 4  
*Percentage of students who achieved Literacy and Numeracy benchmarks (2003) - Site 4*

<table>
<thead>
<tr>
<th></th>
<th>Year 3</th>
<th>Year 3</th>
<th>Year 3</th>
<th>Year 5</th>
<th>Year 5</th>
<th>Year 5</th>
<th>Year 7</th>
<th>Year 7</th>
<th>Year 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Site 4</td>
<td>State-Aboriginal</td>
<td>State-Aboriginal</td>
<td>Site 4</td>
<td>State-Aboriginal</td>
<td>State-Aboriginal</td>
<td>Site 4</td>
<td>State-Aboriginal</td>
<td>State-Aboriginal</td>
</tr>
<tr>
<td>Numeracy</td>
<td>0%</td>
<td>60.8%</td>
<td>88.7%</td>
<td>75.0%</td>
<td>59.2%</td>
<td>89.2%</td>
<td>33%</td>
<td>39.8%</td>
<td>79.4%</td>
</tr>
<tr>
<td>Reading</td>
<td>0%</td>
<td>78.3%</td>
<td>94.7%</td>
<td>67.0%</td>
<td>70.7%</td>
<td>93%</td>
<td>33%</td>
<td>45.9%</td>
<td>83.5%</td>
</tr>
<tr>
<td>Writing</td>
<td>0%</td>
<td>57.2%</td>
<td>85.8%</td>
<td>10.0%</td>
<td>55.1%</td>
<td>87.1%</td>
<td>33%</td>
<td>41.6%</td>
<td>77.3%</td>
</tr>
<tr>
<td>Spelling</td>
<td>0%</td>
<td>46.8%</td>
<td>80.7%</td>
<td>33.0%</td>
<td>50.3%</td>
<td>82.7%</td>
<td>33%</td>
<td>50.3%</td>
<td>80.7%</td>
</tr>
</tbody>
</table>

Note: This data represents all Years 3, 5 & 7 students at Site 4. This includes 11% non- Aboriginal students.
Summary of external assessment:

- None of the (100%) Aboriginal students in Year 3 achieved the numeracy benchmark (Student numbers were not available. However, as students were available for Year 3 classroom-based assessments, it cannot be assumed that no students sat the benchmark test, but only that all Aboriginal students who sat the test did not achieve the benchmark)

The Year 5 group achieved well above the State average for Year 5 Aboriginal students, but well below the State average for all students. This group had two Aboriginal and one or two non-Aboriginal students who stood out as being strong in numeracy.

The Year 7 group achieved below the State average for Aboriginal students, which is about half the State average for all students.

2. Classroom-based Assessment

The school annual report for 2003 provided teacher estimates of numeracy performance for Aboriginal students in the Space strand only:

<table>
<thead>
<tr>
<th>Table VII.10 Site 4</th>
<th>Junior Primary</th>
<th>Upper Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of class on or above Year level</td>
<td>66%</td>
<td>42%</td>
<td>60%</td>
</tr>
</tbody>
</table>
Teacher-estimates for some other learning areas appeared incomplete, but demonstrated that most Aboriginal students were achieving above their Year levels in Health and Physical Education, the Arts, Technology and Enterprise (where there was an Aboriginal teacher) and Languages Other Than English (LOTE – a local Aboriginal language). Some students were also achieving above the State/Territory average for Society and Environment” and Science.

The incomplete nature of data provided in the school annual report sometimes made it difficult to interpret; at times they seemed to neglect providing a complete picture.

3. By internal standards (interview data)

AIEW/Aboriginal community

The impression from the Aboriginal community was that some students in the primary school were working at a good level, but that this was not generally the case, as indicated by the following comments:

Aboriginal community member: “Yeah some kids are very good ...but ...some [are] a bit down... and maybe they are doing the lower levels, but not their level”.

Interviewer: “You mean they're working below their age level do you think?”

Aboriginal community member: “Yes. Yeah. To me, it is.”

The secondary school was not seen as providing any real attempt at meaningful teaching, as indicated by the following comments:

Interviewer: “So in the primary they are doing better do you think than in high school?”

Aboriginal community member: “Yes. Yes...that's [the High School] more like a primary school and, if they can't you know, see it... most of them do the crossword and all that sort of thing.... And I reckon they shouldn't do that. They should teach them high school and that's it, you know”.

Aboriginal Kids on Street: “[They teach the] same thing[s] over and over”.

Teachers

In the Year 5 group, the diagnostic testing inherit in the numeracy program had demonstrated observable progress in the acquisition of numeracy skills. The setting of short-term targets was seen as contributing to this, and the program was seen as catering well for individual needs. It provided for a numeracy specialist, as an extra position, who underwent a course of intensive professional development and then conducted professional development for school staff, including class teachers and AIEWs. This aspect of the program was seen widely as increasing teachers’ knowledge about mathematics teaching and confidence in themselves as mathematics teachers.
CONCLUSION

The Year 5 performance in State/Territory Testing Against Numeracy Benchmarks was a good result (75% achieved benchmark), substantially above the State/Territory average for Aboriginal students (59.2%). According to the principal, students at this school “don’t start to take on [in all subject areas] ‘til Year 4” and this Year 5 group “would [also] have performed poorly in the tests in Year 3”. This appears contrary to performance patterns elsewhere, which consistently show a drop in performance against benchmarks from Year 3 to Year 5 for Aboriginal students (but not for non-Aboriginal students) and an even sharper drop by Year 7.

It is likely that the strong numeracy focus in the school, including having a full-time numeracy specialist, contributed to the Year 5 result, especially as the numeracy teacher meant an extra staff member working in classrooms specifically on numeracy. The numeracy program’s focus on small group work, including multi-age-grouping (Years 4 to 7) is also likely to have contributed. The Years 3 and 7 results were, however, disturbing, especially since the school had an early childhood focus which included attention to numeracy and since the numeracy specialist operated in a numeracy support role throughout the school.

It should be noted that the Year 5 group included a small cohort of students who were achieving remarkably well. This group was composed of both Aboriginal and non-Aboriginal students. The 75% Year 5 benchmark achievement was given for Aboriginal students and oddly, the performance of non-Aboriginal students was not included in the 2003 Annual Report, despite the presence of at least one high achieving non-Aboriginal student in this group. The performance picture at this school was not easy to interpret.

It has been noted earlier that individual Aboriginal students who achieve well in environments where most other Aboriginal students do not, may be compensated by factors such as:

- living in homes where there is strong and/or academic support for school learning
- having excellent individual teachers who are inclusive and strongly supportive
- just being brilliant students

One outstanding Aboriginal Year 5 student appeared to fit into this category, having strong motivational (but not academic or resource) support from home (grandmother) and apparently “just being a brilliant student”. The achievement of this student fits well with the previously mentioned analysis of factors contributing to success for Indigenous American graduates by Rindone (1988), who found that:

Socio-economic status bore little or no correlation to achievement motivation and academic achievement…. [and] parents generally had low educational levels, …. parents and family members were the driving force in their desire to achieve. 41

41 Rindone (1988)
CASE STUDY 5

SITE 5 CONTEXT

The manicured and quiet campus of this urban, Government, Aboriginal community school welcomed the visitor, staff and students, perhaps with a slight sense of affluence. Aboriginal designs were evident, from the flag raised in tandem with the National one, to murals and decorative paving.

The school was selected for the study because it was developed “specifically but not exclusively for Aboriginal students”[42] and it was led by an Aboriginal principal. This was in contrast to the usual method of selection, which was partly based on schools claiming some success teaching numeracy to Aboriginal students. Site 5 was recommended and included on the premise that it was likely to include practices and principles that were effective for Aboriginal students. In many ways this school is seen, perhaps politically, as a model, or potential prototype of best practice for Aboriginal learning in an urban district, despite students generally not having performed well in State/Territory testing for numeracy, and even less well for literacy. The pride of this school was in its sense of Aboriginal community ownership.

It is probable that some observers, particularly from outside the Aboriginal community, see Aboriginal community-controlled schools as test cases for the somewhat neglected political issue of self-determination. Possibly as a consequence of political sensitivities or successful lobbyists, this school was well-resourced, both in human and physical terms. The staff included a numeracy specialist, the library had a wide collection of Aboriginal-subject and Aboriginal-authored literature that would be the envy of many schools and school-based teacher-linguists, and class sizes were small.

The school was new; it had been opened in 2001 and had grown to enrol over 100 students and up to Year 6 in 2003. The ratio of students to FTE (Full-Time Equivalent) non-promotional staff was 13.5, about half that of many mainstream urban schools.

It had a support program that covered literacy and numeracy and employed a full-time specialist teacher, whose role included passing on professional development to classroom teachers.

The AIEWs (one full-time, two part-time) were regarded by students as teachers, but their roles varied between classrooms and included one-to-one tuition, just being there if students needed help, home liaison and administrative support.

There was a breakfast program, but the homework centre had ceased to operate.

Community Involvement

The expectation of the researcher was that, in this school, which has the ‘Community’ label, the local Aboriginal community would be closely involved in its governance. However, this appeared not to be the case. Community involvement appeared limited to the employment of Aboriginal staff, as there was, as yet, no school board representing the local community. Parents were not involved in classrooms much and contact from the school to parents was

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Aboriginal Students and Numeracy

seen as limited to times when the school was handing out reports or when there was “a problem or an issue”.

STUDENT ACHIEVEMENT

1. By external standards (State/Territory Testing against National Benchmarks)

In 2003, performance against the National Numeracy benchmark was low; In Year 3, only 17% (1/6) students achieved the benchmark and in Year 5 all (7) students were below.

The 2004 performance was much better: In Year 3, 100% were above the benchmark and in Year 5, 40% of the 10 students were above, 30% below and 30% close to the benchmark. As 2004 data has only recently became available, contextual factors in bringing about this change have not been examined; only the 2003 context can be described. However, even in 2003 there was some sense of confidence in the school that things were heading in the right direction and that this type of performance would improve with time.

2. By internal standards (interview data)

The Aboriginal community

This school was meeting the needs of its community, to the extent that it (the community) felt that its kids were learning in a culturally-friendly environment and that there was a sound level of community control over decision-making (mainly due to the Aboriginal principal, but also through ASSPA). However, both the school and community relied on improved performance on ‘State/Territory Testing Against Numeracy Benchmarks’ as a real measure of success, as seen from both within and without.

Teachers

Students were seen as making some progress, as evidenced by an increase in knowledge, skills and enthusiasm. Contributing to this were strategies that allowed for student autonomy, power and ownership of the classroom environment. However, the literacy/numeracy specialist felt this progress was not enough. She felt that the school focus had been firmly on literacy and consequently students’ numeracy achievement was poor generally, not just in terms of achievement of benchmarks. This was seen as reflecting the desires of the community and partly due to students having histories of low numeracy achievement when they arrived at the school. Teaching about how to do tests was not included in the curriculum.

Students

Students interviewed seemed confident in themselves as mathematics learners and sometimes regarded mathematics as solving problems and something you work on with teachers and do in groups, reflecting the emphasis in the numeracy support program on teacher support and working in small groups. They enjoyed working in groups, peer tutoring was common and student autonomy was exercised in the grouping of students.

Interestingly, here some students appeared not constrained by mathematics having only right or wrong answers; there was possibility for in-between. This perhaps indicated more of a tendency for teachers to place value on student interpretations and understandings, rather than seeing mathematics in absolute terms.
Students thought that the school was well-resourced.

**AIEWs**

AIEWs regarded positive aspects of the school as:

- Smaller class sizes, providing opportunity for more one-on-one learning
- Explicit teaching of the language in mathematics
- Teachers being empathetic and having knowledge of Aboriginal culture
- Teachers being prepared to consult with AIEWs
- Students having individual and appropriate work plans
- Good staff relations made for a positive learning environment

They saw their one-to-one tuition and home liaison roles as the most valued and important and were consulted by non-Aboriginal teachers on “Aboriginal issues”.

**CONCLUSION**

Although this school community feels pride in its sense of ownership, one factor that may have been holding it back was a lack of strong and consistent leadership; there have been a number of changes in staffing, including the principalship over the past few years. The other big factor may be tied up with the first. Responsibility for involvement of the Aboriginal community in school decisions seemed to rest on an individual; the Aboriginal principal. This responsibility may have been a heavy burden. In other successful urban Aboriginal schools, strong partnerships between principal and community had been forged through times of adversity and shared resistance. These conditions had resulted in the development of a shared vision which had sustained the school community through difficulties and over time. This school has a head start compared to those schools; it has been well-resourced from the start, but will also need to be allowed time for community ownership (and control), strong and consistent leadership and a shared vision to develop and bear fruit.
CASE STUDY 6

SITE 6 CONTEXT

The researcher’s first attempt to reach the Aboriginal community at Site 6, on the dusty, mostly ungraded road, resulted in a broken spring on the vehicle and a return to town to get a replacement vehicle. He finally made it the next morning. The benefit was being able to see the beautiful country on the way out there.

The Administration centre was governed by the Community Council, but operated by non-Aboriginal personnel, as is common in remote communities. There were three flagpoles out the front. On one side was the State/Territory flag, tattered at the edges, but easily recognisable. On the other, the Australian flag was in rags and barely recognisable. This was Aboriginal land, but the middle flagpole was vacant.

This was an Aboriginal community, with a denominational community school. It had been a pastoral lease until receiving Native Title in recent years and was still surrounded by cattle stations operating for pastoral companies, apparently governed by descendants of some of the big cattle barons. This Native Title “…acknowledges exploration licences held by mining companies and States that native title does not extend to minerals, in accordance with current law.”

Although there was evidence of some new housing projects, many houses appeared to be in disrepair, indicating a generally low socio-economic status for many community members. There was some evidence of efforts to provide employment and improve conditions, probably through CDEP project funding.

Paul, perhaps put in a paragraph that is more generic about the economic character of the community and avoid any comment on the spirit of the community or negative remarks about their status.

The incumbent principal had been in the post for three years. The previous principal had been here for about seven years and had instituted some innovative and significant changes in the way the school went about monitoring and assessing student progress. Concerned that available assessment structures were inadequate and inappropriate for Aboriginal students in this community, a consultative process within the school (which may have included Aboriginal staff to some extent) had adapted the Student Outcome Statements document to suit local conditions. As a result, the staff had found it much easier to more accurately assess student progress, identify areas of concern and intensify teaching in those areas.

Like all remote schools, professional development was hard to come by. Most of it was school-based; teachers were nominated to attend strategically identified training in the regional centre (3 hours drive and an hour on a light plane away) and then were responsible for formally passing skills and knowledge on to other teaching staff.

There was two-way learning in this school. Aboriginal teaching staff had developed local stories from students into big colourful books. There was considerable pride in the development of these resources and the responsible Aboriginal teacher had been invited to present them as innovative tools at National conferences. Students were taught a local Aboriginal language and partly taught in that language through the use of local community-

\[43 \text{ Reference withheld} \ (2001)\]
based teachers. The school had been a partner in the development of an interactive CD-Rom in and about local language and culture.

The main focus in this school was Literacy; while “numeracy [was] a poor relation”. This was not the choice of the principal, who felt that “you have to have literacy but I don’t think you can shelve it [numeracy] while you teach literacy.”

Consequently, students were grouped for half-hour mathematics sessions four days per week, according to ability (as long as their age was not too different, as this could cause shame) and focusing on a targeted strand. On the fourth day, teachers were instructed to concentrate on a different strand.

Numeracy teaching strategies concentrated on assessment and used purposeful grouping, tended to be concrete/visual and language focused and were delivered in intensive, daily mathematics sessions on specified thematic strands. The early Years teacher also practiced immersion strategies:

*I'm back on intensive numeracy...just flooding them with the information I suppose, giving them as many opportunities to keep writing those numbers, recognising those numbers. Went through my storeroom, put back up posters that I'd taken down...so the numeracy’s kind of everywhere because that’s the one thing that they need before they can do anything.*

Classroom teacher

School staffing includes one qualified Aboriginal teacher and several Aboriginal staff are either qualified or training to be community teachers, who team teach, but can teach solo under nominal supervision.

Staff roles for Aboriginal Teaching Assistants (ATAs) in the classroom included teaching small groups of ability-grouped students during the intensive daily mathematics sessions. Non-Aboriginal and Aboriginal teaching staff complement each other in classrooms; ATAs feel they are valued to an extent, as part of that team, but that sometimes their skills could be better utilised. They would sometimes prefer to be busier. They regard the community teachers as having more responsibility and a harder job.

Staff relations were considered to be generally amicable. However, some Aboriginal staff considered that non-Aboriginal staff did not always get on well and those staff, at least, considered that one Aboriginal teacher was letting the teaching team down through persistent absences.

Recruitment was not an issue on which the Aboriginal community was consulted, but if an incumbent teacher was considered inappropriate, it was considered by the community that they would probably have the power to bring about that person’s removal.

As an isolated community, there is some insularity and one ATA was surprised to hear that there were Aboriginal principals in some schools.

The school was considered to be well-resourced, although more physical resources would have been preferred. Students participated in many local excursions (in company of teachers and elders), which combined school with language and other traditional learning and some students participated in a major excursion each year.
ABORIGINAL STUDENTS AND NUMERACY

Expectations: teachers and students are encouraged to aim high, but high achievement by external standards is not generally seen as realistic, at least in the short term.

STUDENT ACHIEVEMENT

1. **By external standards (State/Territory Testing against National Benchmarks)**

Performance against Numeracy Benchmarks is considered to be poor. Data were not provided to the researcher.

2. **Classroom-based assessment**

The early Years teacher considers her teaching is contributing to success:

> yeah, very positive. I just retested my pre-primaries. There’s a PIPS testing that I did at the beginning of the year and then I did just last week and it was phenomenal.... it was really, really good that they recognised all of the numbers. And there were some abstract things that I didn’t think they would get where it was like they had maybe two clowns on the screen and a lady who says if you took one away how many would be left? And they got that. I didn’t think that something so abstract, they would be able to get. And then it was if you add one and they got them which I was really, really happy with.

3. **By internal standards (interview data)**

Based on comments from Aboriginal teaching staff, the community felt that their kids were “doing okay” at mathematics. This was evidenced by their “coming to school everyday”. The inference was that they must be learning well if they want to come (although school attendance was considered a problem in the community).

Children sometimes talked at home about things they had learned in mathematics at school.

The community felt that, between traditional knowledge that was taught outside the school and Western knowledge taught inside the school, children were receiving a balanced education throughout the school.

School staff also believed that they had community support:

> The community is very supportive of the strategies that the school puts in place. There have been a lot of community meetings because the community does care a lot about how the kids are going in school and creating that caring environment. I think...one of the highest things, above probably the maths groups, is the fact that the kids are safe in school, it’s somewhere where they can go that is safe.

Early Years teacher
Factors contributing to/inhibiting Achievement

The school appeared to have some outstanding Aboriginal and non-Aboriginal teachers, from an energetic and informed recent honours graduate with an early childhood background, to the secondary teacher, who had surprised the principal, who described him as:

what I would call a ‘Yap Yap’...he talks all the time and he talks about the kids but he also brings them along with him. He explains things as he goes but he never stops talking... at first I thought oh he’s not going to get through to these kids, they’re going to switch off or whatever but he cares about the kids so therefore he’s going to teach them anyway.....He does things with them outside school so he’s got them ...They listen and they learn.... if you care about them you’ll get them there.

I’ve got a good team at the moment, I’m very happy with them. [name deleted] is an Aboriginal teacher, she’s great. Her classroom is a joy to go into, the kids are always working. Every now and again she might throw in ... it’s not always standard Australian English but they're learning and yeah.

The early Years teacher was a reflective practitioner who focused on concrete/visual teaching strategies, especially for some strands and concepts:

Teacher: Because ... they're receiving this information in a language they understand. They understand visual... but still they are receiving the information through English which is not their first language so they still need to process and then discover their answer in their own language and then convert it to English so there’s a lot of ...decoding that they need to do. But with pictures and concrete materials it’s easier to hold one up and show the answer.

Researcher: So the comparison is something that they can do regardless of language?

Teacher: Absolutely.

Researcher: Without depending on language?

Teacher: Yeah...[and] I’ve found with some of my children that aren’t very forthcoming with their language, [that they] are actually quite good at their maths and they've gotten better and better at showing me that they know things.

This was an information-rich school, which made effective use of its local setting. The digital camera was used extensively and photographs of the students doing a range of activities, including numerous excursions with elders to significant places in the area, were on display everywhere.

Part of that richness was the learning of and through local language, which was taught by elders (language specialists), but also through use of a CD-ROM developed for that purpose. The following extract from the CD_ROM explains the roles of various personnel in the process:

Central to the team is the language specialist who speaks the language. This person takes a leading role in the lesson if they are able and provides the model for correct use of (local language).
The classroom teacher is involved in the role of management, fitting the (local language) class into the weekly program, and helping the language specialist manage the children if this is needed. Of course the setting isn't always the classroom, it is often outside where the environment provides natural language learning opportunities. Sometimes short bush trips or excursions to significant local places can lead to the telling of stories.

Another member of the team is the Aboriginal teaching assistant who may know some (local language) but is still a learner. The teaching assistant's role is one of support for both the language specialist and the teacher. Sometimes the team needs to call on the fourth member, the linguist, whose skills are more in the area of recording and writing the language.  

CONCLUSION

There was obviously good teaching going on in this school and the community was happy with the balance between Aboriginal and Western knowledge in the curriculum. Many Aboriginal community members were involved in teaching in a variety of roles; teachers, community teachers, ATAS and Elders. Student numeracy achievement however remained low.

There was evidence that this community and school were still somehow separate; they did not always work in concert. There appeared to be some sections of the community which fully supported and were prepared to work closely with the school. The school appeared to be primarily governed by an external organisation, and the decision-making power of the community may have been limited by those structures. Nevertheless, the school and the organisation appeared to be prepared, to some extent to involve the community in school decisions, although the willingness of the community to take that opportunity may have been limited to a few individuals; there was evidence of some disunity. It was difficult to ascertain whether this was symptomatic of, or contributed to the apparent separation between school and community, but it appears likely that this separation was a barrier to student achievement.

44 Source witheld (1999)
Aboriginal Students and Numeracy

CASE STUDY 7

SITE 7 CONTEXT

This remote school seemed to be quietly going about its business. The community was also a quiet place, the evening silence only broken by the shouts and calls of kids on the flood-lit basketball courts. Aboriginal students made up almost 100% of the student population.

In a region with over 30% of youth unemployed, the needs of this community leaned towards the school providing students with the necessary skills to set up and operate community-based enterprises and skills to gain employment, preferably in the community as a skilled workforce for those enterprises. They wished to develop community aspirations for employment beyond the limits of CDEP programs. This seemed based not only on providing an economic base for the community, but also as a means of keeping the kids in the community, rather than them having to move away to or spend time away in the regional centre, some 2.5 to 3 hours drive away. Some parents were worried they were losing their children to the culture and values of American ‘gangsta rap’ music and sought to keep them close and employed to enable the nurturing of their own culture and values.

Consequently, although much energy was directed towards the primary school, there was a strong focus and hope placed by the school and community on the secondary program, where a small group of higher-achieving senior students were experiencing some success studying through the School of Isolated and Distance Education (SIDE). There was also emphasis on developing the skills of adults in the community, through an adult learning centre.

The main factor contributing to the success in the secondary program was seen by the school to be purposeful use of the ATAS-funded tutorial program. A specialist secondary school mathematics teacher was employed under this scheme to support the mathematics learning of students studying VET courses. These courses had numeracy learning embedded in units aimed at developing technical and business skills in enterprise development and management. The teacher’s focus on developing the numeracy skills required to complete those tasks was seen as integral to success: “having that emphasis of a maths specialist teacher’s been really important”. (The principal)

For students studying through SIDE, the paper-based format was seen as contributing to their ability to perform in paper-based tests such as the State/Territory Testing Against Benchmarks for numeracy and literacy, although data relating to these tests was not provided. The structure of the program was seen to be contributing to the development of independent learners although the learning contexts presented in the paper-based SIDE materials were often seen as inappropriate; “you’d love to be able to have it…relevant to Aboriginal students but I’ve yet to see anything out there”.

School-wide, there was an identified numeracy teaching focus on number, but no particular early years focus. Teaching strategies in the secondary school included explicit teaching of the language in mathematics, as evidenced on posters created by the AIEW.

As a remote community, professional development was limited. However, staff had received professional development on two-way learning.

Expectations are focused on the needs of students and the community:
my goal is...to effectively give them educational opportunities...[for] university but...at the same time I’d like to be able also to give those kids the maths skills for life, lifelong...learning and being an effective member in [Site 7 name] community. So it’s...giving kids the skills to be able to make...the right decision in terms of their educational opportunities, that’s what it’s all about.

Staff relations in the school were seen as collaborative. Teachers, together with their AIEWs were given extra time for collaborative planning for literacy, but plans to extend this to include numeracy had not yet been realised.

Aboriginal community involvement in school decisions occurs through representation on the school council and through ASSPA. The school has also engaged the community through invitation to identify their ideas and aspirations for the school at school/community forums involving all staff. These have revealed that:

literacy and numeracy is seen as really important...but also they see...sustainable enterprise as being really important too; things like tourism, aquaculture...they see that as being the future for the community in terms of developing that sustainability.

we’ve only been doing it for the last two years but... we often as educators...think we know what’s best for the community and we become very insular but if you actually go out and engage in your community and engage what the community wants you’ll find that there’s often a quite different picture.

This was seen as an “enlightening experience for...staff to be engaged in.”

In terms of the relationship between school and community, the principal sees the school “as part of the community...we’d...like to take the next step of promoting the school...as a lifelong learning centre....but we’ve a long way to go”.

STUDENT ACHIEVEMENT

1. By external standards (State/Territory Testing against National Benchmarks)

Quantitative data were not made available, but the impression from interviews was that, although there were some students in most classes achieving the numeracy benchmark, achievement by this measure was not high in any class, student group or school-wide; “the [benchmark data] won’t give you a huge amount... we just haven’t got the large group of kids in that group” However, there was some questioning of the ability of the State/Territory testing to accurately depict student achievement.

2. By internal standards (interview data)

The Aboriginal community

The community had confidence that the school was meeting its needs, as evidenced by indications of children in the early Years being excited about their mathematics and teenagers feeling more confident that they could achieve.
The school was also seen as meeting community needs as, in a community where most parents are not numerate, the adult community-learning centre offered opportunities for adults in the community to develop literacy and numeracy skills. This was resulting in adults who were more confident as learners.

In the secondary school, parents felt that factors contributing to success were ‘old-fashioned’ teaching methods and more realistic learning that related to future employment. In primary school the provision of awards and certificates to encourage achievement and attendance was seen a positive.

Parents considered that the school was generally well-resourced, although they thought the focus on the achievers, to the neglect of non-achievers, could have been addressed by employment of extra support staff for children with special needs.

The teaching of an Aboriginal language from kindergarten was seen as positive, although teaching about Aboriginal culture was seen as sometimes neglecting big issues for Aboriginal people, such as racism and stolen generation.

Health was attended to well in the school, which had regular hearing-tests and a breakfast program.

Aboriginal teaching staff (including AIEWs), were seen as an important part of the school, but their role was seen as sometimes too much in administrative support and not enough in teaching support.

It was seen as an advantage having an Aboriginal principal, who consulted well with and had the confidence of, the community. However, this person was not local and more local community involvement and responsibility on education issues was seen as desirable.

The principal

Numeracy achievement tended to be referred to in terms like ‘reasonable progress’. For example, in some areas of the school, such as Years 4/5, 6/7 and 8-10, it was felt that the school was “doing a reasonable job in terms of improving outcomes in the maths learning area”. This was evidenced “not so much in the [benchmark] data but just in the feedback”.

In the Year 6/7 group, there was seen to be “a cohort of kids that are...showing progress....I actually wouldn’t put a great degree in terms of the ableness [sic]....I wouldn’t say they’re extremely gifted, I think they've just made some reasonable progress”.

Secondary students studying through SIDE were seen as progressing well with the numeracy embedded in the VET courses, through specialised ATAS support; “in terms of working at that mainstream level, I’m comfortable saying that they’re making reasonable progress”.

Aboriginal Students and Numeracy
Aboriginal Students and Numeracy

The Teachers

Attendance was still seen as a big issue and non-attendance as a big limitation to student achievement. There was a whole-school, incentive-based focus on strategies to improve attendance and possibly to cope with non-attendance; one advantage identified for the SIDE program was that it was individualised and self-paced, so if students missed some school time, they could easily pick up where they had left off. The higher-achieving secondary group are those who attend more regularly (but it was not clear which was the chicken and which the egg).

Indications from the administrators of the SIDE program were that “we’re one of the remote schools where it’s working the best in the State”. A major factor was seen as having “a teacher specifically for the SIDE students”.

CONCLUSION

This was particularly informative as a remote Aboriginal school with an Aboriginal principal which, unfortunately, was an unusual combination.

While numeracy achievement by external standards was not high, there was strong evidence that the school was well on the way to meeting the needs of its community. The community still felt that students were educationally disadvantaged, compared to mainstream students and that the community still had some way to go in terms of school attendance and community sustainability. However, their needs were being catered for by including local language in curriculum and providing education pathways through secondary school that were realistic and would enable students to gain skills and knowledge that would benefit themselves and the community.

While school and community maintained some separation, to a degree that may have been determined by structures and processes controlled externally from the organisation. There was evidence that the presence of an Aboriginal principal who was prepared to engage the community in the school and vice-versa had brought the two closer together.

The principal’s aim was to “provide community people with the skills to make choices...also empowering them to develop...the skills to...make the community self-sufficient, to be sustainable....that’s critical”. In regard to achieving that aim, the fact that this was a government school was seen as significant; “we’ve got some structures there that guide us and that’s fantastic but [would prefer the organisation] just being able to give that little bit more flexibility”.

we’re focusing on a...mainstream schooling system that doesn’t really impact on education for Aboriginal students....we run on four terms a year... set by [Metropolitan managers] and ....at the moment...we haven’t got many kids here ‘cause this is a time [of year when] people are meeting families, going to other things...where we tend to be stuck in by the [inappropriate] systems.... Why not let the community have a say in terms of the times of school operation.... engage the community in terms of setting the priorities for the school...? Why should we be governed by a department that sets the times?

I still think you need some safeguards in terms of accountability mechanisms to make sure that the kids are actually learning and that there’s accountability in terms of the
school principal and staff but I’d also like to be able to have latitude in terms of the modes of operation and engaging ... the community and the learning process.

He also would have also preferred the flexibility to engage the community in decisions regarding curriculum, school business (including recruitment) and education and training opportunities for adults.

He felt that an adult education focus could also be extended effectively to secondary school students:

*let’s treat them as adults [give them] the opportunity to come to school with adults...so they’re seen as adults rather than...as still primary school kids.... more in line with...how they’re treated... culturally as being young adults. We still sort of put in place a system where the kids are still being treated as what I’d term as primary students and they’re not, clearly not.... we’re making decisions for them whereas they’re at that age now [where] they’re making decisions for them[elves] in the home life....they've been getting a huge amount of responsibility in the home life. But this is not shown in terms of the school system.*

This principal was making a difference to a school and community, but his effectiveness appeared constrained by bureaucracy and the length of his tenure in the school. This community needed such a principal to stay, and flexibility in the organisation that would make this happen.
CASE STUDY 8

SITE 8 CONTEXT

Like Site 5, the manicured and quiet school campus of this inner-regional, Government Aboriginal Community school welcomed the visitor, staff and students. The Aboriginal community here were proud of their new school; there was a sense of pride in ownership and achievement.

Like Site 5, in many ways it has been seen, perhaps politically, as a model, prototype or test case of whether this example of best practice for Aboriginal learning can provide a successful model for other Aboriginal communities.

It also has taken a less ‘institutionalised’ and ‘institutionalising’ approach; where curriculum (to some extent) and instruction have been designed to meet the specific needs of Aboriginal students and have been approved by the Aboriginal community; in an environment that has provided something of a buffer from political domination and assimilation and also from racism in the wider community.

This urban/regional Aboriginal community has been consulted as part of a State/Territory government program to support Aboriginal community schools, including involvement by communities in identifying appropriate physical location and design of these new schools. This has indeed broken new ground; consultation and involvement of Aboriginal communities in real and important decisions regarding the education of their children has rarely characterised education policy in the past.

However, this school may look new, but it has a history. The school has been operating as an Aboriginal school for 10 years. The level of government support has recently increased dramatically, as evidenced by the brand new premises. Enrolments also have increased. The school operated for most of its life on the barest of resources and previously occupied a group of tiny demountable buildings. It is a tribute to the perseverance of the school and community that they have finally been recognised and rewarded, not for their persistence, but for the achievements of both the school and its students.

There are two Aboriginal teachers in the school. Here, AIEWS are also regarded as teaching staff, are involved in school planning and engage in a planned professional development program.

The principal has been in the position for 8-10 years, has been very much involved in creating and sustaining a school vision and has shared with the community in all its developmental difficulties. This principal has worked to ensure school and community are not separate and to reflect community values in day to day school decisions and thus works with the full confidence of the community.
Aboriginal Students and Numeracy

STUDENT ACHIEVEMENT

1. By external standards (State/Territory Testing against National Benchmarks)

This school had some recent outstanding results in numeracy achievement, evidenced by the fact that in 2003 (see Figure VII.9 Site 8), Year 3 and Year 5 Aboriginal students at this school all achieved the Numeracy Benchmark. This result is outstanding for any school, not only for an Aboriginal school. Two of the five (40%) Year 7 students achieved the Numeracy Benchmark. This low result (but marginally above the State average for Year 7 Aboriginal students) is explained thus:

*The Year 7 group was below the State average but above the State average for Aboriginal students....We have a number of students come into the Year 5/6/7 area ... mainly 6/7 who’ve failed at other schools and we find our data shows a drop at the 6/7 end but when we take out the new students there hasn’t been a drop.*

The whole school picture showed that 66% of students (in Years 3, 5 & 7) achieved the Numeracy benchmark; lower than the State average for all students (79.4%) but well above the State average for Aboriginal students (53.3%).

Figure VII.9 Site 8

The principal felt that the State/Territory Numeracy tests have improved over time in their cultural inclusivity. She has been consulted as part of a Departmental process to modify the tests.
2. **Classroom-based Assessments**

Hard evidence was not provided, but qualitative data from interviews indicated that student progress is evident in periodic assessments by teachers using “Numeracy Net, Easymark student outcomes” and also “teacher-made judgements linked to the outcomes.”

(Easymark Maths is an optional standardised test, provided by a private company. Schools can “either buy the tests and mark them themselves or buy them and get Easymark to do the marking. If schools choose the latter option, they will also receive data that compares the school’s performance with other schools around the State”.)

3. **By “internal” standards (interview data)**

Qualitative data from interviews indicated that student numeracy achievement was also seen as positive by parents: “kids’ interest in maths as well and confidence,... [and] parents comment... they can see it at home, them coming in and using what they’re doing and even helping the parents in some things”.

**FACTORS CONTRIBUTING TO NUMERACY ACHIEVEMENT**

**Early Years Focus** - The principal regarded a period 4 years ago as a turning point, when they decided to focus on numeracy in the early Years. It was felt that this is really showing with the current Year 3 and 4 groups, even though the main focus has been on literacy (there is a Literacy specialist).

**Test Preparation** - The school felt that the use of another optional diagnostic test (Easymark) provided an external measure, which to some extent prepared students for the State/Territory Testing Against Numeracy Benchmarks:

*by doing them with the 2, 4s and 6s (the alternate Years between State/Territory testing) it also prepares them for doing the (State/Territory) tests ... (for) a lot of kids ... the testing’s a thing to get over, the actual process of it.*

**Attendance** - The school felt confident that its approach was successful in engaging Aboriginal children who often have not been engaged as learners at previous schools. They felt that this was a strong factor in increased attendance; “one this term has had more attendance here in four weeks than what he did in two years.”

The school’s tendency to accept Aboriginal students who had not been achieving elsewhere was also indicated by their initial reluctance to provide Benchmark results for Year 7 students; feeling that, because older new students often have longer histories of poor achievement, it took longer for the positive environment to be effective and many such students had not yet been engaged for long enough to benefit from its programs. This reluctance to provide Year 7 statistics was also evident at Site 9, for apparently similar reasons.

**School Size** - It was felt that the small size of the school improved the effectiveness of the principal:

> [be]cause it’s a small school I get into the classrooms a lot and also have meetings with the staff, the teaching staff looking at their data at the beginning of the year so where are your kids? What’s your step to link your teaching plan to your data? And that’s...
something the school have been working in the last couple of years.....Yeah and be there for resourcing ‘cause sometimes they can talk with me about ... oh when you know need more hands-on stuff for the measurement for this and that and I say well what have we got? What haven’t we got? That’s when I can help with the financial side, looking at that and also where to put non-teaching staff to help.

CONCLUSION

This school/community and the one at Site 9 had much in common. The big difference was in its governance. Although able to practice some autonomy, this remains a government school and thus, subject to external control through funding.

Although students at both schools seemed to be achieving well in numeracy, there was more hard evidence here. Students at Year 7 were achieving less well at both sites and they both cited similar reasons and showed similar reluctance to provide statistics that might show them in a poor light. Like Site 9, the main focus here was literacy.

Both schools have fought long and determined battles for survival. With that has also come recognition, but the impression was that recognition was not the prize. The aim of their resistance was realisation of their self-belief.

This school/community and the one at Site 5 also had much in common. The big difference was in its history. If, as suggested by this research, persistent resistance and adversity were factors in the success of the Site 8 school, then these are hardly likely to be conditions one would attempt to recreate. Perhaps the school at Site 5 still has a way to go to grow into these shoes.
Aboriginal Students and Numeracy

CASE STUDY 9

SITE 9 CONTEXT

This Aboriginal community had established its own school. It was set up initially to:

- cater to the needs of kids that weren’t going to school for whatever reason, some were rejected from schools, others were ejected from mainstream schools....For far too long Aboriginal families have had complaints about ...fighting with kids to get them to school and then blues with the schools to keep the kids in there.

It has been in operation since 1986 and is governed by a school board of elected members. Therefore, presuming that the whole community was consulted, it could be assumed that the school reflected the needs and desires of the community it served.

Although the composition of the boards tended to retain a constant core, formal community consultation occurred through general meetings and election of board members, so rotation or change of the composition of those boards was at the discretion of the community.

The current principal started in the position 11 years ago (when there were 25 to 28 students), including the past 6 to 7 years at the current site. Consequently as school leader, she has walked side by side with students, parents and community leaders through much of the school’s development, including conflicts with bureaucrats and the outside community. The current site of the school was a government primary school which closed due to amalgamation of several schools. The Aboriginal community here had a struggle getting permission to take up the premises, including much resistance from the local non-Aboriginal community, many of whom didn’t want an Aboriginal school in the area. Because of this resistance and negative community perceptions and because it is an independent school, adequate resourcing has also been a constant struggle, but this community is resourceful and very determined. The school has grown to now cater for students to Year 12 and Pre-primary and has developed an Adult Community Skills Centre which provides training for older community members.

Perceptions of the school from within the community have also been developmental:

- we had three girls leave at the end of term 1 because they felt they wanted a broader experience but they were also nervous about going because there’s this sort of conception that maybe at the [Site 9] School we don’t do ...Real stuff you know...what they’re doing in mainstream schools. Now those girls come back and visit and the comments are the work is actually just the same, except the teachers aren’t nice to you and you don’t get the help that you get here.

The school has not generally seen the need to develop its own formal curriculum. However, because there is no Indigenous Studies syllabus for primary school in this State/Territory, here they have developed a distinct syllabus entitled Cultural Studies, which is taught as well as the State/Territory framework’s core, Study of Society. The school-based unit took “more of a history based approach....and the...study of different indigenous cultures”. In the junior Years it was more about families and “all the nice things”, but in upper primary it addressed bigger social and political issues.

There was also a vocational focus in the curriculum; from Year 8 onwards all students were enrolled in career education modules: “Those over the age of 15 generally spend a day a week
in the workplace, connecting directly with the world of employment and developing their skills and self esteem”. This community wanted its children to be prepared for opportunities to gain employment, including in administration, management and politics. It saw the future for many of its children as effectively working in and managing Aboriginal organisations:

probably 25, 30% of the kids that go through a school, most Indigenous ones, will end up becoming a member of either a land council, a legal service, a health service, a CDEP or something else.

Consequently, “wherever possible, these students complete their work-based training with Indigenous organisations and businesses”. It also saw children as future leaders and constructive community members. The focus was clearly achievement of the whole child, for the benefit of the whole community; “Our children are taught to be independent and to speak their own mind”.

The school has a literacy intervention focus, but no numeracy focus. The rationale was clearly explained:

we began a literacy intervention program nine years ago, because the gaps were ... much greater in literacy than numeracy ....We experienced such success in that first year that in the second year we decided to split the time available into literacy and numeracy and we didn’t have the same results either for numeracy or for literacy and we have found that by concentrating on literacy, that numeracy seems to come along with it.... so we have gone back to focusing in terms of intervention with literacy.

Similarly, there is no particular focus on numeracy in the early Years; “No, the resources ... are spread throughout the school. We don’t really see that one particular age group is more important than another”.

In terms of the hidden curriculum that often reinforces Western values and cultural norms in non-Aboriginal schools, this school’s cultural and socio-political agenda pervaded the school culture in similar but more visible ways. Part of this approach was greater acceptance of Indigenous language/dialect, social conventions and a strong focus on valuing the whole child and the whole community (which included the school). They “never give up on a child.” School programs that aimed to meet the needs of the community by supporting students at school and getting them to school, included a bus run, breakfast program. These strategies were reflected in school attendance, for the school reported very few unexplained absences.

In terms of formal assessment, however, this community adhered to State-imposed structures. Although there was considerable disregard for the validity of Benchmark Testing, they complied with the system as much as was required to maximise opportunities for students to acquire academic qualifications that would enable them to function effectively as potential leaders in Aboriginal organisations. This compliance may also have been tied in with a perceived need for validation by the non-Aboriginal community; to be successful by their own definition and to be seen to be successful by western definitions. This would not only help to silence their many critics, but recognition of the success of their approach would improve opportunities for Aboriginal students in mainstream schools.

There’s this [white] superiority complex ....we[’ve] got higher achievements here than the Education Department...for Aboriginal people within its system. We still don’t get the recognition and support...that we should, they still don’t look at what we’ve achieved and how we achieve it .... not once have they come along and said well you guys are onto something here, let’s sit down and have a look at it and see if we can’t make some
STUDENT ACHIEVEMENT

1. By external standards (State/Territory Testing against National Benchmarks)

Figure VII.9 Site 9

![Site 9 - Year 3 scores for State/Territory Numeracy Tests - 2003](image)

Figure VII.10 Site 9

![Site 9 - Year 5 scores for State/Territory Numeracy Tests - 2003](image)

The above data (figures VII.9 Site 9 and VII.10 Site 9) for 2003 indicate that Years 3 and 5 students at this school performed generally higher than Aboriginal students throughout the State, but lower than all students State-wide.

In the ‘Space’ and ‘Measurement and Data’ strands, Indigenous Year 3 and 5 students at this school achieved remarkably higher scores than Indigenous students across the State, but considerably lower than State results for all students, with the exception of the ‘Space’ strand in Year 3, where Indigenous students achieved similar (but slightly higher) scores to all students in the State.
In the ‘Number’ strand, Year 3 and 5 students achieved similar results to Indigenous students across the State (slightly higher in Year 3 and slightly lower in Year 5), but well below the results for all students.

When scores were averaged across all strands, students in both Years achieved considerably higher than the State scores for Indigenous students and considerably lower than the State scores for all students.

Year 7 results were not provided, and were not regarded as providing a positive, nor a realistic picture of achievement. This was partly due to the high proportion of Year 7 students who were new to the school and therefore had not had the benefit of extended exposure to the numeracy program and also to the fact that existing students had not had ‘early years’ or extended exposure to this relatively new numeracy focus.

**By internal standards (interview data)**

There is ample evidence in the preceding statistics of the success of the school’s approach to Aboriginal education, in comparison to the approach of other schools and systems in the State/Territory. There is considerable pride in the school’s achievements and the impression was that this outcome undervalued them, despite any apparent reluctance to recognise the validity of these tests. The principal feels they are doing better than these statistics indicate, and feel the snapshot view they provide misrepresents the reality of their growth in achievement:

> [five] years ago...every Year 3 student was... above mainstream average. Those students are now in Year 8 so...this cohort of Year 8s are the first that we’ve had really that are doing well.

The school’s frustration over these reporting systems is evident:

> Can’t we...report on children that have been at this school for two years or more... as opposed to children that have just entered the school?... I’ve always asked if we can provide more than one set...of data for the year’s results.

It stems from the disregard of the Benchmark reporting for the length of time students have been at the school; the school is confident that, given time to influence students’ learning, they can develop successful learners:

> I think they’re doing well but it also depends on how long they've been here.... continually we’re taking children here that are way behind the eight ball, so in...yesterday’s test there’s a... 12 year old child who is... operating at a two year old level, a 10 year old operating at a six year old level... there’s a whole lot of other factors... that you have to take into account.... because that data is ... skewed and brought down by those students that have not long been at the school....In the Year 3 test, those children that have been here since Year 1,...are doing better than any others ... in our school....Most of them are mainstream average as opposed to indigenous average.

This is consistent with suggestions that the results of benchmark testing can be somewhat of matter of chance regarding Aboriginal students, partly due to student and family mobility. Just as students who have only recently arrived at this school might cloud an accurate picture of whole-school achievement, in communities where mobility and school attendance may be more critical, the performance picture painted by such testing programs can vary considerably according to which students (regular or non-regular attendees) happen to be there on the day, especially if one assumes a somewhat direct relationship between attendance and
achievement. Many students at this school have or have had disrupted lives: “Nearly 30 percent of students are in State care and many are returning to school after periods in detention.”

**FACTORS CONTRIBUTING TO NUMERACY ACHIEVEMENT**

**Staffing – Recruitment.Roles/Development**

Teachers are recruited for this school more for their personal qualities than a particular pedagogical approach to learning:

a large part... is the type of person that they are, can they be flexible? Can they operate in a school where at times there are very difficult behaviours and not spit the dummy….you have to be patient, you have to be tolerant and you have to be prepared not to give up on children….what is important in terms of any sort of successful teaching is the relationship that exists between the teacher and the student.

The school has a number of Indigenous teachers (approximately half), but Aboriginality is not considered a primary qualification:

Apart from the fact it’s very difficult to recruit indigenous people for the high school we’ve kind of moved beyond those notions and a good teacher is a good teacher whether they’re...indigenous or non-indigenous.

We have been quite brutal in cases where there’s been Aboriginal teachers that just don’t make the grade and they've got to be cut loose.

She [the principal] may be a non-indigenous woman but she’s the best person for the ... job.

Board member

It is felt that successful teachers for these students are those who:

- Establish productive relationships with students
  
  if a child feels comfortable in a relationship with a teaching ... a person responsible for teaching then there usually is a successful outcome for the student.

- Show respect/understand Indigenous protocols
  
  in that [mainstream] system you demand respect because you’re an adult. Not our way, not our way, you give respect you’ll get it. If you’re going to demand it you’ll get nothing most times.... that’s a different thing.

Some respondents felt that professional teaching qualifications do not make a teacher: “I think teachers are born...they’re just like healers and people like that...you’re born into a role...that you need to play, have responsibility for” and that many practising teachers do not have the necessary qualities and possibly should not be teaching, especially teaching Aboriginal children, indicating some cynicism for teacher-training programs:

you got people out there that seem to think they want to be teachers and should be teachers and must be teachers for whatever reason ... they yell... and they scream and they carry on. It’s just sad to see ... those sort of people in control of our kids for the majority of their school lives....And yet you can see other teachers that are real teachers, they are born to be teachers and they’re very sensitive and caring and know how to deal with the challenges that they face....they’re communicators.
The demands on teachers are considered unique here and new appointees are held accountable by only being given a one-year contract. Renewal of the contract is dependent on “a range of factors but mainly successful teaching and outcomes for the class that they’ve been responsible for... teachers are responsible for the success of their students”.

One unique aspect is considered to be how the collaborative environment determines flexible staff roles within the classroom and the school:

There’s no great differentiation between the person in my position and the bus driver...all staff here contribute to making things okay for the kids and the children don’t see any sort of great [difference in rank or responsibility]... a staff member is a staff member...there’s no hierarchy here.

Often in the classroom you’ll see that the teacher aide will take the lead role as opposed to the teacher but again that sort of goes back to ... how people are treated here in that no teacher would ever think that they were better than the teacher aide and no teacher would order around [a teacher aide]... they’re partners.

This informality in staff roles extends throughout the school. It is one of its valued characteristics and potential teachers, particularly non-Indigenous ones, are assessed for how well they will fit in: “you have to be a particular person to ... to work in this context”.

It is also seen as an advantage of having a relatively small school (it has grown now to approximately 200 students):

in some ways... I regret the school getting bigger....Because I think in some ways we had better success when we were smaller....we’ve always had large classes but fewer of them....it’s just that level of knowing ... every single student in this school, I could tell you the name of every single one but I don’t spend time with each student individually as I used to ’cause there isn’t enough time in the day....Almost like part of the family and that’s what we do try to engender here, is that this community is an extended family.

As a metropolitan school, it is easier to attract good teachers with experience working in Aboriginal schools and the principal’s wide experience in Aboriginal schools throughout the State/Territory is used to advantage:

Principal: You’ll see dotted around [the school]...all these people that I used to work with...[in]every community that I’ve been there was always one other good teacher and you’ll find ...

Researcher: And you’ve snaffled them up have you?

Principal: Yeah....And I often still teach myself.

Professional development of staff recognises that many Indigenous teachers are only three year trained, which restricts their opportunities for career advancement:
we have an arrangement here ...If a three year trained teacher undertook 100 hours of professional development...it’s not something that [is] transferable....in our context they are classed as a four year trained teacher in terms of remuneration.

The school has recently become a Registered Training Organisation and the director of the Adult Skill Centre has provided in-service training to all staff members to qualify them with Certificate IV in Workplace Assessment and Training. This has improved the versatility of staff, enabling them to teach both children and adults in the community, in vocational courses in hospitality, administration, mechanics and horticulture.

School staff (the principal and deputy principal) are also involved in delivering compulsory teacher pre-service training outside of the community.

**Teaching strategies**

The principal does not see anything special about the way the school goes about its numeracy teaching and does not openly endorse any particular teaching strategies or style; “We will have teachers here that teach differently. We don’t sort of tell teachers how they have to teach, we just tell them they’ve got to have outcomes”.

However the style of some of its best teachers is regarded as “fairly traditional”.

[the deputy principal] is probably one of the best teachers that I’ve ever seen... to me though she’s like a very traditional teacher but at the same time all of those kids love and respect her.

Although this approach flies in the face of contemporary pedagogical theory, the school stands firm by its claims that “traditional” teaching style and strategies can be as or more effective for Aboriginal students.

all you got to do is look at say [school board member], his father’s age group....their literacy levels are fantastic... and why?.... probably only went to grade 3, he learnt more in those years than the kids in [a remote community] today are learning through Year 7....it was more traditional teaching, western traditional. There’s something about being strict, yeah, and there’s something about expecting order.

More consistent with contemporary pedagogy, but contrary to common suggestions of the existence of ‘typical Aboriginal learning styles’, Indigenous children are seen as individuals who all learn differently, there being no:

little box of tricks that you’re going to pull out for successful maths teaching.... it’s a whole range of things that contribute to good outcomes for kids.... the successful teacher... is the one that knows his or her students on a very intimate level and knows what works for them.... it’s the connection that exists and the successful teacher here is the teacher that finds out what clicks for each individual child.

I get a bit cross when you still hear of... pre-service teachers being told if you go to an Aboriginal community don’t look at children in the eye, they’re all visual learners or ... it’s got to be hands-on. It's a crock....Not only does it take away from any notion of individuality, it also takes away from the notion that there are many indigenous cultures.
Regarding numeracy teaching strategies that were proving successful, the principal found it:

difficult to isolate...a specific type of subject teaching being more effective than any other. I’m more of the feeling that a sound teacher is usually a sound teacher across the curriculum...as opposed to just say in numeracy or literacy.

Although observed teaching practice in this school appeared to not comply with what had been characterised by the literature review as culturally inclusive/responsive and language focused, it was problematic to suggest, in this environment where whole-school philosophy was informed by Aboriginal world-view and where students and most staff had much commonality in their cultural and linguistic backgrounds, that teaching practice could be anything else.

Expectations

Students are expected to be successful learners, “not just in mathematics but ... it’s like ... sort of an underlying ethos of the school,...that every child is clever and every child can do well and every child will do well with the proper support”.

Principal: “if children come here after several years of repeated, repeated, repeated failure... I’ll say well why were you being naughty in class? And they’ll say ‘cause...I’m dumb, I can’t do that work. And that’s the first hurdle that you’ve got to work towards, is...letting children know that they’re not dumb...you know they’re not and they can do it and they will do it if they keep trying.... you have to believe that all children can flourish”.

Researcher: Do you make that explicit, that it’s not you [the student] that was [at fault]...it was the schooling you were getting?

Principal: Yeah, we certainly do.

Aboriginal Tutorial Assistance Scheme (ATAS)

The purposeful use of ATAS (now ITAS) was seen as a major factor contributing to student success in literacy (and therefore in numeracy): “that program is probably one of the largest sectors in terms of educational success”.

The program is detailed in a handbook. After the assessment by a speech and language pathologist, individual language development plans are drawn up for each student. Depending on “how great the gaps are”, these determine how much individual tuition they receive; between two and five half-hour sessions per week. Even children who don’t necessarily need intervention get some and “that’s usually extension as opposed to intervention”.

Tutors work closely with the speech and language pathologist to apply these plans. These ATAS sessions are not used for homework, as is common elsewhere; students are withdrawn from class to attend these intensive language sessions.

Children often develop personal relationships with tutors, many of whom are Indigenous and experienced:
mostly they’re people undertaking postgraduate studies because we do prefer to employ teachers in that program and so the honours students and PhD students are often what we attract you know to that program....They’re highly qualified.

The nature of these tutors means that they are not all available all the time, but there can be any number up to twelve working with individual students at any time.

Holistic approach - whole community, whole school, whole child

The community and the family, that’s a part of the school as well you know.

This school is seen as “a community centre where you’ll see families and older members of family ... [and] children here on a regular basis and you’ll see elders in the place and that’s all ... that reinforcement of culture, the identity and culture”.

It’s the whole concept of the school,... there is a sense of ownership that the children feel of this school and likewise their parents because it’s a well known fact that it’s a community owned and community controlled school and although I hold the position that I do [principal] and I’m not an indigenous person, parents have this concept well my bosses are [Indigenous] people and it’s the board that tell me what to do so there’s some sort of confidence in [me].

After eleven years, this non-Indigenous principal (who is also connected with the Aboriginal community through family) shares the community’s sense of ownership and has their full confidence: “She’s [the principal] taking us ahead in leaps and bounds, she’s great.... And she’s a woman that doesn’t want to step up front, doesn’t want to take any accolades for the achievement and stuff you know”?

This sense of ownership is seen also as extending to children:

Kids come into this school and they know they’re the bosses, they know this school is here for them and to serve them.... they feel what they've got to say is considered....we really need to be able to serve our students better. If we want more informed and better educated people we’ve got to try to cater to their needs and they’re the ones that can tell us what they are. So we consider what’s said out there, we don’t jump every time they say we want this, [but] we consider what they’re saying.

Board Member

Community members see this ownership as bringing “the pride, the self-confidence, the self-esteem, the identity and that’s a key thing, identity.... any individual’s identity is the key building block, is the foundation of a human being, it’s a soul, it’s a spirit”. Thus, development of the school, both as a good school and as a community resource was seen as important “they’re probably the best resourced community facilities in the country, schools.... yet they’re only utilised from 9 ‘til 5. They could be opened up and utilised more broadly in the community” and was seen as fulfilling a community-development role:

Too many people have too many unhappy experiences and memories in a...school yard... too many people want to burn [them] down,...There’s got to be a way of changing that, there’s got to be a way of making that a place where almost everybody has good memories and it’s seen as assisting them on their pathways through life.

Board Member

The successes of the school are seen as emerging from a sense that “We know what’s failing because for too long we’ve seen the [mainstream] system fail us so we know what’s failing, we
know what we shouldn’t do” and also from the school being “much less of an institution, it’s more of a community organisation”.

As part of the community, and to redress the failings of that system, the school sees its role as showing belief in students so that eventually they’ll believe in themselves:

sometimes you have to put aside the fact that some kids will at times take things out on you because they have no-one else to take them out on, so I suppose you have to have a bit of a thick skin and be prepared not to carry a grudge….But you also have to then be prepared to work with that child to try and put things right for them.

30% of our kids are kids in care so it means that they often come from very dysfunctional, unhappy kinds of backgrounds, so this school has attempted to move down the path of looking after the whole child and not just their educational needs and that’s why we have things like the breakfast, morning tea and lunch [programs].

I could take you down the road and show you three children ... they’re not children anymore ... three young adults who are in successful employment and doing very well. For the first three years here... if we had been like any other school they would have been expelled because their behaviours were abhorrent, but we have a philosophy here that we will never give up on a child and we will continue...as long as we can to work with that child to make things better for them...and nine times out of 10 it’s because of life experience that they are now in this situation and displaying these behaviours so we just have to work very hard to not only improve...their educational standing but that’s why we [follow upon] work placements, you know where they’re living and how they’re living and stuff, sort of the whole [picture].

principal

While the many approaches here aimed at bringing school and community closer together may seem innovative, there is a feeling that to this community, they are approaches that make natural sense: “It’s attitude really and it comes back to the culture, it comes back to Aboriginality but comes back to also trying to cater to the whole child, to the whole being you know? And... I think being a community organisation and not an...institution is a big part of our success”.

The fact that we attempt to look after the whole child and take it even further...into the community and how we attempt to support parents and care providers. I think in fact that we’re providing a community service and not just a service to children. And I think that’s fairly innovative particularly in terms of Indigenous kids because often things have to get better at home before they’re going to get better at school.

Part of this innovation includes developing partnerships:

with sort of strategic and influential kinds of organisations that can assist us with certain things like the [State Indigenous community health service]. We brokered a deal with them...[on the] disused dental clinic, we allowed them to refurbish it and it’s now an out clinic for the medical centre so there’s a doctor here ... onsite one day a week and it is open to the wider community but our children have first priority. We have a relationship with [the State/Territory] Health [Department] because otitis media is still a significant issue and the children’s ears are tested quarterly and [State/Territory] Health [and] the medical centre, ...work in conjunction to do all the follow-up necessary. We have a child and family worker... whose role really is to ensure that the Department of Communities do what they should be doing for children in care, so she basically monitors and makes
sure that all of the children’s needs are attended to because they can often you know slip through the cracks particularly if the ... you know the foster parent or the you know other care provider you know isn’t taking up that role.

Other special services and programs have been developed through partnerships:

We have a relationship with the University...so that our OT [Occupational therapy] program runs here two days a week ...at the beginning of the year [pre-primary [and] ... any new [Year] 1s [and] 2s are assessed, so...apart from the regular occupational therapy program, clinics come to be for children who are at risk in those areas. We also have a speech language pathologist who was here one day a week and on entry as soon as practical she assesses all of the children....we’re looking at things that most schools don’t I believe, ‘cause we test for visual perception, auditory conceptualisation, yeah a whole sort of gamut of things ‘cause often there are sort of little problems that can be delaying literacy and numeracy.

There is a school-based counsellor who deals with personal and family issues as well as an employment placement officer.

Community involvement in school decisions is achieved through the school board and also through the ASSPA committee. “And our ASSPA is a bit different from most ASSPAs, [it’s] like our P&C... they fundraise as well [as administer government funds]”.

Some School Board members are influential, creative and very active supporters of the school: “We get a lot of freebies though too... by lobbying around”. For example, when a group of students were selected to perform in a high-profile theatrical production, “what I said was okay well don’t pay our little six performers, what you can do is buy us $2,000 worth of books for the library and all of our school and our parents will come”, although the school was not always seen as well-resourced: “We’re getting better though....I’d prefer smaller classes”. (the principal)

Although technically subject to election, the school board members did not necessarily see themselves as a voice for the community, “there isn’t any real board around the place that’s a voice for the community”, but more as a group of influential and energetic people “pretty much...just trying to do the best we can for the clients we have, for the section of the community we deal with whether it’s sick people in the health service or people looking for education in the school, it’s just trying to do the best we can in our particular area”.

As far as this school being a model for other communities, this board member was reluctant to be drawn:

They've got these schools ... I don’t know much about them ... government built schools and then [Aboriginal people] sort of managing them and trying to run them....I think it all comes back to ownership...but then again there’s got to be different things tried along the way there, it’s not a one size fits all approach and that’s the biggest problem with the education system in this country I think, it’s a one size fits all and that goes for health, for education, for every[thing].

Board Member

CONCLUSION

It is problematic to discuss this school in isolation from its community. As the study progressed, it became clear that where Aboriginal students were achieving best in numeracy
Aboriginal Students and Numeracy

(and this also meant generally), the relationship between school and community was closer
than elsewhere.

Here, unlike most other sites in the study, this relationship was characterised by an almost
tangible sense of common purpose and identity among the school community. This
community included Indigenous and non-Indigenous people and was composed of community
leaders, principal, teachers, other staff and students.

While this list may appear as a hierarchy, that is less the case here than in other schools. Having
said that, the first two are deliberately placed in consecutive order, as the principal,
while being the nominal school leader and responsible for all day to day school decisions,
actively reflected, responded to and sought the counsel of the community leaders. This was
more than taking directions. The school philosophy had grown from and was in concert with
the community’s philosophy. This philosophy was based on an Aboriginal world view. Critics,
using stereotypical models may respond negatively to this contention by arguing that
this Aboriginal world view is something that has become remote from the experience of urban
Aboriginal groups through cultural dislocation. After all;

"When you destroy a person's language, it destroys their world view.”
Jorge Estevez (Taino), participant coordinator, Museum of the American Indian, New York, 2000

However, despite the loss of much of their language in this urban setting, through the
pressures of colonisation and its mutated offspring, assimilation, a distinctive world view
persists. It is different from other world views held in the wider community outside, in
particular that of the dominant individualistic culture. And it is a world view that has been
maintained and possibly informed by a persistent resistance.

This case study revealed the least separate relationship among school and community. There
appeared to be some characteristics of community dysfunction outside the school, as can be
found in any disadvantaged urban group (the population-base of this school was not merely
Aboriginal people of higher socio-economic status). The leaders of the school community
(perhaps somewhat autonomously), both assumed and practised their leadership for the whole
community. All Indigenous children were welcomed and supported. For that reason alone,
and also perhaps because this reflected an Aboriginal world view, those leaders appeared to
be supported by the wider Aboriginal community.

This holistic approach (this jargon is over-used, but accurate in this case) applied to the whole
school, the whole community and the whole child. While this may sound rhetorical, there
appeared to be a determined political will driving this school, steered by competent and
reflexive leadership. The impression was that this will was shared among the whole school
community.

This driving force was producing a high level of innovation, as indicated by the purposeful
use of ATAS to strategically, specifically and individually address language development. Such
a driving force is not something that can be manufactured; it had developed through the
emergence of strong community leaders, responding to history and resisting its repetition.

Indian School
CASE STUDY 10

SITE 10 CONTEXT

At the local airport, the researcher noted the prominent image of the Aboriginal flag on the tails of aircraft on the tarmac. There were five of them, and although they were only small single and twin engine jobs, the sight was impressive.

The small airport was built to service the large mine and its small service town, but it has also meant that Aboriginal communities in the area have reliable wet weather access and regular flights. This has been instrumental in improving communications and opportunities for local people.

In the early 70s, this Aboriginal community was involved in an early land rights case, which they subsequently lost. Policies introduced by the Whitlam government from 1972 however, progressed the loosening of assimilationist policies resulting, by the 1980s, in the outstation/homeland movement, enabling families to return to their homelands, where Aboriginal community teachers currently operate in satellite schools. While student numeracy achievement at the Site 10 school was healthy, achievement at satellite schools was apparently, at least in terms of Western education, less healthy.

It was evident that the community and the town were mutually exclusive destinations for most arrivals at the airport. On the road from the airport, past the mine, signs directed those either going towards the town or towards the Site 10 Aboriginal community. However, on the road towards the airport from town, signs pointed only to the gun club, the mine and presumably a favourite fishing spot, but not to the community. Perhaps it was presumed that ‘white’ people coming to the community (staff and official visitors) usually came directly from the airport and that anybody interested in travelling from town to the community would have been Aboriginal and therefore would not have needed a sign.

The community seemed a calm place; perhaps a little sleepy in the humidity of the early build-up to the wet season.

Site 10 was a two-way\textsuperscript{46} school. The school environment (including classrooms) was rich in language and emphasis on the bicultural nature of learning. In the staffroom, a six metre poster displayed a *Timeline for Bilingual Education* (1975-2000). Beneath a prominent symbol representing both-ways learning, an inscription read,

\begin{quote}
*We chose to plant the seed of bilingual education to develop a better understanding of both cultures – that of Aboriginal people themselves and of non-Aboriginal society.*
\end{quote}

Also evident in the staffroom, on butchers’ paper, was a resource wish list for teachers; most of the requests were for numeracy resources.

The principal worked closely with (and sometimes under) leaders in the community, some of whom also worked in the school as teachers and teacher/linguists. He had been in the position since 2000, but had a much longer association with the school and community through

\textsuperscript{46} see Glossary: Bilingual/bicultural education
various roles, including assistant principal, principal of the homelands schools, adult educator, lecturer in teacher training and visiting teacher.

Aboriginal teachers and other professional staff in this school had considerable authority in this community. The nature of the relationship between school and community leaders meant that this authority existed also in the school (some teachers were also on the school council). Some of these teachers also had established strong credentials outside the community as spokespeople and academics. There was a feeling that between Aboriginal and non-Aboriginal staff, there was a wealth of knowledge and experience here.

The approach here, like at Site 9, was more holistic, as demonstrated by the following slogan, prominently displayed:

*Our Children, Language, Land and Identity: Our Most Precious Resources*

**STUDENT ACHIEVEMENT**

1. **By external standards (State/Territory Testing against National Benchmarks)**

Figure VII.11 Site 10 (See below) shows an increasing trend for Aboriginal Year 3 students at Site 10 achieving the Numeracy Benchmark over recent years; increasing its margin above the National average for Aboriginal students (which has remained relatively constant) for the past two years and approaching the National average for all students (which has also remained relatively constant).

![Graph showing Year 3 students achieving Numeracy benchmark - Site 10 vs. National](image)

Figure VII.12 Site 10 (See below) shows that at Site 10, after performing reasonably well in 2000 (their first year of testing), performance of Year 5 students against the National numeracy benchmark declined sharply in 2001 (not explained). However, despite still performing below the National Aboriginal average, a strong increasing trend since then augurs well for the future. It is disappointing to note that the Year 3 group who performed well in 2001 performed less well when they reached Year 5 (in 2003). However, it is difficult
to place great emphasis on such interpretation, due to the influences of student mobility and other factors affecting attendance.

Figure VII.12 Site 10

The Year 5 result at this remote school was better than the average for all remote Indigenous students in this State/Territory for 2002, when only 20% of Year 5 students achieved the numeracy benchmark.\(^{47}\)

According to the principal, there had been no agreement on benchmarks for Year 7 in 2003, so school comparisons were unable to be published. However, Year 7 students sat the [standardised] tests and it was his belief that three of 12 Year 7 students (25%) would have achieved the benchmark for Numeracy. If students in this group were the same students as the Year 5 group in 2001 (a tenuous assumption) then they have improved their performance, but this group remains considerably below both Aboriginal and all students Nationally in performance.

The apparent decrease in test performance as children progress through school was acknowledged: “There is a drop off over the years in terms of…more Year 3 kids doing well in the numeracy paper than the Year 5 and then subsequently the Year 7 kids”.\(^{47}\)

Explanations alluded to a high jump in conceptual difficulty; “the bar gets raised”, but also to social factors; “as the kids are getting older their attendance slackens off and their participation…slacks off so there are some issues there”.

Overall performance at this school indicated gains well beyond other remote schools in this State/Territory, where there are “persistent achievement disparities between remote area Indigenous students with their non-Indigenous and urban peers”.\(^{48}\) Here, of the students who were attending regularly and had done so over a period of years, and who engaged when they were at school, “a significant proportion of each of the cohorts [achieved the benchmark

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\(^{47}\) Source withheld

\(^{48}\) Source withheld
and]... [did] so...consistently....There’s some consistency between...in school assessment of where kids are at and what happens there [in State/Territory tests]”. However, the “significant number of kids who aren’t achieving benchmark” was considered unsatisfactory.

The principal regarded the tests as an important part of system requirements. He had been for some years, on the State/Territory steering committee responsible for advising on test development and had “constantly led the fight about the sorts of test items that are used ... that are kid friendly as opposed to kid harsh ... given the second language or the multi-lingual background these kids come from”. Mathematical concepts in the tests were seen as “sometimes...embedded in dense text that is at a...higher literacy level than the numeracy level the student’s being tested at”. He felt that State/Territory authorities, despite earlier belligerence, had more recently “listened to...concerns...about specific test items...[and] tried to address [them]”, in response to a perceived imperative to improve student test outcomes and a major shift from “the polarised approach...of schools [being]...to blame [and] the tests [being] sacred” to acknowledgement that “there are some things that could be done simply in terms of making the test more user-friendly, better able to gauge whether students know things or not and not reliant on the use of English as a first language”.

2. By internal standards (interview data)

The assessment from the community’s point of view was that students were achieving well in terms of their development of mathematical knowledge that aligned with Aboriginal knowledge, but not so well in terms of western mathematics.

The principal saw achievement as not easy to define: “we’ve been sort of standing over shifting sand and so one day’s level of appreciation of how well things are going, next day you got to revisit”. This was seen as due to rapidly change resulting from external influences on community structure and culture:

There’s issues going on in the community now that weren’t present 30 years ago or 20 years.... ‘cause those years normally coincide with the life of ... the mining company being here, the town, the ready access to alcohol.... in those 30 years you’ve seen the death of nearly all of those older people who led the community 30 years ago who had major impact into the school....... we’re in the process of rebuilding connections to people in the community.

FACTORS INFLUENCING SUCCESS

Bilingual/bicultural school

The basis of this approach here was the development of a curriculum that aligned and included concepts from both Aboriginal and Western knowledge systems (including mathematics), delivered in a bilingual setting, by both speakers of students’ first (Aboriginal) language and SAE. A team of two teachers, one Aboriginal, one non-Aboriginal, operated in all primary classrooms.

The program aimed to develop quality educational programs for students who were in the process of becoming bilingual and bicultural. Concentration was on developing knowledge (both Western and Aboriginal) in first language only, in the early Years. Students were not expected to be bilingual until Year 5, when they were first assessed in Reading and in Writing by the State/Territory Testing Against Benchmarks.
The bilingual/bicultural program had been in operation since 1975, despite intermittently intensive resistance from successive State/Territory ministers and governments. This was largely due to the intensive and sustained determination of this Aboriginal community to achieve the cultural and political objectives of regaining, retaining and maintaining land, culture, and language. This was evident in the prominent reminder on the staffroom wall:

“When you take our language and our Homeland the sunrise won’t come up”.

These objectives were seen as achievable through regaining/retaining “control of curriculum, teaching, learning and literacy” which was seen as being “all about power”\(^{49}\). It was seen that, as well as being literate in SAE, “younger generations needed to be competent to a very high level within their own language to be able to translate the principles of the [name of language/cultural group] world views and...law to the Australian institutions founded on the foreign, British system of law”\(^{50}\).

**Targeted recruitment of accountable teachers**

Teachers at this school were accountable, being assessed each year by the school’s governing body for their willingness and suitability for teaching here.

Recruited graduates (valued for their youthful energy) had always completed their professional practice at this school and therefore had been assessed for their suitability. Attributes valued by the community were appreciation of Aboriginal culture, being a good communicator, and being ready to learn. This also meant they were willing to work closely with (and acknowledge the authority of) ATAS and other Aboriginal teachers. The best teachers for this community were regarded as “black on the inside”.

**Numeracy teaching strategies in a bilingual/bicultural program**

The bilingual/bicultural program was seen as successful for numeracy because “for those kids who turn up [and] work, they're in classrooms where the teachers are organised and... there’s a focus on becoming numerate and using mathematics... in a way that’s relevant in their world....making a link between traditional knowledge and your knowledge of their world” and building that “into a sort of Western understanding of mathematics”.

An important role of teachers in this program was seen as “explicit use of oral language and locating any task or any activity around a real world ... real life situation so the kids are understanding that maths is actually about interpreting... had a purpose and [was] part of a view of the world”. Learning about number focussed on “the recursive nature of the number system and how it relates to [kinship-based concepts in] maths...it can be incorporated into their own knowledge process”.

There was a classroom focus on small group work, lots of practical activities and use of concrete materials, through to upper primary “way beyond when they might normally [be used].” It was felt that:

one of the problems with primary schooling and maths education is we stop using concrete materials too early...so we get down to pen and paper, algorithms and so on which actually decontextualise and in many cases don’t mean much.

\(^{49}\) Reference withheld (1998)

\(^{50}\) Reference withheld (1998)
One advantage of the concrete approach was seen as encouraging students to verbally discuss mathematical concepts: “by locating your activity around a concrete [activity], there’s a conversation going on, working through so you actually tease language out of the kids that actually helps them remember I think”. This conversation started in children’s first language [which was shared by Aboriginal teachers] and developed into SAE as their confidence increased.

Teachers found that by having daily oral routines based on developing number-proficiency, the program catered to some extent for students who were not regular attendees.

Some students had been in other schools, where “Sometimes teachers use hard language....[and] I think in [first language] and ...then I think in English”. Students found it easier having local teachers and learning in their first language, where they could “think [in their first language] and then write in English”.

Non-Aboriginal teachers found that concepts which students had a “deeper knowledge of”, that could be related to a Western concept, were easier to teach, while other concepts such as probability and measurement were concepts they found difficult to contextualise. They also considered that, towards upper primary, numeracy achievement was more dependent on SAE proficiency: “once it gets into those [higher] concepts it’s really language dependent and it’s usually the kids with better English that succeed at those higher levels.”

**Teaching for test preparedness**

Preparation and formal test-readiness for State/Territory Testing Against Numeracy Benchmarks were integrated into teaching programs and school planning, although explicit teaching for the tests was avoided:

> we have tried to...prepare kids...without focusing too much on the test... having the kids test ready and having some strategies about pencil and paper activities, using some of the formatting of those things... you're making sure they've got some knowledge of those processes...so those teachers involved with that... meet regularly and...share resources and ideas.

**Staff and the school-community relationship**

The action group, which had grown into the school’s governing body responsible for developing and guiding the school, had aimed to “invent a governance structure that would allow us to explore alternative visions of what it means to be educated and literate”. To achieve this, they had needed to “overcome the structural and organisational barriers”, which “became a collaborative project...[in the] community...[involving representatives from each] clan.51” Despite this sense of collaboration, however, outside of the school, this community as a whole was not without some dysfunctional symptoms, such as sub-optimal school attendance; the close relationship that was evident between the school and some sections of the community was not shared by all. The school saw part of its role as attempting to repair some of this dysfunction, so considerable and sustained effort and innovation was applied to programs aimed at engaging more families in their children’s education and in the school community; in effect to attempt to make school and community less separate. Some of these, such as planned innovation in reporting student progress to parents, had been trialled in

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51 Reference withheld (1998)
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the community and had the parallel purpose of engaging school staff more closely with the whole community:

what we’re trying to do is to move away from an individual classroom teacher reporting to the parents of their class,...we’re going to allocate groups of teachers to a group of houses... teachers and team ... like it’ll be a team from the school, it’ll involve admin, the whole school staff.

These visits were intended to explicitly share information about attendance, engagement at school and achievement and would involve portfolios of student work containing “concrete pieces of evidence to support claim[s], video clips or photos of kids doing things”. Teams would discuss samples of students’ work and judgements of student progress and how they related to minimum expectations established for each student. This particular initiative was a response to the perceived failure of written reports in this community context:

We have in the past put enormous amount of effort into providing written reports to parents which mean absolutely zilch to parents in most cases ’cause they're not located in a conversation.

It also conformed with philosophies embedded in a professional development program, which all staff had attended; TRIBES ©, a North American community-building program for schools (learning communities) “which is about improving communication, relationships and inclusion.” This program was seen as being very successful in developing and maintaining a common focus.

Apart from being a lot of fun, events which mobilised the whole community, such as a recent fish-trap, were seen as a valuable opportunity to build on school-community ties, in particular for non-Aboriginal school staff to engage with the whole community.

Despite the many gains made in creating a learning environment that reflected the needs and aspirations of this community, particularly in terms of staffing and curriculum, it was felt that this was still a government school and subject to government judgment and control exercised through funding. The community would prefer more control over content and process, although it was generally happy with the level of community invitation, inclusion and control in school management, feeling that, although on occasion the school community and bureaucrats “can disagree, sometimes [Aboriginal Group Name] get their way”. The principal referred to frustration over some issues under external control, such as school location. It was felt there was opportunity to bring the school and community closer together (in much more than a physical sense), by having the school located in the centre of the community, rather than on the outskirts, as dictated by an earlier government department and maintained by the current one. This apparently minor issue reflects a changing atmosphere of control; in comparison to the past, some communities feel less constrained to accept terms that are dictated; consultation is seen as a primary goal.

Attendance

Satisfactory attendance at this school was defined as 90% attendance, but actual attendance was 45-60% (seasonal pattern). However there were indications that the rate was improving.

The school ran a bus service to pick up students from around the community as well as from the town. The school seemed to do everything it could to meet the needs of students at school and to get them from their gate to school, but some factors affecting attendance were seen as beyond the school’s control. For example, partnerships between the different government
agencies and different community governments (there were four, with overlapping boundaries and inconsistent functions and policies) were required to accelerate change and overcome an apparent culture of non-attendance in some sections of the community.

From the interview data, factors influencing non-attendance were seen as mobility of families and children (between central and homeland communities and to towns and the city) as well as a ‘don’t care’ attitude, particularly by some parents/carers. Despite one third of students being bussed to school, many didn’t make it to the front door in time. It was reported that this was sometimes exacerbated by family dysfunction.

**Expectations**

The community has high expectations for its children, expecting some to become doctors, lawyers etc., but acknowledges that there are some hurdles “both here and outside”; experience has taught them patience.

**CONCLUSION**

The impression here was that the school and some sections of this community were working in concert, but that this was not true of the whole community, where dysfunction was a barrier (or a symptom of other barriers) which was preventing the developing of this relationship. Leaders and members of the school community, with the support of leaders and many members of the whole community, were extremely focused on getting the best from students at school, on getting children to school and on developing ways to involve the whole community in the school. Their purposeful and sustained efforts were resulting in substantial student and school achievement, including in numeracy. The bilingual/bicultural nature of the both the teaching and curriculum appeared to be significant factors in that achievement, but there was a sense that the fact that the community had demanded and won the right to do those things their own way was even more significant.

The close power-sharing relationship between the non-Aboriginal principal and key Aboriginal staff is the overarching factor in this school’s success. This relationship is the product of having strong leaders in the school and community who have learned both ways together over a long period and through much adversity.

However, while the school community celebrates its many successes, there is still a sense of frustration here in the school, due to a seemingly insoluble situation regarding attendance; student non-attendance at school is both a symptom of dysfunction and a barrier to repairing it.
VIII. Numeracy Achievement

Defining achievement

The proposal for Phase I of this study spoke of the “exclusion of Aboriginal students from many avenues of employment…for the high status professions that require demonstrated facility with mathematics, such as medicine, engineering and science” and the need to “facilitate their access to these desirable and influential occupations”. Other Aboriginal communities across Australia have expressed a desire for their children to be able to achieve by mainstream standards, to be fluent in the secret language\(^{52}\) (including mathematics), which is the language of power and influence in Australian society.

Performance against National benchmarks would appear to be a good measure of progress towards such aims. Although they would prefer their kids to be achieving better by those standards, some schools and communities see measurement against national benchmarks as an imposition more related to promoting competition between students, schools and communities than as meaningful measures of achievement; an impression often reinforced by the media. It may be simplistic and presumptuous for definitions of achievement and prescriptions for how it should be measured, to come from outside the many individual communities that make up a diverse Australian Aboriginal population.

Achievement in a community context

In this study, communities tended to have different ideas of what sort of achievement they wanted for their children.

One urban community in the study, for example (Site 9) wanted their children to be prepared for opportunities to gain employment in administration, management and politics. They saw the future for many of their children as effectively working in and managing Aboriginal organisations. They also saw children as future leaders and constructive community members, so their focus was achievement of the whole child, for the benefit of the whole community.

A remote community (Site 7) saw a need for their children to develop the skills to establish, manage and operate industrial enterprises in areas such as aquaculture and horticulture that would provide local employment and income for the community and decrease reliance on welfare (including CDEP).

Another remote community (Site 10), where some members held highly regarded positions in education, self-governance and politics, saw academic achievement as important, but not more important than achievement in their own Aboriginal context; appropriate development of Aboriginal knowledge (law) and leadership.

Some Aboriginal communities may see school achievement as merely providing skills for meaningful employment. This may seem out of reach in some communities where there are few employment opportunities.

If schools “best meet the needs of their students if they remember that …(they) are there to serve the community”,\(^{53}\) then it is arguable that many schools serving Aboriginal

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\(^{52}\) Mack (2004) *Personal Communication*

\(^{53}\) Heitmeyer (2001)
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communities do this less well than most schools serving for example, ‘white’, middle class communities, where school principals, management structures, teachers and curriculum may be more likely to already reflect the values and world views of their clientele. The disparity of educational achievement between these communities may reflect this imbalance. The Report of the Royal Commission into Aboriginal Deaths in Custody (1991), also “clearly linked educational participation and achievement of Aboriginal people with their ability to exercise choice and shape their lives and communities according to their own visions and aspirations.”

Among mainstream principals, schools and communities there may be more commonality in such choices, visions and aspirations. In Aboriginal schools and communities where this commonality was more evident, school and numeracy achievement were higher. Where Aboriginal people have little exercise of choice and there is little accommodation of their views, there are steps schools can make to become more inclusive and responsive to their needs; for example, by inviting Aboriginal communities to express what opportunities and what sort of achievement they want schools to provide for their students and by enabling structures which will ensure that this dialogue will influence school decision-making and affect change. This can often only occur with the willingness of education providers or individual school leaders to consult and negotiate. Although Education providers acknowledge the responsibility of schools to “deliver quality education services that are responsive to local circumstances”, by “develop[ing] and maintain[ing] effective partnerships with their communities”, there is a sense here that they may rhetorically dispense this responsibility from themselves to schools. There is also little evidence that they advise schools (or principals) how to go about it. Principals who attempt to meet these commitments, especially in regard to Aboriginal communities situated within or alongside ‘white’ communities, may sometimes find themselves at odds with parents and other members of the wider community, but receiving little moral support from their organisation. Policy-makers themselves may need to take the initiative and the responsibility for asking Aboriginal communities how they define achievement; what they want their children to achieve at school and in what way they would like to assess that achievement, as did the Collins Report in the Northern Territory, in 1999. Of course to be effective, such consultation needs to be followed by action, in the form of changes to policy and practice; the often missing ingredient.

The Collins Report was a response to reports of strikingly lower levels of literacy and numeracy in NT Aboriginal communities. It broke new ground in Aboriginal education, at least by the breadth of community consultation across a large geographical area and a large number of communities. It included case studies of 44 schools, interviews with targeted stakeholders and stakeholder groups, a call for submissions and open public meetings in major centres to attempt to find out “What … Indigenous parents, children and communities want from schools.” The report, however, acknowledged restrictions due to the time frame of the review, which is not surprising, given the breadth of its scope.

On a smaller scale however, real community consultation and involvement is achievable, while in its absence, tension between school and parent groups may manifest itself in unfulfilled goals. It is achievable as an ongoing process in which teachers and schools

54 Department of Education Science and Training (accessed 2005)
56 Northern Territory Department of Education (1999)
57 Orvando and Collier (1985)
“learn about their communities, including language use, values and education goals” and parents and caregivers are given “the power to determine the form and content of school programs so that community needs and aspirations are met”.\(^{58}\) This power, however, is not always freely available. It is sometimes taken and less often given. Its accessibility is often dependent on the strength of communities and their leaders who are prepared to demand it. It may also be dependent on the will and strength of educational leaders who are prepared either to give it, negotiate it, or to work closely with communities so that they can establish a position to demand it. It is difficult, however, for such strong school leaders to affect change in the absence of support from leaders within their organisations.

**What factors contributed to schools meeting the needs of communities?**

Where communities feel that students are achieving well by their own standards, that is, the school is meeting the needs of its community:

- There has been consistent and strong leadership (particularly the principal), with clear goals and processes fully supported by the Aboriginal community, over a number of years (5-10)
- The Aboriginal community has real influence in decision making, including purposeful recruitment, and therefore:
- There are committed teachers (including Aboriginal teaching staff), who know their students and therefore know their communities
- School and community are less separate; there is a sense of common purpose

**Achievement by external standards**

Schools where Aboriginal students are achieving well according to community standards are also those where students are achieving well according to external standards. Schools are more culturally inclusive/responsive and there is real community involvement in decision-making, including recruitment; school and community are less separate

**In schools where Aboriginal students are having most success as numeracy learners, how well are they doing?**

By external and internal standards, where schools and communities are less separate, Aboriginal students are achieving better than other Aboriginal students.

Their performance also compared quite favourably with all students, in terms of achieving above National benchmarks or State/Territory averages (external standards), but not necessarily in all classes.

There is a drop in achievement against numeracy benchmarks by Year 7, but this seems to be for Aboriginal students in all schools, regardless of community/school relationship and is evident also, but to a lesser extent for non-Aboriginal students.

\(^{58}\) Mellor and Corrigan (2004)
Some anecdotal evidence\(^59\) has suggested that in upper primary, some Aboriginal students “hit a wall” when faced with more complex mathematical concepts. Benchmark statistics indicate that Aboriginal students may not be the only ones to face this ethereal obstacle, but the fall in achievement of numeracy benchmarks by Year 7 is greater for Indigenous students than for all students. Some respondents in this study also saw “a drop off over the Years in terms of...more Year 3 kids do well in the numeracy paper than the Year 5 and then subsequently the Year 7, so there’s some issues there... the bar gets raised”. However, it was considered that in this remote setting, blaming conceptual difficulty was simplistic: “what comes in there is, as the kids are getting older their attendance slackens off and their participation still slackens off so there are some issues there”. Literacy may also be implicated in this picture and closer analysis of the language skills required to complete the numeracy tests at this level may be required to investigate whether they accurately test numeracy skills for ESL students, many of whom are Aboriginal.

It seems clear that research has not yet provided clear analysis of the complexity of factors involved in the changing patterns of numeracy achievement by Aboriginal students (and all students) as they move from Year 5 to Year 7.

Although schools did not always readily disclose benchmark statistics, qualitative data suggests that over time, in schools which have developed these close links with Aboriginal communities, and where these have become reflected in school structures, processes, curriculum, culture and achievement by community standards, achievement by external standards is also increasing, and at a faster rate than Aboriginal students in other schools and all students in all schools.

**Issues for interpreting school performance against numeracy benchmarks**

It is problematic to look at this measure of numeracy achievement of Aboriginal students from a whole school, whole State, whole nation or single Year perspective because:

- In some communities attendance is still a big (and to some degree separate) issue; achievement by students who are regular attendees may need to be looked at separately
- In some communities students’ duration at the school is a strong factor in achievement (it needs to be examined for students who have been there long enough for the school to have a positive effect, especially where students from non-achieving backgrounds are welcomed)
- In communities where students are achieving, a culture of success is developmental; achievement needs to be looked at longitudinally

Interpretation of individual or whole school achievement according to measurement against numeracy benchmarks should include reference to the influence of these factors.

\(^{59}\) Bubb (2003) *Personal Communication*
Swimming strongly against the tide!

Some Aboriginal students are having success in mathematics in some schools that make attempts at culturally inclusive practices, but where reflections of clear social divisions and racism between Aboriginal and non-Aboriginal people in the wider community persist, this necessarily pervades the school culture. School and the community remain quite separate.

These students’ achievement may be due to the influence of other factors such as:

• living in homes where there is strong and/or academic support for school learning
• having great individual teachers who are inclusive and strongly supportive
• just being brilliant students

How do specific classroom and numeracy teaching strategies contribute to numeracy achievement?

Specific numeracy teaching strategies identified in the Literature Review as likely to contribute to effective teaching & learning were sorted into four overlapping categories:

Culturally inclusive/responsive, language focused, concrete/visual and immersion strategies.

Where Aboriginal students were achieving well in numeracy by external and internal standards, numeracy teaching strategies were:

• Culturally inclusive/responsive and
• Language focused

Where numeracy teaching strategies conformed to a concrete/visual approach, they appeared to be part of effectiveness in some cases but not in all.

Where numeracy teaching strategies conformed to an immersion approach, they appeared to be part of effectiveness in most cases but not in all.

Concrete/visual strategies include those that emphasise the use of “resources that allow learners to manipulate concrete materials to construct their own understandings and use these resources in the application of concepts and skills” or where “visual imagery is an integral part of developing mathematical pattern and structure”.60

Representing a constructivist approach to learning, this practice represents a large slice of current orthodoxy in the discourse of education. For example, the use of visual imagery “has been linked to development across many aspects of mathematics, including understanding of number concepts and operations and spatial learning”.61 In particular, the use of both concrete and visual strategies has been seen as important in Aboriginal education. There is certainly no indication that these strategies are less effective than other approaches, but the evidence at Site 9 suggests that they may not represent the only effective approach.

60 Department of Education, Science and Training (2005)
There is some alignment with this approach and strategies commonly recommended in Early Childhood Education. For students who are not necessarily in early childhood, these strategies may be problematic, due to reported higher degrees of autonomy and independence in some Aboriginal children (which may be more highly valued by their communities), compared to non-Aboriginal children.62

In the practice of immersion strategies for numeracy teaching, students are immersed in a physical/linguistic environment rich in mathematical information. These strategies therefore could also be said to have a language focus and often include the use of visual imagery. Immersion strategies, while not demonstrably essential to effective mathematics learning, seem likely to have a positive effect on mathematics learning, especially when they include immersion in the language of mathematics.

As indicated previously, Aboriginal students were achieving better in numeracy by external and internal standards where numeracy teaching strategies were culturally inclusive/responsive and language focused. This implies that these students were exposed to the following numeracy teaching strategies (as identified by the literature review):

Culturally inclusive/responsive

- Flexible approach to student-centred and negotiated teaching
- Lack of reliance on ‘busy-work’
- Tasks that scaffold learning; building from student understanding at a variety of achievement levels; focus on what is known, rather than what is not known
- Encourage and value students taking risks; minimise risk of being ‘right’ or ‘wrong’
- Provision of a range of tasks that allow students to make some progress and attain some success
- Explicit teaching of differences between and valuing of both Western mathematics and Aboriginal mathematics
- Provision of a range of learning environments, including outdoors
- Encouragement of sharing as an acceptable and desirable aspect of learning
- Student freedom to choose methods of recording that fulfil their needs
- Explicit teaching of differences in learning contexts

Language focused

- Encourage displays of student understanding
- Provision of ‘rich’ learning tasks that are contextually meaningful and embedded in relevant and diverse language
- Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics

These conditions were common to many of the schools where numeracy achievement was evident for Aboriginal students. However, some schools such as at Site 6, practiced many of the above specific numeracy teaching strategies, but student numeracy achievement was not high; factors outside of the influence of school and teaching practice may have been overwhelming.

At Site 9, there was little evidence of deliberate attention to numeracy teaching strategies that would specifically cater for Aboriginal students. In the face of contemporary pedagogical

62 Corrie and Maloney (1998)
wisdom, the approach at this school openly espoused a somewhat conservative reliance on what they saw as methods that had worked for previous generations of Aboriginal students, and these were the same methods that they considered had worked for previous generations of all students. On face value (and by the school and community’s own definition), these methods appeared to be characterised by traditional teaching methods, largely involving expository teaching, rote learning and quite strict discipline; almost the antithesis of a constructivist approach.

Despite this apparently contrary position, students here were achieving well in numeracy (and generally), especially when taking into account the school’s open enrolment strategy. The school never refused access to an Indigenous student, which resulted in a student body of very diverse backgrounds; often characterised by conflict and low achievement.

To help explain this apparent anomaly, it was necessary to look beyond the above prescription (from the Literature Review) as in any way a complete or exclusive list of specific teaching strategies which constituted culturally inclusive/responsive and language focused practice. After all, at Site 9 the more traditional teaching approach meant that most of the strategies on the list did not appear to be practiced, at least explicitly in the classrooms which were observed.

This school was problematic to any assumption that schools which showed evidence of above specific numeracy teaching strategies were the only ones where teaching strategies were culturally inclusive/responsive and language focused. Therefore, I have included in this category schools which may not have necessarily practiced the above specific strategies, but where Aboriginal educators are integral to instruction and instructional design. Therefore there is instruction in and/or acceptance of Aboriginal languages/dialects and dialects of SAE and Aboriginal world views and ways are included in teaching and curriculum. This inclusion was based on the assumption that where students are teaching staff shared socio-linguistic backgrounds, the teaching is likely to be culturally inclusive/responsive and language focused because teachers will have empathy for cross-cultural and linguistic challenges that students face. They will be less likely to make the same stereotypical and erroneous culture and language-based assumptions that often limit the effectiveness of non-Aboriginal teachers in cross-cultural situations.

**How have schools been able to meet the needs of their communities?**

For most Aboriginal communities, real consultation and recognition of community needs by schools and organisations seems elusive

The best way for schools to meet the needs of communities is for the communities to have control of schools; have the capacity to identify their own specific educational needs, and to design, manage, deliver and assess programs in the way that they see as most appropriate and effective for their children. To achieve this they need principals who are strong leaders, responsive to their needs and who have their full confidence. These principals often are (or become) accepted as part of the community. Where communities cannot have control of schools, they need to have control (or real influence) in schools.

Communities where schools are going close to meeting community-defined needs are often those that have been in a position to demand it. In those cases, communities have often had to fight long and hard through successive State and Federal governments to achieve any self-
determination of appropriate schooling for their children. They have had strong leaders and, in some cases strong allies.

In some cases strong leaders have initiated major consultation/change processes to consult and involve communities in their schools and this appears to have brought schools closer to meeting community needs.

It is interesting to note that two successful schools in this study, both Site 3 (a mainstream school) and Site 10 (an Aboriginal school) have employed the same professional development program which has improved community participation and influence in the school and improved staff relations. TRIBES, is a North American community-building program for schools “which is about improving communication, relationships and inclusion.” The program focuses on ‘learning communities’, a concept which by definition includes schools and the communities they serve.

**Implications for mathematics instruction and teacher training**

Successful Aboriginal mathematics learners are the result of sound school and teaching practice. Most teaching strategies that particularly suit Aboriginal students suit most other students as well; they are generally just sound teaching practice. The difference is that more middle-class ‘white’ students (the majority) will still achieve reasonably well in the absence of this good practice, due to advantages of their more privileged position in Australian society and co-membership with the dominant culture (the ethnocentric nature of education systems will work in their favour by including them).

For example, teachers are urged to “get to know your students”. This sounds like common sense and it is sound teaching practice. It is often reiterated to undergraduate teachers studying Aboriginal Education, who are encouraged to consult with their AIEWs to tactfully and gradually get out there among the Aboriginal community and get to know students and their backgrounds; where they live, what’s important to them, who their relations are, where they are from, etc. But many teachers don’t do this.

For most Aboriginal Australians, such descriptors relating to country and family ties and world view are like a cultural backpack that you can’t take off. White middle class teachers and the white middle-class students whom they often teach have their own backpacks, but they share the contents. They know much of what’s in each other’s backpack; they understand their content and context. These don’t necessarily include the same things as the Aboriginal backpacks, nor do the things that are in them necessarily have the same order of importance. Teachers can get to know a few of the items in the Aboriginal backpacks by getting to know the student in the classroom context, but there are important elements that can be more elusive. Several white teachers and also Aboriginal teachers and other Aboriginal educators and parents or carers who were interviewed suggested that you have to know “where they’re coming from”. This expression can be used tritely (being able to have an informal chat about the “footy” may be seen by some teachers as getting to know where an Aboriginal student is coming from), but is certainly used more literally by culturally inclusive/responsive teachers. This suggests that, in many Aboriginal contexts, getting to know the individuals in the place where students come from; their relationships to each other and also to land, is essential .

Non-Aboriginal teachers in schools in the study got to know where students were coming from to varying degrees. Certainly where teachers (Aboriginal and non-Aboriginal) knew
some of students’ family they were more popular and accepted and, in schools where that expectation was the norm, students seemed more relaxed, contented and confident as learners.

Part of that getting to know where they’re coming from process includes teachers being prepared to learn and learning about Aboriginal histories and culture (and how it relates to those histories). This learning needs to encompass histories and culture of Aboriginal people widely as well as locally. They can achieve this in a number of ways: through pre-service training, professional development (in-service training), from their students, by reading and by developing effective professional and social networks with Aboriginal staff, other community members and teachers.

In some universities, teacher training includes a compulsory Aboriginal Education Unit of study that is intended to prepare teachers for work in schools where there are Aboriginal students. The aims of these units include raising awareness of Aboriginal histories and culture, including histories of living people. In some of these units and universities, the structure and purpose goes further, attempting to actively challenge ‘white’ students’ preconceptions and stereotypes of Aboriginal people and to critically examine their position of advantage in Australian society. This is constructive in the process of learning about Aboriginal histories and culture, particularly contemporary culture.

There appears to be some tension between the aims of different Aboriginal Education units in different universities. The more emancipatory units which take the more critical approach described above, provide the opportunity (sometimes taken) for students to examine the content of their cultural backpacks and discard items that may be barriers or include some shared items that will arm them for the task ahead; to engage all of their students. Other units provide pre-service teachers with information about Aboriginal histories and culture, but concentrate more than others on providing and modelling classroom teaching strategies that will benefit Aboriginal students. This can be problematic as it sometimes includes information about learning styles of Aboriginal students, which can result in the misleading assumption that Aboriginal people are a homogenous group and that one size fits all. It may also be problematic in that this research suggests that recommended best-practice numeracy teaching strategies will not result in Aboriginal students achieving well in mathematics, in school and classroom environments that are not inclusive of students and their communities.

Clearly, teachers (some of whom will become principals) need to know how to go about their practice so that it is inclusive of Aboriginal students and their communities. However, to effect positive changes in the achievement of Aboriginal students generally, teachers have to also acknowledge that need and be prepared to take action. They have to recognise, understand and address the sources of disadvantage for Aboriginal students in schools. This involves getting to know students’ parents/carers and communities and taking action to involve them in children’s education. Their practice cannot be informed by stereotypes that restrict high expectations of achievement; these need to be challenged. In some communities, teachers and principals who attempt these steps will encounter resistance from non-Aboriginal staff, parents and other community members. How well they are received by the Aboriginal community may depend on their flexibility, tact, openness, listening skills and willingness to go out of their way to form relationships. Playing team sport may also help.

Recently there has been a policy shift in some universities to abandoning the compulsory completion of units of study in Aboriginal Education for some training teachers. The admirable intention is to replace them with Aboriginal perspectives across the curriculum for pre-service teachers. This policy has merit, especially since pre-compulsory education
providers and those same units in Aboriginal Education commonly espouse that teachers should also include Aboriginal perspectives across school and classroom curriculum, rather than include a discrete module of Aboriginal Studies (which sometimes happens, but may be limited to coincide with events such as NAIDOC week/day). However, it remains to be seen how well universities can provide for the broad inclusion of these perspectives, how they will monitor the process and how well and by whom they will be scrutinised.

In at least one community (Site 10), the teachers most welcomed and accepted by the community (which added to their effectiveness) were, firstly, teachers and other educators from the local community and secondly, other teachers who were either Aboriginal or, as two Aboriginal teachers described it “black on the inside”. This school and community have considerable control over recruitment. Some teachers from outside immerse themselves in the community to the extent of choosing to be formally “adopted” (for want of a better term), into extended families. In most other communities visited, acceptance into an extended family and community can occur, but this may be done less formally. Unfortunately, in this, as in many non-metropolitan communities, most ‘white’ teachers come and go anyway, but good ones are encouraged to stay and new graduates who are recruited have always done some professional practice in the community and thus have been assessed for their suitability by the community.

In most communities visited, there was little out-of-school or out-of-school-hours interaction between non-Aboriginal teachers and Aboriginal staff or other community members, which in towns at least, indicates divisions within those communities. Such factors will affect how effective schools can be, especially for Aboriginal students. By contrast, staff, including non-Aboriginal teachers, at Sites 9 and 10 tended to be part of the community; either their partners were Aboriginal and/or they lived physically (or socially) in the community. At sites 9 and 10, this was also true for the principals.

According to Partington, Godfrey & Harrison (1997), equity of achievement “will be achieved only if the structural components of schooling are changed to provide a more responsive environment for them.” At sites 8, 9 and 10 in particular, school operational structures were notably more aligned with Aboriginal ways. They were less official and officious. There was a tangible sense of community, rather than institution.

Sound School and Teaching Practice for Aboriginal mathematics learners may incorporate a range of strategies identified in the Literature Review, but in the end, it may be less about specific numeracy teaching strategies, than it is about:

• Schools that value kids and involve/respond to/reflect community values, language, knowledge and ways

• Teachers who value kids and involve/respond to/reflect community values, language, knowledge and ways

What this means is that the best schools and teachers care enough about children and communities to involve parents/carers in schools, school decisions and teaching; learn about and respond to their needs and reflect this in their practice. This may be the essence of sound teaching practice and in its absence, specific numeracy teaching strategies may have negligible effect on most Aboriginal students becoming effective mathematics learners and effective practisers of numeracy.

63 Partington, Godfrey & Harrison (1997)
Where this sound teaching practice does occur, numeracy teaching practices that are culturally inclusive and have a language focus will be evident. Numeracy teaching strategies that focus on immersion or concrete/visual stimuli may be effective, but are not necessarily the only approach that will be successful.

**Recruitment and development of principals**

A good principal is integral to developing a productive relationship between a school and its community, by building a “climate of trust between school leadership, teachers, students and parents”\(^64\). This requires explicit communication with parents, and giving them the opportunity to contribute to and construct an understanding of the desired student learning outcomes\(^65\). Only at the most successful schools was this evident. These were schools that were less separate from the community.

Making sure a school serves the needs of its community (sometimes plural communities) and at the same time serving well the needs of staff, accountants and often a multitude of bureaucratic structures is difficult. The principal needs to be highly skilled in financial and human resource management, industrial relations, human relations, conflict resolution and so on. For principals working in remote Aboriginal communities, the range of necessary skills (and demands on their time) may extend to tasks such as plumbing, bus driving, air-conditioner mechanic and auto-mechanic.

The Collins Report\(^66\), resulting from extensive consultation with Aboriginal communities across the Northern Territory, recommended that employment contracts for principals should include a performance requirement.

Is it too big a change to allow communities the right to decide whether the performance of an educational leader working in their community is up to scratch? Are they in a position to decide whether an applicant for a principal’s position is the type of person who will provide strong leadership in partnership with their community? Some Aboriginal communities have taken the initiative themselves and, by forming independent schools, enabled themselves to assume control over decisions such as recruitment. For the majority however, this seems beyond their grasp.

Some State/Territory governments have enabled Aboriginal communities to take on some of this responsibility, by recognizing and supporting government funded Aboriginal schools. Some of these experiments are working well, especially where they have had those necessary ingredients of strong and consistent leadership and real community decision making power. These schools and successful independent Aboriginal schools have often fought a long battle with bureaucracies and the wider (‘white’) community for recognition and the right to do things their way. These schools have often, early in their journey, found/identified principals (non-Aboriginal in these cases) who were strong leaders and were willing to work closely with their communities to establish, develop and sustain a shared vision that would be strong enough to withstand a long history of community criticism and bureaucratic barriers. In these cases strong leadership from within the Aboriginal community has also been integral to sustaining these partnerships.

\(^{64}\) Russell (2000)  
\(^{65}\) Heitmeyer (2001)  
\(^{66}\) Northern Territory Department of Education (1999)
In schools where Aboriginal students and communities represent a minority, recognition of their right to appropriate education (by their own definition) may seem impossible. Can a school make education culturally appropriate for a range of cultural groups?

Lessons are there to be learned from schools like Site 3, where by “building a climate of trust between school leadership, teachers, students and parents\(^\text{67}\)”, school and community have become less separate. Schools need to sit down with communities and explain what the school wants and find out what they want. This can be achieved, with strong and consistent leadership, even in communities where characteristics of social dysfunction and division exist.

\(^{67}\) Russell (2000)
IX. Existing Programs Which are Likely to be Successful in Schools Which are Culturally Inclusive/Responsive

1. Getting It Right (Numeracy) Strategy (GIR or GIRLNS– Western Australia)

Although the mathematics achievement of Aboriginal students may not be outstanding at schools which have this program in place, it may be too early for the positive effects to have emerged. In regard to performance against numeracy Benchmarks, data may need to be examined with regard to attendance patterns of students tested. What was evident in these schools was a notably higher level of classroom teacher-confidence in their knowledge and skills for teaching mathematics. It appears that many teachers, particularly recent graduates, have low confidence in themselves as mathematicians and as mathematics teachers. It could be anticipated that increasing this confidence would have a flow-on effect on student mathematics learning and confidence.

The role of the Getting-It-Right numeracy specialist is:

- As a numeracy-support/teacher-mentor in the classroom, to provide hands on resources, ensure a minimum time commitment to numeracy, with a special emphasis on number and small group approach. This means that frequently, often daily, students have intensive mathematics sessions, with access to two teachers and sometimes an AIEW as well. This enables an emphasis on small-group work and provides for meeting individual learning needs (strategies supported by the findings of this project’s Literature Review). In this study, this function was highly valued by teachers, Aboriginal staff and the community.

- As a numeracy-mentor for classroom teachers, AIEWs and community helpers. The GIR Specialist attends frequent intensive professional development sessions on strategies for numeracy teaching. This teacher then workshops the school’s classroom teachers, passing on these strategies. This function was highly valued by teachers.

How commonly attendance at these workshops includes AIEWs and community helpers is unclear, and may depend upon how highly schools (principals and teachers) regard the (numerical) ability and value the educational role of Aboriginal educators, but it is interesting to note that in early documentation for the GIRLNS program, the role of the GIRLNS specialist included “working with classroom teachers to: improve levels of parent participation”. By the third round of funding, however, mention of this role and that of assisting in planning whole-school approaches seems to have been omitted from official documentation.

Where there is a full-time, Getting-It-Right Numeracy specialist in the school, there is often a focus on the early Years (K-3); a positive strategy according to the Literature Review. However, this is problematic. There was a feeling among teachers at some schools which have a GIR numeracy specialist, that this extra support, invaluable as it was in the early Years, was not enough and needed to extend beyond those Years (as it does, in some cases). It may be too early for any full evaluation of the positive, flow-on effects of such early-Years

68 Woodbridge Primary School (2003)
69 Department of Education (2002)
70 Department of Education (accessed 2004)
intervention, but there seemed to be a feeling among teachers in the field that it was not a cure-all, but merely evidence that, to become successful mathematics learners, many Aboriginal students may need this extra support throughout much of their schooling.

This impression among the teachers who were interviewed appeared to be informed by previously suggested anecdotal evidence suggesting that rather than due to lack of number-facility alone, in upper-primary/secondary many Aboriginal students are limited by difficulty coping with more complex mathematical concepts. It may be too early to determine whether programs, such as GIR, which focus on improvements in number sense and facility in the early Years, or indeed, strategies aimed at number and other strands in the middle Years, can impact on the more dramatic fall in numeracy achievement of Aboriginal students by Year 7.

Such anecdotal evidence appears to be confounded by the experience at Site 4, where there is a perception that although students in early Years struggle, in the middle Years (4-5), Aboriginal students really “come on” in their numeracy, only to struggle again as they move towards secondary schooling. This appears to be supported by Benchmark statistics at this site, (see Table IX.1).

Table IX.1: Summary of Benchmark statistics – Numeracy (Site 4, 2003)

<table>
<thead>
<tr>
<th></th>
<th>Year 3</th>
<th>Year 5</th>
<th>Year 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aboriginal</td>
<td>Non-Aboriginal</td>
<td>Aboriginal</td>
</tr>
<tr>
<td>% of class on or above benchmark</td>
<td>0%</td>
<td>N/A</td>
<td>75%</td>
</tr>
</tbody>
</table>

*This school had 89% Aboriginal students

The principal at this school indicated that this was a normal pattern and that the Year 5 students above would have performed poorly in the Year 3 round of testing. This school has had a full-time GIR numeracy specialist (1.0 FTE) since 2002.

**Note: GIR funding does not provide for secondary students.

GIR numeracy specialists in rural and remote communities at least, are identified by nomination or self-nomination. They are usually teachers who want a change of role or more teaching hours. They often do not (at least initially) appear to have strong mathematics knowledge, mathematics teaching or mathematics training backgrounds. This may appear problematic, but the intensive and ongoing nature of their professional development program may negate any lack of knowledge or experience.

2. **Purposeful use of ATAS/ITAS**

At Sites 7 & 9, the Aboriginal (now Indigenous) Tutorial Assistance Scheme was used more effectively and efficiently than often occurs elsewhere.

At Site 7, Aboriginal secondary students were studying through the School of Isolated and Distance Education (SIDE). A specialist mathematics teacher was employed through ITAS to specifically and effectively support the mathematics learning embedded in VET courses. While limited data were available to support the identification, by external standards of these
students as high numeracy achievers, qualitative data suggested that this strategy was providing some numeracy success by both external and internal standards.

At Site 9, the scheme was used extremely purposefully. All Aboriginal students in the school were withdrawn from classes regularly for intensive language tuition, the number of hours per week being determined according to the needs of individual students. A teacher-linguist initially worked with each student to design a program specific to his or her needs in language development. ATAS tutors, working closely with the teacher-linguist to apply these programs to each student, reported back to the teacher-linguist on progress for assessment and program-modification. Evidence suggested that this program was highly successful for development of literacy skills. Students here were also achieving well in numeracy and it was considered that enhanced language acquisition contributed to the development of successful numeracy learners.

3. **Teaching for the ‘tests’**

At schools where Aboriginal students were achieving well by external standards (i.e. in State/Territory Testing Against Numeracy Benchmarks), there was generally some explicit teaching that prepared students for doing the tests, or extra and special tuition that addressed particular aspects of numeracy where students may have under-performed in the tests. This appeared to be an innovation introduced independently by these schools, not something that was recommended by any external body. However, this practice may not be unique to these schools, as anecdotal evidence suggests that there is much variability among all schools in the level and type of coaching that precedes the application of such tests, as well as in the level and type of support given as they are applied, despite the clear instructions that accompany them. Competition between schools for high performance against benchmarks is likely to influence the practice. Whether variability in the support/preparation significantly affects the validity of tests or interpretation of their results is an issue that remains to be addressed by education authorities. If so, then a more comprehensive program to ensure all students are equally-well supported and prepared may be useful.
X. Factors Likely to Inhibit Successful Outcomes in Schools Which are Culturally Inclusive/Responsive

a. Attendance

The discourse in Australian education circles regarding attendance of Aboriginal children is ambivalent. On the one hand, there is a strong message that Aboriginal parents/carers and communities want their children to do well at school and to have opportunities that are available to other children. On the other, there is a message (at least coming through the discourse of teacher education) that Aboriginal parents & carers, due to their own negative experiences with education systems, may not value education highly and thus contribute to student non-attendance by not encouraging their children to attend school. Also explicit in the discourse of teacher education is the impression that child-rearing practices in Aboriginal homes encourage child-autonomy and sibling-support and that therefore Aboriginal adults do not see it as their role to encourage or compel children to go to school; kids may be absent or late because they have had to get their smaller brothers or sisters ready for school. Because of these ambivalent views, discussion about school attendance of Aboriginal students at least from outside the Aboriginal community, is often plagued by confusing information and influenced by conflicting values. Consequently, it often results in reference to non-attendance, rather than to attendance.

Why do students not attend school?

Student non-attendance at school can be for a variety of reasons. In many remote communities, a major factor is the mobility of the Aboriginal population. Aboriginal communities are often more mobile than non-Aboriginal communities, due to a number of cultural factors. For communities that align more closely with traditional lifestyles and values, this may be more pronounced. Families may often relocate for traditional or family gatherings or to fulfil other cultural or family obligations at significant locations.

A student tracking system, introduced by the Department of Education and Training, after recommendations from the Aboriginal Education and Training Council (AETC) in 1997, aimed to track “the whereabouts of students who have 'gone missing' from the school system” and involved “a centralised data base, coupled with confidential State and National cross-sectoral reporting protocols”71.

Reports on this system indicate that it has had mixed success. It has been moderately effective in locating students who, without explanation (to the school) go missing from one school and appear (often after a period of absence) in another school elsewhere. However, the spirit of the system, to enable continuity of education for such children, has been reported to be unrealised in practice. It appears that education systems may lack the structures or personnel with the capacity or will to ensure that teachers in the new location receive information pertinent to a child’s progress, for while the tracking may work, the impression from at least one principal in the study was that the follow-up is not being effectively carried out.

In some Aboriginal communities, recent and distant histories have meant that many people’s lives are characterised by disadvantage and discrimination. Some of these communities are not healthy as communities. Many are in a State of rebuilding and schools can play a role in that process. Some communities are grappling with serious issues relating to substance abuse,

71 Office of educational Services (accessed 2005)
suicide and juvenile engagement with the justice system. In these communities, non-attendance at school is a big limitation to the school’s effectiveness in meeting community needs.

Some schools and communities are working hard and well together to improve attendance by targeting children and their families. They provide services such as bus pick-ups and breakfast programs, as well as encourage adults to get involved in school activities (including formal or informal teaching, story-telling, ASSPA) and learning, through adult and community learning centres. AIEWs or Aboriginal Liaison Officers actively and promptly follow up students who do not attend. Where all of these strategies are practised and the Aboriginal community has real influence in decision making, schools and communities are not very separate and students who attend regularly are achieving well in mathematics. Where schools and communities are inseparable, attendance seems to be also less of a problem, so schools are more effective. At Site 10, the urban school and community were virtually inseparable. There were very few unexplained absences in 2003.

Where the schools and communities are more separate, lack of support from parents seems a larger factor in non-attendance. In one remote community, the (denominational) school was putting a great deal of effort towards meeting the needs of its community, by including two-way learning through local language, developing curriculum and assessment tools tailored to meeting community and individual student needs and consulting, employing and training Aboriginal staff (including teachers). On the surface the impression was that school and community were working well together. However, some signs pointed to the contrary: students were not generally achieving very well in mathematics and while most school staff were committed and worked quite well as a team, one Aboriginal staff member, a non-professional teacher, was often absent from school without explanation. Not surprisingly, this teacher’s children were also not regular school attenders. It seems that, while some sectors of a community may be engaged by and with their school, the community as a whole may not be. Despite its efforts, the school remained largely separate in this very remote and not particularly healthy community. Factors involved in the dynamics of the socio-historic relationship between the community and the denominational education provider were not examined, but the institutional nature of the organisation, like that of government education providers, may inhibit development of a sense of community ownership of the school.

In another remote community (Site 10), the school was closer to being part of the community. This school and the school community had been working hard and well together to improve attendance. Students who attended regularly studied only in their first language in the early Years and were achieving well. Curriculum included Aboriginal knowledge and world view. Local Aboriginal community members were team-teachers in every classroom and the community had influence in decision making, including recruitment. This was an effective school for regular attenders, with a committed principal and staff. The school was a welcoming place and the community was part of the school, but was the school part of the community? This school and community leaders have fought a long battle, through successive governments, to get community control of their children’s education and they have made some big gains, but this is still a government school under the ultimate control of government, in terms of major decision making. For example, the school is situated down a side road, physically separate from the community. Community preference would be to have it right in the centre, symbolically and physically, but that is a government decision; the community and the school remain ultimately separate.
In this school, part of the attendance picture reflected family and cultural obligations; many families had obligations that lead them to reside on outstations for parts of the year. This was also a dry community, but the proximity of an industrial town (15 minutes drive) with licensed liquor outlets had some bearing on attendance. Families visiting relatives and friends in the capital city (connected by regular airline flights) for extended periods was also a factor.

The fact that some sectors of the community did not give their full support to the school was evidenced by sub-optimal, seasonally adjusted school attendance. School effectiveness could not help but be influenced by these and other factors which may influence the holistic health of the community. How much school effectiveness was inhibited by the separation of community and school (as an institution), how much by the complex of social divisions within the community, how much by external factors and how much by other effects of community dysfunction was not clear.

In urban communities, cultural obligations might not be as structured, or even necessarily seen as cultural, but many urban Aboriginal people are still more mobile than their non-Aboriginal counterparts. This mobility may be reflected in transient movement between schools and non-attendance at school. In other cases, school non-attendance may be an act of resistance against (white or parental) authority or may be due to conflicting social obligations; students may have better things to do. This may reflect an inability of schools to provide engaging programs or meaningful (useful) instruction, which in any way reflects the real life experiences or world views of Aboriginal children or their communities.

Ultimately, to achieve optimum attendance, the kids have to want to come to school and/or parents/carers have to regard it as necessary for them to go. School needs to be regarded as belonging to the community, rather than as a separate place or white institution. Institutions have often historically acted against the interests of Aboriginal people and the attitude that they continue to do so prevails, sometimes with reasonable cause, in the minds of many. To overcome this schism, school and community need to be inseparable.

It was felt at Site 10, although they had not given up and were constantly trying new things, that the school could only do so much to improve attendance. A major barrier for achieving satisfactory attendance and therefore high and consistent student achievement in this community was seen as the overlapping of multiple jurisdictions. Between the community and the nearby town, there were four councils operating. This made it difficult for community leaders to coordinate or regulate the movements or behaviour of families and their children.

At Site 9, school and community were inseparable. The school was run by the community, and was therefore seen more as part of the community. The community was also an integral part of the school, as evidenced by the sense of almost mourning, palpable in the school when a violent incident occurred during the researcher’s visit. Here the school does not exhibit many of the institutional characteristics of other schools. The position of the school in the community represented a different paradigm to any other site in the study. It was positioned in an holistic Aboriginal way, because all decisions were ultimately made or influenced by the Aboriginal community. It should be noted, however, that as an urban (and probably dispersed) Aboriginal community, how much the school reflected and was supported by the whole Aboriginal community, as opposed to the community of members who were engaged in the school, was difficult to assess.
b. Effects of racism

In Australia, there are many communities in which Aboriginal people numerically constitute a minority. Aboriginal communities function, to varying extents, as part of those wider communities, but also retain discreet characteristics and are often regarded as separate and inferior by an apparent majority of the ‘white’ community. These Aboriginal communities may also regard themselves as separate and also inferior, but in terms of opportunities available to them; characterised by intersecting inequalities in education, health, occupation, disposable income, housing and political influence. Consequently, relations between these groups are often characterised by racism. Of course, racism can be a two-way street; both parties can harbour resentments based on cultural differences and perceived differential treatment. However, the effects of racism cannot be examined without reference to distribution of power. Those who possess greater economic and political power are less likely to suffer ill-effects from racism.

Because schools primarily deal directly with children, and if we can assume that most teachers (some of whom become principals) take up their profession with the aim of improving the capabilities and opportunities of the children they will teach, then schools should provide for Aboriginal children an oasis, or at least a buffer from the racism that may more directly affect their lives outside the school gates. This appears to be the case, but the extent of the protection schools offer is variable and influenced by the actions and attitudes of teachers, and particularly school principals. Thus, protection is affected by the nature of the teachers’ and principals’ relationships with both the Aboriginal and non-Aboriginal communities inside and outside the school.

The effects of direct racism in schools on Aboriginal students can come from other students, teachers, other staff, the principal and visitors to the school, including parent helpers and committee members. This is somewhat regardless of whether Aboriginal students constitute a minority or a majority in the school, although for Aboriginal students in schools with only a few non-Aboriginal students, direct racism from other students will pose much less of a problem. There are exceptions, for example where racism occurs between Aboriginal groups.

Craven and Rigney\(^{72}\) suggest that “the frame of reference of ‘white’ Australia is based on cultural racism”, involving “the exclusion of viewpoints and the imposition of a dominant frame of reference”. The practice of “cultural racism” has been addressed in this report, in terms of the extent to which teachers, classrooms, principals and schools are inclusive of Aboriginal students, communities and culture. This inclusivity has been shown to be a leading factor in providing successful outcomes for Aboriginal students in their numeracy learning.

In schools where Aboriginal students constitute a minority, teachers and especially principals can be effective in breaking cycles of racism that may exist in schools. Those who go out of their way to invite and include members of the Aboriginal community, and actively include recognition of Aboriginal perspectives in school and classroom activities, who demonstrate respect for Aboriginal students, communities and culture, and who do not tolerate racist behaviour, directly reduce the impact of school racism on Aboriginal students. They also do so indirectly, as role models for all students, parents and staff members.

Strong leadership in such schools is essential to reducing the negative effects of racism on achievement, as members of any community will take notice of, and to some degree emulate.

\(^{72}\) Craven & Rigney (1999)
the actions and attitudes of leaders, both good and bad. This maxim applies at all levels; to societies, institutions, schools and families; it is the basis for the term ‘role model’. A school leader who is a good role model for students and teachers alike will not tolerate racism and will back his/her words with action, by actively including the Aboriginal community in the school and sometimes by interacting with both the Aboriginal and non-Aboriginal community outside the school. He/she should model expectations for teachers by getting to know students and their community and forming relationships with them. In schools where Aboriginal students (as a majority) were achieving well in numeracy, these characteristics were often evident in both school leaders and non-Aboriginal teachers.

At Site 3, where Aboriginal students formed one minority among a large and very diverse student population, teachers shared these characteristics. The principal, however, had many official commitments outside the school. My impression was also that this person did not reside in the local community and did not interact with the Aboriginal community outside of school activities. However, through a deliberate, long and thorough consultative process, the Aboriginal community (and other communities) had been involved in setting school goals and establishing processes. Their opinions had been valued and included, there was recognition of Aboriginal culture evident around the school and they felt some ownership of and pride in the school. This was also evident in Aboriginal students, who seemed confident as learners and socially comfortable. There seemed little evidence that racism was endemic to the school social setting, despite conditions outside the school that showed characteristics of social and cultural divisions.

Less direct forms of racism also impact on the achievement of Aboriginal students. Craven and Rigney\(^{73}\) also identify another common form of racism as institutional racism, characterised by “systems and processes which disadvantage people based on their race”. The Commonwealth Department of Education, Science and Training appears to recognise that they still have a work to do in this area, stating that “Although education systems no longer take such a deliberately oppressive role, they retain elements of assimilation and institutionalised racism”\(^{74}\).

The practice of institutional racism is further addressed in Chapter XII, Implementation, in terms of the inability or unwillingness of institutions to implement changes that reflect their Stated aims.

Some schools with a majority of Aboriginal students, whether physically located within Aboriginal communities or not, have created environments that are virtually free of cultural racism. These are schools where there is Aboriginal control over decisions, in partnership with a strong leader (often non-Aboriginal). They often provide a buffer zone or an oasis from an environment outside the school or community boundaries which can be racist and hostile. The closer these schools are to being independent of larger organisations (institutions), the less they are subject to effects of institutional racism.

Cultural racism appears to inhibit student achievement more critically than institutional racism. There is less cultural racism in schools which are culturally inclusive/responsive. Institutional racism, in the form of hegemonic control over resources, processes and curriculum appears to be frustrating to Aboriginal schools which are ultimately controlled by large organisations and may be a barrier to communities developing sense of real ownership of schools. Although this may frustrate attempts by school communities to make schools and

\(^{73}\) Craven and Rigney (1999)
communities less separate, improve attendance and create healthier communities, it does not appear to inhibit student achievement for Aboriginal students who attend regularly in culturally inclusive/responsive schools.

c. Community dysfunction

If education gaps for Indigenous children in literacy, numeracy and attendance were to be closed, then issues of health and socio-economic disadvantage must be addressed in the first instance.  

In some communities where many of the school-based conditions are in place that should contribute to high Aboriginal student achievement, including consultation with and involvement of Aboriginal people, progress is still slow. These communities may still have some progress to make (and may need to be assisted), to satisfy the following Principles of Social Sustainability for communities developed by the Western Australian Council of Social Services (WACOSS).

- Equity; includes equal opportunity, Indigenous rights, human rights and overcoming disadvantage
- Diversity; achieved through inclusiveness and valuing difference
- quality of life; including subjective well being (things like people's sense of belonging, sense of self worth), objective living conditions (such as levels of education, health, housing) and opportunities for personal and social development
- interconnectedness; covers quantity of social processes (participation and links with organisations and systems), quality of social processes (the extent to which interactions are based on trust, shared norms), structures governing social processes (leadership and mechanisms for resolving conflict) and community infrastructure (including public and civic institutions, planning and physical infrastructure and community services)
- democracy and governance; covers people's ability to access information, knowledge and expertise and their ability to participate in decisions that effect their lives as well as the effectiveness, integrity and accountability of processes and structures. It also incorporates justice and legal rights components.

In particular, disadvantage in employment, housing and justice, related to the principles of quality of life, interconnectedness and democracy and governance may be "a strong factor in people's sense of belonging and sense of self-worth (and)…a key factor in …. people’s sense of empowerment and responsibility and their sense of safety".

Such factors contributing to community dysfunction may inhibit the development of clear and common understandings by communities of what they see as their educational needs. This means that schools may be able to work with only some sections of the community to establish educational goals and the necessary processes to achieve them. This will obviously create barriers to whole-community acceptance of, and contribution to education.

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75 Wyatt (2001)
76 Western Australian Council of Social Services (WACOSS) (2002)
77 Barron and Gauntlett (2002)
Education may be “a tool through which aspirations relating to future community development, greater autonomy, and improved standards of living and well-being, can be achieved”\(^78\), but to some degree schools may also reflect communities. Where communities are not healthy, it is difficult for schools to be healthy. Healthy schools are needed to help sustain and need to be sustained by communities that are healthy; physically, socially and spiritually.

Clearly, solutions to numeracy achievement issues that are rooted in community dysfunction lie partly beyond the scope of this study and, in the absence of some communities being able to mobilise themselves, better policy and practice outside of the scope of school education is required to develop the capacity of communities to sustain themselves and to grow. However, many schools and school personnel can and do continue to work with and for communities and in those cases, their combined efforts in creating positive school environments can only work in favour of helping to develop healthier communities. In communities where there is some dysfunction, the main factor contributing to success in schools appears to be school leadership. The principal is not a factor in isolation, but in some cases is a person that has provided a catalyst for change; has developed strong relationships with key community members over a long period, that has resulted in development of a shared vision and a sense of confidence that success is possible, if not inevitable. This person is someone who shares beliefs with the community; is able and prepared to share, then acknowledge an Aboriginal world view as legitimate.

XI. A Model School?

The aims of this study included the development of a functional model, recommending effective numeracy strategies for Aboriginal students; one that would inform positive change in the policy and practice of Education providers.

A definitive set of effective numeracy teaching strategies did not emerge from observation of a broad diversity of schools. However, what did emerge, were a number of broader strategies that were likely to improve achievement of Aboriginal students in all learning areas including numeracy, and with them recommendations that provide ample opportunity to inform change in policy and practice.

Although it is beyond the outcomes of this study to describe a model of teaching that may be universally successful, it may be possible to identify several models of schools which may be used to improve the service provided to communities; and to reduce the symbolic, social and political separation between schools and communities. The proposed models provide no quick-fix solutions. A recipe for numeracy teaching strategies which teachers could apply or be trained to apply may have provided this, but the changes needed go far beyond the classroom and a pedagogical bag of tricks for teachers.

They require changes to the organisational structures of existing schools and the development of new schools. They require changes to the way schools operate. To achieve this they require some changes to the organisational structures of education providers, in development and recruitment of key personnel and in their willingness to acknowledge the legitimacy of different ways of doing business. In effect, organisations need to be prepared to become less institutional, or at least to allow schools to do so. This means the divestment of some power and control.

Because of the diversity of communities and where they are located (physically, politically and socially) in relation to the wider community, there is no one-size-fits-all model.

Model Aboriginal Schools

Sites 8, 9 and 10 combine to provide clues to a model for Aboriginal schools. These are schools where students are predominantly Aboriginal; their primary purpose is to serve Aboriginal communities. Yet these are three quite different schools:

Site 8 is a Government (community governed) Aboriginal school in a regional city. In 2004 there were 81 students, with a student to non-promotional staff ratio of 10.1. It has been operating as a school for 10 years and the principal has been here for most of that time. Originally using second-hand, dilapidated, demountable buildings with limited resources, it now has a new site, new State-of-the-art facilities and is well-resourced; perhaps recognition by the government of the community’s persistence through adversity, but more likely recognition for consistent improvement in student achievement to a current level that is more successful than many mainstream schools. Staff and students here have a quiet confidence and pride in their achievements and in their beautiful new school, which was designed in accordance with consultation of the local Aboriginal community. In this urban-regional setting it is difficult to gauge the level of social dysfunction in the surrounding community and how well the school reflects the wishes of the whole community.
Numeracy teaching in this school is culturally inclusive/responsive and language focussed, and it also employs concrete/visual and immersion-based strategies.

In this State/Territory, recognition of the growing success of the school has been building for some years. That recognition has now been realised by changes in either policy or practice, that have enabled allocation of significant resources, in the form of new premises, facilities and a generous staffing formula (less than half the student to staff ratio of many suburban primary schools, but similar to many remote schools). This indicates, on the part of government, both recognition that the school’s approach is successful and a willingness to support and increase that success.

Roughly in parallel to this injection of funding, another school (Site 5) has been developed along similar philosophy, structure and resource allocation. At the time of the case study in 2003, this school was not experiencing the same success as Site 8. However, recent access to 2004 data indicates that the school may be showing a rapid increase in benchmark achievement, particularly in Year 3. The main difference between the two schools is their history. While Site 9 has persisted through adverse years, through strong leadership and partnership between principal and community, there is the impression that Site 5 has been created to attempt to replicate Site 9’s successful formula, but does not yet have the strength and determination which has emerged from that history. The school at Site 5 has had numerous changes in staffing and leadership in its short history; once that part of the formula is achieved, there may be no barriers to strong growth.

Site 9 is an Independent Aboriginal school in a metropolitan zone. In 2004 there were 156 students in the primary school, with a student to teaching staff ratio of 20.8. This did not include staff employed under the Aboriginal Tutorial Assistance Scheme (ATAS), nor volunteers. It has been operating as a school since 1986 and the current principal has been in the position for 11 of those years, during which the school has grown from approximately 25 lower primary students to 156 primary school students and high school students to Year 12 (in 2004). It also operates an adult learning centre. Originally doing it rough, the school moved to the current site (an ex-government primary school which closed due to amalgamation of several schools) 6 to 7 years ago. The school runs on limited resources, making the most of those it can get. The atmosphere is busy and informal and the community appears to be defensive of the position (both physical and philosophical) it has fought to establish. In this urban setting it is difficult to gauge the level of social dysfunction in the surrounding community and how well the school reflects the wishes of the whole community.

Numeracy teaching in this school is culturally inclusive/responsive and language focused. There is little evidence of concrete/visual or immersion-based strategies.

As an independent school, this school community is politically active and has done things their own way, conforming to bureaucratic conventions only as much as has been required to achieve their own goals. They have done it alone for the greater part, finally getting some bureaucratic recognition in the granting of used but functional premises. Unlike Site 8, the success of this school provides little opportunity to bureaucrats for kudos and this may be reflected in a continued struggle for support and resources.

Site 10 is a Government (community governed) Aboriginal school in a very remote setting. It had evolved from a mission school to a Government school in 1972. The current principal has been in the position since 2000, but has been involved in other local schools for much longer. The school’s official status as a bilingual school has fluctuated since the mid 1970’s, due to
variable resistance from incumbent governments, but the shared vision and determination of the school and community leaders has prevailed. This is a two-way school, with bi-lingual teaching and Aboriginal knowledge and world-view incorporated into the curriculum. There is a nearby service town for the mining industry, where there is evidence of divisions based on race and social class. This is officially a dry community adjacent (20km) to a wet town. There is evidence of community dysfunction, which the school acknowledges and which school programs are aimed at reducing. The school includes primary, secondary and an adult learning centre.

Numeracy teaching in this school is culturally inclusive/responsive, language focused, and employs concrete/visual and immersion-based strategies.

This school is similar to Site 8 in that it is a government school that has persevered, often under political duress over a number of years, has had strong leadership (although of more than one principal) over those years, has had some strong and consistent political allies (often in government opposition in this case) and more recently has developed allies in government bureaucracies. It is different because it is in a very remote location, the Aboriginal community has distinct languages and a much more comprehensively preserved and documented system of Aboriginal knowledge, lore and law. Its Aboriginal leaders are also more politically active, outspoken and visible (despite their remoteness) in a much smaller State/Territory population. This school has not received the same level of resources, nor been granted the same level of autonomy over resource-allocation. However, they have demanded and received some autonomy over curriculum and pedagogy, which in this environment is valued more highly.

Test-cases or self-determination in practice?

It is probable that critical observers, from inside and outside the Australian Indigenous community, see some of these Aboriginal independent and community-controlled schools as test cases. If Aboriginal students learn in environments that acknowledge their language and shared values; where schools are ‘owned’ by the Aboriginal community, and thus take a less ‘institutionalised’ and ‘institutionalising approach; where curriculum (to some extent) and instruction is designed to meet the specific needs of Aboriginal students and has been agreed upon by their community; in environments that serve as something of an oasis from ‘white’ control, domination, racism and assimilation, then will these factors provide the catalyst for increased achievement of Aboriginal students?

In a way schools such as Site 8 may be seen by some as a test for self-determination; a phrase out of political vogue, but a concept strong in the minds and hearts of many Aboriginal leaders and apparently in the few strong supporters of such schools within some education provider-organisations. Support for this model, in this State/Territory, seems to have heralded a significant change in the philosophy of the involved agencies and their governments. However, from within some of these communities, self-identification as test cases may be ludicrous and self-determination may be seen as a ‘white’ construct. Some of these schools have persisted against sustained external political and social pressure for a long time.

The Draft Declaration on the Human Rights of Indigenous Peoples (1993, Article 15), States that:

Indigenous children have the right to all levels and forms of education of the State. All indigenous peoples also have this right and the right to establish and control their educational systems and institutions providing education in their own languages, in a
manner appropriate to their cultural methods of teaching and learning. Indigenous children living outside their communities have the right to be provided access to education in their own culture and language. States shall take effective measures to provide appropriate resources for these purposes.\footnote{Human Rights and Equal Opportunity Commission (1993)}

Urban Aboriginal groups often face criticism from the wider community over claims of any distinctive need for recognition of Aboriginal world views, culture or language. This criticism is often based on the level of degradation of this knowledge that has resulted from colonisation. It is sometimes aligned with concepts of 'purity of blood'. Thus it may be said that someone is not a 'real Aborigine' if they do not conform to a stereotype in terms of skin colour, language and ceremonial practice. The principles in the above declaration however, apply to all Indigenous people, regardless of the degree to which they are seen to conform to such externally imposed stereotypes.

It appears that some States and Territories take such obligations more seriously than others and those that do, have perhaps acted somewhat belatedly. Each of the above Aboriginal schools has achieved its success as an act of resistance to an inability or refusal of the State to provide appropriate education for its children. Each has had to persist on self-belief, through a long period of government disregard and political and community resistance. For some, eventual acknowledgement has brought freedom from the constraints of having to work under Spartan conditions, while for others this struggle is ongoing. These schools have become very resourceful. How much the success of these schools is attributable to that resistance and persistence is unclear.

**What do these Aboriginal schools have in common (apart from persistence)?**

In all these schools, students are experiencing success as numeracy learners by community (internal) standards and by external standards. They also share the following characteristics:

- Numeracy teaching strategies are culturally inclusive/responsive and language focused
- Aboriginal community members are intrinsic to major decision-making, including recruitment
- They have principals with extensive experience in Aboriginal education, who have worked in close partnership with the community or nearby communities for a number of years, often through a development phase characterised by adversity and resistance from organisations and the wider community.
- These principals have gained the trust of the community through development of a combination of strong social, cultural or emotional connections with the Aboriginal community
- They provide services aimed at improving attendance and student health (e.g. bus pick-up, breakfast program, ear health programs which address identification, treatment and education)
• They attempt to involve the whole community in the school through community resource/adult learning centres and as such see their role in community sustainability

• There is no evidence of cultural racism; they are culturally inclusive/responsive and there is acknowledgement of Aboriginal world views.

• There is acceptance of Aboriginal languages/dialects and explicit teaching of standard Australian English.

• Aboriginal people are in positions of authority in the school and Aboriginal people with authority in the community are involved in school decisions.

• The school accepts and supports all Aboriginal primary school students who apply to enrol and attempts to involve the whole Aboriginal community in the school, which may be inhibited by varying levels of social dysfunction in the surrounding Aboriginal community.

This could be seen to provide a model for conditions in Aboriginal schools that are likely to contribute to effective numeracy learning.

However, therein lies a dilemma. All these communities have developed strong and vibrant schools through tough times. There is a strong impression that this persistence has contributed significantly to their ultimate success. These are not conditions that can or should be replicated.

Mainstream Schools

The school at Site 3 provides the best model in the study for schools where Aboriginal students form a minority. The nature of the school experience for such Aboriginal students is in some ways intrinsically different and it was initially my intention to describe a different model. However, the majority of the above characteristics of successful Aboriginal schools also describe Site 3, with two exceptions.

1. The principal here does not appear to have strong social, cultural or emotional connections with Aboriginal community members, but has gained their trust by demonstrating a commitment to involve this community meaningfully in decision making and by taking pride in the school being seen by that community as a desirable school for their children. Given the cultural diversity in this school, the establishment of strong social, cultural or emotional connections with each community represented in the school may be unachievable. The establishment of a formal process for development of a shared vision (which enables reflection of their views and desires in school ethos, policy and practice) may be an eminently practical solution.

2. Aboriginal people do not appear to hold positions of authority in the school, although Aboriginal people with authority in the community have been involved in the school through the formal consultation process. There are also no formal structures for involvement of Aboriginal people in recruitment, although there are indications that they would be involved informally in identification of existing first-year teachers to be offered continuing contracts. The identification of Aboriginal people for positions of
authority in the school may be one area in which this school could formalise this function and at the same time improve its service to the Aboriginal community.

By adapting to these considerations, a single model can be constructed, which is likely to improve numeracy achievement for Aboriginal students an all schools:

**The Model**

- A principal is recruited in consultation with the community, with extensive experience in Aboriginal education and a commitment to work in close partnership with the community for a number of years, perhaps through a development phase, to develop and sustain a shared vision.

- This principal is prepared to establish strong social, cultural or emotional connections with the Aboriginal community. Alternatively a principal may gain the trust of the community through engaging its members meaningfully in a formal consultation process and developing a shared vision. This necessitates more than rhetoric, but acting upon the community’s recommendations.

- Numeracy teaching strategies are culturally inclusive/responsive and language focused. This means that all Aboriginal students have exposure to teaching staff who share their socio-linguistic background. It also means that non-Aboriginal teaching staff are likely to employ a range of the following numeracy teaching strategies:
  - Flexible approach to student-centred and negotiated teaching.
  - Lack of reliance on busy-work.
  - Tasks that scaffold learning; building from student understanding at a variety of achievement levels; focus on what is known, rather than what is not known.
  - Encourage and value students taking risks; minimise risk of being either right or wrong.
  - Provision of a range of tasks that allow students to make some progress and attain some success.
  - Explicit teaching of differences between and valuing of both Western mathematics and Aboriginal mathematics.
  - Encouragement of sharing as an acceptable and desirable aspect of learning/peer tutoring/employ a range of grouping strategies.
  - Provide for student autonomy eg. freedom to choose from a range of activities/own methods of recording.
  - Explicit teaching of differences in learning contexts.
  - Provision of a range of learning environments, including outdoors.
  - Encourage displays of student understanding.
  - Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics.
  - Use of visual imagery to aid concept development.
  - Student autonomy/freedom to choose methods of recording that fulfil their needs.
  - Explicit teaching of specialised vocabulary and use of common words with specialised meanings in mathematics.
• Provision of ‘rich’ learning tasks that are contextually meaningful and embedded in relevant and diverse language.

• There is no practice of cultural racism; school ethos, policy and practices are culturally inclusive/responsive and there is acknowledgement of Aboriginal worldviews

• There is acceptance of Aboriginal languages/dialects as well as explicit teaching of standard Australian English.

• The school provides services aimed at improving attendance and student health (e.g. bus pick-up, breakfast program, ear health programs which address identification, treatment and education)

• Aboriginal community members are meaningfully involved in major decision-making, including recruitment

• The school attempts to involve the whole community in the school through community resource/adult learning centres and as such sees its role in community sustainability

• Aboriginal people are in positions of authority in the school and Aboriginal people with authority in the community are involved in school decisions

• The school accepts and supports all Aboriginal primary school students who apply to enrol and attempts to involve the whole Aboriginal community in the school, regardless of varying levels of social dysfunction in the surrounding Aboriginal community.
XII. Dissemination

A presentation of the first stage of this research as a work-in-progress was given at the Centre for Indigenous Australian Knowledges (CIAK) at Edith Cowan University, on May 31, 2004 and at the Third National Indigenous Education Conference Indigenous Partnerships in Learning, in Ballarat in November, 2004.

As this report is the property of the Aboriginal Education and Training Council of Western Australia, dissemination remains at its discretion.

It is hoped the report will be distributed widely and will inform policy-makers, education providers, schools, communities, principals and teachers about ways to improve the numeracy achievement of Aboriginal students. However, the findings of the research have indicated that strategies which will improve numeracy outcomes for Aboriginal students cannot be confined to numeracy teaching strategies. The aim must be wider and while recommendations emerging from this research are aimed at improving numeracy outcomes, acceptance and adoption of recommended practices will necessarily improve outcomes well beyond those related to numeracy alone.
XIII. Implementation

As previously Stated, the aims of this study included the development of a functional model, recommending effective numeracy strategies for Aboriginal students; one that would inform positive change in the policy and practice of Education providers.

A concern has been expressed that informing may not be enough to bring about positive change. Research should be a catalyst for that change. This study faces the danger of becoming another stone in a long trail of research that has demonstrated best practice for Effective Teaching and Learning for Aboriginal students, which has not translated into effective policy and practice on the ground. In a sense, the wheel may be constantly re-invented.

As a key part of the study, perceptions were sought, from researchers and practitioners in the field of Indigenous education, on what is required to bring about that change; individually and systemically. Interpretation of this data may be used as a suggested basis for further research that may be of interest to bodies such as the MCEETYA task force.

Respondents indicated that barriers to change were manifestations of a range of factors, including:

- institutional resistance
- Aboriginal “frameworks and mechanisms” not being “understood, recognised and respected” (equal partnerships where strategies are negotiated and agreed to by policy makers and governments)
- policy not reflecting what communities want and need, but only what governments think Aboriginal communities need
- too many people continuing to push systems that fail

Institutional barriers to effective educational change

In one State/Territory, respondents saw educational institutions as being “too protective of failing systems... pushing and forcing a failing system on people” and needing to “be more open to ideas and ...change” and to “recognise failure, recognise difference and something that might work and be prepared to give something else a go”. This was seen as due to the people in organisations being “too comfortable” and “frightened of change”.

In a different State/Territory, a respondent also quoted a 1976 document which advised government that Aborigines [sic] “will not continue to quietly tolerate ill-founded programmes”. Here, a “negotiated system of education” was seen as necessary; one that may not sit comfortably with governments, but would “reflect what communities want and need, and not what governments think Aboriginal communities want and need.”

In another State/Territory, an Aboriginal principal saw some resistance to change at all levels, but generally believed that “cutting edge” advice for teaching practice was being generated by research and filtered down through institutions; that in this district at least, the organisational environment was in many ways conducive to change in school governance for Aboriginal communities, empowering Aboriginal people “to develop skills to take on a greater role in schools” and being willing to “let loose with the reins a little bit”. The point of most

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80 Northern Territory Department of Education (1976)
resistance was seen as being teachers and schools which were not willing to make “that shift in themselves”, which often came down to extra work. Resistance however existed higher in the organisation, in the form of the allocation of appropriate resources to support that practice, for example in the form of payment for extra time to spend in collaborative planning.

It appears from respondent feedback and from observed policy and practice, that there is a great deal of variation between States and Territories in the degree to which governments are willing to dispense resources, and control over resources, for Aboriginal education to Aboriginal communities.

This lack of coordination appears problematic for any hope of equity in participation and achievement in education and educational decision making for Aboriginal communities on a wide scale:

[the] way in which... resources are controlled and allocated contributes to the lack of participation by many Indigenous people. Allocation is determined by the values of those who control the resources. The choice of the resources, who gets them, how they are used and what outcomes are considered desirable as a result of the allocation, are all decisions that are influenced by values. In education, these decisions are usually made for Indigenous students and their parents by non-Indigenous teachers and administrators whose values are markedly different from their clients.

If those in authority lack an understanding of the needs of the families, fail to gain their co-operation or don't take cultural differences into account, they will find that resistance to the support may negate its effects.  

Variations between State/Territory government policy and practice are not new. The role of the Commonwealth should be a unifying influence, but in practice, its policies are often as inconsistent over time as State/Territory ones are inconsistent over geographical borders. Institutional resistance to change may be relative to the size of the institutions and Commonwealth ones are even bigger than those of the States/Territories.

The National Aboriginal and Torres Strait Islander Education Policy (AEP), introduced in 1989, which contains twenty one National goals agreed by Commonwealth, State and Territory Education Ministers and is still Australia’s national policy on Indigenous education. It was examined in 1995, but apparently remains unchanged.

The twenty one National goals are divided and listed under four major goals:

Major Goal 1: Involvement of Aboriginal and Torres Strait Islander People in Educational Decision-Making
Major Goal 2: Equality of Access to Education Services
Major Goal 3: Equity of Educational Participation
Major Goal 4: Equitable and Appropriate Educational Outcomes

81 Partington (1998)
82 Aboriginal and Torres Strait Islander Commission (ATSIC) (accessed 2005)
This policy then informed Australian Government priorities in the MCEETYA National Strategy for the Education of Aboriginal and Torres Strait Islander Peoples 1996–2002:

Priority 1: To establish effective arrangements for the participation of Aboriginal and Torres Strait Islander peoples in educational decision making

Priority 2: To ensure equitable access for Aboriginal and Torres Strait Islander students to education and training services

Priority 3: To ensure equitable and appropriate educational achievement for Aboriginal and Torres Strait Islander students

Clearly, ideas flowing from this study, indicating that the involvement of Aboriginal communities in decisions that affect them is likely to contribute to the development of successful mathematics learners, are not new. Priority 1 above clearly shows that policy makers have known those answers since at least 1996. How have they responded?

Some progress has been made towards realisation of Priority 1, with the establishment of regional, State/Territory and National advisory bodies which include Aboriginal people. ATSIC also performed this function as part of its role and included regional representation, but has now been decommissioned. Currently, on a community basis, some State/Territory governments have ensured Aboriginal community consultation in the development of targeted schools. Largely however, the level of participation of Aboriginal and Torres Strait Islander peoples in educational decision making at the community level appears to be quite variable and at the discretion of school principals.

Rural and remote students are more disadvantaged in access to education and training services and there is a small but steady decrease in the proportion of remote students extending their school education and gaining a Year 12 Certificate. It also appears that a higher proportion of Indigenous students live outside metropolitan areas. For example, 74% of Indigenous VET students live outside metropolitan areas, compared to 43% of non-Indigenous VET students. Therefore, it would appear that Priority 2 has not been achieved.

Use of the vague term ‘equitable access’ encourages a range of interpretations and implies both a defeatist and a deficit model. The use of this term seems more like a self-defeating prophecy than a performance criterion. The absence of equitable outcomes as a stated target in these priorities seems to assume that this is unachievable (at least within a term of government). This indicates low expectations for any real gains in achievement, on the part of government which at the same time espouses that “Raising the expectations of parents, teachers and the community about the literacy and numeracy levels which can be achieved by Indigenous students” is crucial to achieving “English literacy and numeracy for Indigenous students at levels comparable to those achieved by other young Australians”.

Statistics presented in this report also make it clear that the equitable achievement targeted by Priority 3 has not been achieved. The inclusion of ‘appropriate’ as a descriptor for achievement warrants some interrogation. It begs the question; “appropriate by whose definition?” This may be an escape clause that enables government justification of poor outcomes, but it may also be an attempt to allow Aboriginal communities to decide for themselves what is appropriate.

84 Indigenous Education and Training Alliance (accessed 2005)
It is still obvious in 2005 that achieving Priority 1 would improve educational outcomes for Aboriginal students and a multitude of outcomes for many Aboriginal communities, but it is happening far too slowly. Clearly there are barriers to its implementation.

This set of circumstances suggests three possible explanations:

a) Governments representing electorates and driving institutions which don’t want Aboriginal people to have equal opportunity, through fear of them gaining political power

b) Governments that are not willing to go to the effort or expense of trying to effect change, when they believe that those schools where Aboriginal students are achieving and where Aboriginal people are making the decisions are ephemeral; they will fail sooner or later; and

c) Governments actually know what is required and are trying to effect change, but community apathy and ignorance combines with institutional (bureaucratic) conservatism and elitism (from both sides of politics) to form a chain of resistance that prevents the development or emergence of a large enough cohort of quality teachers and principals to get the job done.

Four years into the six year term of the MCEETYA National Strategy for the Education of Aboriginal and Torres Strait Islander Peoples 1996–2002, the National Indigenous English Literacy and Numeracy Strategy 2000–2004 was introduced, which aimed to address the following six key elements:

- Achieving attendance;
- Overcoming hearing, health and nutrition problems;
- Pre-schooling experiences;
- Getting good teachers;
- Using the best teaching methods;
- Measuring success, achieving accountability.

Although sounding much more decisive, a critique of the content reveals that earlier proposed “arrangements for the participation of Aboriginal and Torres Strait Islander peoples in educational decision making” from the 1996–2002 Strategy had disappeared. In place of equitable outcomes and equitable access, National Indigenous English Literacy and Numeracy Strategy 2000–2004 (NIELNS) aimed for improved attendance, measurement and accountability. However, it also claimed to aim for the “active support of a greater number of parents of Indigenous students and community members for their children’s education” and the NIELNS page on the DEST website contains a statement from a group of un-named Indigenous Australians supporting the strategy, who state that it aims to “increase the involvement of the parents, families and communities of Indigenous children in all aspects of education planning and delivery,” although how this was to be achieved was not made clear.

What is encouraging in the National Indigenous English Literacy and Numeracy Strategy 2000–2004 (NIELNS) is the intention to get good teachers, although government strategies to achieve that also seem ephemeral. The question perhaps should not only include “How do we

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teach preservice teachers to teach?”, but also “How do we ensure that the teachers we employ to teach care about kids and communities?”

In 2000 MCEETYA released the following two documents:

“Statement of Principles and Standards for More Culturally Inclusive Schooling in the 21st Century” and “Model for More Culturally Inclusive and Educationally Effective Schools”,

Statements by the Council of Australian Governments in 2001 indicated that both of these documents “were...used to support the professional development of school principals and teachers”, were “in broad use in all jurisdictions” and were “being used to audit existing policy and programmes and to support the development of more effective partnerships between schools and their indigenous communities.”

However, this appears not to have been reflected in NIELNS, where there is no mention of getting or developing good principals.

The trail of Commonwealth Indigenous Education policy appears to be a convoluted one, but what does appear clear is the erosion over time of the intention to enable Aboriginal self-determination in education policy and practice. This may indicate resistance to the structural changes necessary for real improvement in educational outcomes for Aboriginal Australians.

**Institutional barriers to effective research**

In research organisations, although it was considered that there were “some good people...doing good research” (this may have been out of politeness for the researcher), research was occasionally seen as being “generally for keeping people in jobs” and for the purpose of “talk fests”. The education research profession was also seen as characterised by “old boy networks” and a “white” superiority complex.” Elsewhere, shortcomings in educational research priorities have also been seen as “the wrong sort of research...being done and ... in a lot of cases the right people [not] being spoken to.”

Institutional barriers were also encountered in the conduct of this research. While the researcher was ambivalent regarding the validity of internal and external definitions of achievement, the possible existence of a large Commonwealth database of national statistics on numeracy benchmarks was an attractive prospect. The Commonwealth apparently saw achievement of numeracy benchmarks as a legitimate measure of successful mathematics learning for Aboriginal students and governments seemed more than willing to publish data showing that Aboriginal students were achieving less well as a group. It was frustrating, then that policies prohibited the release of such data that could have easily identified schools across the country where clusters of Aboriginal students were performing best by the standards of numeracy benchmarks. This would have made targeted case-study research much easier and the identification of successful strategies a more efficient process.

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89 Council of Australian Governments (COAG) (2001)

91 Partington (1998)
XIV. Recommendations

The following recommendations have emerged from the findings of this study, as presented in the conclusions of individual Case Studies in Chapter VI, in the analysis of effective numeracy teaching strategies in Chapter VII, in descriptions of successful programs in Chapter VIII, in discussion of inhibitors to success in Chapter IX, discussions of Model school in Chapter X and barriers to implementation in Chapter XII.

**Recommendation 1**

That the practices identified in this study to improve numeracy achievement for Aboriginal students be implemented as a matter of urgency.

**A Aboriginal involvement in school decision making**

Processes for the more effective engagement of Aboriginal communities with schools need to be explored. This may require development of a model for establishing, developing and supporting community involvement in school decision making. Aboriginal consultative or advisory groups with clear responsibilities and influential roles in school management may be effective, but successful approaches, such as at Sites 3 and 10 appear to go beyond that. There, school staff, students, parents/carers and other interested parties are engaged meaningfully as a learning community. Partnerships with external agencies may form extensions of this community.

**Recommendation 2**

That in schools where there are Aboriginal students, resources be directed towards the identification and engagement of consultants or professional development programs that have shown success in meaningfully engaging schools with their Aboriginal communities. One such model which may inform this process is TRIBES©.

**B Aboriginal Schools**

Most of the schools in this study where Aboriginal students were experiencing success as numeracy learners were Aboriginal schools. The successful Aboriginal schools were those where Aboriginal communities had real and meaningful influence in decisions affecting their children and where there was strong leadership by a principal who was prepared to engage effectively and represent the Aboriginal community. One Aboriginal school which had those conditions was not yet successful, but was showing signs of rapid improvement, despite inconsistent leadership.

Although detractors may cry apartheid or segregation, it should be noted that none of these schools was closed to non-Aboriginal students. Given the rate of growth of a culture of success in some of these schools, they could soon find themselves in a position where demand for places by Aboriginal students means that they have to refuse non-Aboriginal students. This would be unfortunate, as demand for places by non-Aboriginal students may also parallel their success.
**Recommendation 3**

i) That efforts be made to encourage the establishment of Aboriginal consultative groups, especially in urban and regional centres, with the aim of channelling resources to the establishment and support of new Aboriginal schools.

ii) That such groups should be encouraged and supported in the identification of experienced potential principals experienced in working closely with Aboriginal communities and willing to closely involve these communities in school decisions.

Some Aboriginal schools are achieving success which appears to be related to their governance structures and the involvement of the community.

**Recommendation 4**

i) That the governance structures employed in Aboriginal schools which meaningfully involve Aboriginal people in decision making should be considered as models for implementation in all Aboriginal schools and schools where a significant proportion of students are Aboriginal;

ii) Resources be allocated to implement this process.

**C Promotion of culturally inclusive/responsive and language focused numeracy teaching strategies**

**Recommendation 5**

That culturally inclusive/responsive and language focused numeracy teaching strategies be encouraged for teachers of Aboriginal students, through:

i) enhanced efforts to recruit and train Aboriginal educators, including volunteers

ii) enhanced pre-service and post-service training for all teachers which focuses on such strategies, as identified in this research

**D Teacher Training**

Where teachers do not share socio-cultural backgrounds with Aboriginal students and their communities, they appear much less aware of and capable of applying culturally inclusive/responsive and language focused teaching strategies in their teaching. This situation may be amended by improved training opportunities for all teachers.

In some universities, students studying for Bachelor of Education or Graduate Diploma of Education courses must complete coursework specific to Aboriginal education. In other universities this is not the case and some have undertaken to incorporate Aboriginal perspectives across the course curriculum. The second option has the potential to be more effective; after all schools and teachers are encouraged to do likewise in their curriculum and teaching. However, questions remain regarding; how effectively universities will execute this
Aboriginal Students and Numeracy

curriculum development; how and how much they will involve Aboriginal experts in the curriculum development and its delivery; how they will be scrutinised for the effectiveness of this process. While one of the above options seems necessary, the effective incorporation of Aboriginal perspectives across the teacher-education curriculum is likely to be a long developmental process and maintaining a specific, compulsory Aboriginal Education unit seems necessary, at least in the short term.

In this curriculum development process, specific attention needs to be made to mathematics education. The findings of this research indicate a range of culturally inclusive/responsive and language focused numeracy teaching strategies that may be employed by teachers and these should inform the development of curriculum for teacher training. Part of this language focus for numeracy teaching may need to include training in strategies for teaching ESL and understanding numeracy in an Aboriginal context.

**Recommendation 6**

i) That universities include Aboriginal education as a specific compulsory unit in all undergraduate and graduate diploma teacher training.

ii) That such compulsory units are reviewed to emphasise culturally inclusive/responsive and language focused numeracy teaching strategies. Aboriginal educators should be actively involved in the development and delivery of these units.

**Recommendation 7**

That universities which intend to make specific units in Aboriginal education in undergraduate and postgraduate diploma courses non-compulsory, be required to develop a comprehensive curriculum development plan, including specific attention to culturally inclusive/responsive and language focused strategies for the teaching of numeracy in an Aboriginal context.

**Recommendation 8**

That until such curriculum development has been completed and endorsed by a panel which includes Aboriginal education experts, teachers who wish to teach Aboriginal students should have completed specific undergraduate or post-graduate training in Aboriginal education or other comprehensive training in Aboriginal cultural awareness.

Many emerging and current teachers of Aboriginal students appear to have difficulty engaging with Aboriginal communities. Post-service training of teachers currently teaching Aboriginal students should include training in Aboriginal cultural awareness. Such training should include strategies for engaging with Aboriginal communities. Aboriginal community members may be in the best position to identify those who require extra training. It may be necessary for Aboriginal communities to be engaged in assessment and nomination of existing and pre-service teachers for such training. Where possible, Aboriginal people from the local community should also be engaged in delivery of such training.
Recommendation 9

i) That resources be directed in individual communities towards identification and training of community members for development and delivery of Aboriginal cultural awareness training for existing teachers and Aboriginal cultural awareness/induction for new teachers.

ii) That Aboriginal cultural awareness training programs undergo development to include strategies for meaningfully engaging Aboriginal communities in schools (in governance, operations and curriculum) and in classrooms.

Recommendation 10

That processes be developed for Aboriginal community members to be involved in assessment of the effectiveness of pre-service teachers on professional practice, teachers completing their first year of teaching and other teachers of Aboriginal students.

E Recruitment of teachers

In some States/Territories, the recruitment process includes many graduates being compelled to first work in country or remote locations, before becoming eligible for urban positions. This policy is intended to address a shortage of teachers who volunteer for assignment in remote locations; the majority of graduates (who are urban) prefer to remain urban. The unfortunate effect of the policy for Aboriginal students and their isolated communities is that they firstly often get teachers who don’t really want to be there, are resigned to doing their country service, but will not stay beyond their indenture, so there is little continuity of staff with any local knowledge. The other disadvantage is that rural/remote communities, and particularly Aboriginal students in those communities, are further disadvantaged by being allocated the least experienced teachers, in a working environment that may provide little professional support.

Recommendation 11

That teachers recruited to teach Aboriginal students should have completed undergraduate, post-graduate or post-service training in Aboriginal education or Aboriginal cultural awareness, and should be assessed for their suitability by a panel which includes a member of the local Aboriginal community.

Recommendation 12

That incentives be offered to encourage experienced or highly qualified teachers to nominate for teaching positions in rural and remote schools.
F Development of principals

Strong leaders with many skills and a strong commitment to their students and communities are needed for Aboriginal students in all schools. Schools where Aboriginal students were experiencing success as numeracy learners were those where such strong leadership was in place and where this commitment was also demonstrated by a willingness to work closely with those communities over a long period. The success of these schools appeared in most cases to have been the result of the development of a shared vision among the school community, in which the principal’s leadership and willingness to respond to community wishes was prominent. Although such a vision cannot be formed overnight, lessons from those leaders and communities may be informative for the training of both current and future principals. Otherwise, the mistakes of the past will be repeated and Aboriginal communities will continue to take pot luck in their quest for good school leaders. Processes should be established for identification of early career candidates and their grooming for that specific role.

Specialist training should be developed for potential principals in schools where there are Aboriginal students. This should training should include attention to strategies for engaging with Aboriginal communities.

Teachers, particularly Aboriginal teachers should be encouraged to nominate for future principalship roles in schools where there are Aboriginal students, should be offered incentives for additional specialist training and should be at least partly assessed for their suitability by Aboriginal people.

**Recommendation 13**

That postgraduate training be developed to provide opportunities for teachers of Aboriginal students with a desire to work with Aboriginal communities, to undertake specialist training in Aboriginal education and educational leadership, with a focus on developing effective working relationships with Aboriginal communities. Such training could be developed for a Master of Aboriginal Education or Master of Educational Leadership with scope for specialisation in Aboriginal education.

**Recommendation 14**

That scholarships for teachers of Aboriginal students be made available to enable promising undergraduate teachers with a desire to work with Aboriginal communities, to undertake specialist training in Aboriginal education and educational leadership, with a focus on developing effective working relationships with Aboriginal communities. Such training could be developed for a Master of Aboriginal Education or Master of Educational Leadership with scope for specialisation in Aboriginal education.

**Recommendation 15**

That scholarships be made available to enable early career Aboriginal teachers to specialise in educational leadership
G  Recruitment of principals

The nature of the relationship that principals develop with Aboriginal communities appears in most cases to be vital to the success of Aboriginal students. Local Aboriginal communities may need to be involved in the recruitment process to assess whether that relationship is likely to flourish.

Recommendation 16

That principals recruited as managers for schools where there are Aboriginal students should have completed undergraduate, post-graduate or post-service training in Aboriginal education, Aboriginal cultural awareness, or educational leadership, with a focus on developing effective working relationships with Aboriginal communities.

Recommendation 17

That principals recruited as managers for schools where there are Aboriginal students should demonstrate experience in working closely with Aboriginal communities and a willingness to involve these communities in school decisions. This aspect should be given similar emphasis to financial and human resource management skills and knowledge of organisational process.

Recommendation 18

That principals recruited as managers for schools where there are Aboriginal students should be assessed for their suitability by a panel which includes a member of the local Aboriginal community.

H  Specialist Numeracy Teachers

In schools and classrooms which are culturally inclusive/responsive, the benefits of programs such as the Getting it Right (numeracy) Strategy are evident, particularly in their support role for classroom teachers and AIEWs.

Recommendation 19

That funding be maintained for numeracy support programs such as the Getting it Right (numeracy) Strategy and provided in States/Territories where such programs do not exist.
I Future Research

If similar research is commissioned in the future, restricted access to the National database of benchmark results should be provided to the researcher. Quantitative analysis of this data would be invaluable in locating cohorts of high-achieving Aboriginal students, according to performance on State/Territory testing Against Numeracy Benchmarks.

Recommendation 20

That future research into successful numeracy teaching strategies receive full bilateral support from State, Territory and Australian Governments, to allow comprehensive and privileged access to benchmark data, to enable identification of possible clusters of students who have achieved numeracy benchmarks.

This study has demonstrated the value of engagement of Aboriginal communities in their children’s school education. The policies and practices of schools and education institutions in the past have contributed to the assumption in many Aboriginal communities that schools are not places where their voices will be welcomed or acknowledged. The responsibility lies with schools and education-providers to challenge these assumptions by working to actively engage Aboriginal communities in schools. Yet many teachers and principals are either unwilling or unable to do this effectively. Research may be needed to identify strategies which can be employed at the school level on ways to improve numeracy achievement of Aboriginal students. The findings of this study indicate that such research would need to include working on ways for schools, principals and teachers to encourage and facilitate this process of engagement. However, such engagement should not be seen as a one-way process, but rather one where school and community make attempts to engage with each other, thus reducing the ‘separateness’ of school and community. Such structured research could take the form of Action research.

Recommendation 21

That future research be commissioned to work with schools on strategies to improve numeracy achievement of Aboriginal students.

i. That such research works with schools and communities on developing ways for schools to better engage Aboriginal communities in the education process, including school governance and that such research also investigates ways for school personnel to better engage with the Aboriginal communities inside and outside of the school.

ii. That research be encouraged to explore existing models that have enabled schools and Aboriginal communities to more effectively engage. One model which may inform this process is TRIBES ©.

Mathematics is widely seen as a culturally-defined discipline specific to Western societies. However, innovative curriculum development at Site 10 has successfully aligned Aboriginal concepts and knowledge with Western mathematical concepts and knowledge. The Aboriginal knowledge in this case is quite specific to this particular Aboriginal language group, so does not lend itself to be easily applied to many other Aboriginal contexts. However, the methods employed to develop this alignment may provide insights into ways that mathematics and
Aboriginal knowledge can be aligned in curriculum elsewhere. In some more traditionally based communities where Aboriginal concepts and knowledge are documented and visible, this process may be duplicated. In other communities, including urban communities, mathematical concepts relating to number and measurement using number may not be given the same importance as they are in a Western sense. However, in these communities, mathematical judgements may be still seen as culturally important. There is scope to explore Aboriginal concepts and knowledge from an ethnomathematical perspective, which may then be used to inform the development of curriculum and teacher training for both individuals and a range of Aboriginal contexts.

**Recommendation 22**

That resources be directed to research that will explore processes for incorporation of documented and specific Aboriginal concepts and knowledge into mathematics curriculum. This may need to include investigation of concepts and knowledge which is both generic and specific to particular Aboriginal groups.

**Recommendation 23**

That resources be directed to research that will explore the existence of Aboriginal concepts and knowledge that relate to how mathematical judgements are made according to Aboriginal world views. This research may then inform curriculum development of models of mathematics curriculum and numeracy teaching that will meaningfully include Aboriginal perspectives. This may need to include investigation of concepts and knowledge which is both generic and specific to particular Aboriginal groups.
XV. Conclusion

Some may infer from this document that its conclusions have little to do with numeracy. This would be an error. The contention in the school community at Site 10, that it is more important to focus resources on literacy than numeracy because numeracy is dependent on literacy, while simplistic, may have some merit as mathematics (and numeracy) is culture-based and therefore language dependent. The expressed belief at Site 10 that if you get the literacy right, the numeracy will follow, is even more simplistic and contentious. The school, of course still teaches numeracy, but the emphasis on literacy may also reflect the school community’s perceptions of their political role. Certainly many of the strategies suggested by this research as likely to improve the numeracy achievement of Aboriginal students are also likely to improve their achievement in other learning areas, in literacy and in academic achievement generally. This, however, should not be seen as devaluing the research outcomes, but rather as evidence that improving numeracy achievement of Aboriginal students concerns a much broader spectrum of issues than those specifically associated with numeracy teaching strategies. The difficult solutions proposed by this research are likely to improve the school achievement of Aboriginal students and therefore improve their numeracy achievement.

Rather than the idea that a quick-fix list of classroom activities for teachers that can magically enable them to transfer mathematical knowledge to their students, solutions lie embedded in challenging this paradigm. The difficulty is not that teachers don’t know how to teach mathematics; the difficulty is not that Aboriginal students learn mathematics differently; the difficulty appears to be in the way in which teachers, schools and organisations approach the task of enabling education for Aboriginal students. Rather than the concept of education providers providing and clients either accepting, rejecting or being incapable of receiving this offering, educators need to recognise that education can be a communicative process, involving meaningful interaction and knowledge exchange between parties. This requires a preparedness to acknowledge and accept alternate values, ways of doing business and world views. In turn, this requires a shift in the way in which power and influence are balanced in classrooms, in schools, in organisations and in society.

It is hardly surprising that the numeracy and other achievement of Aboriginal students in schools such as Sites 8, 9 and 10 is high and increasing in comparison to that of Aboriginal students elsewhere, particularly when compared to students at Sites 1, 2 and 4. In the school communities at Sites 8,9 and 10, there is acknowledgement that being Aboriginal and its associated ways of seeing things and going about things is valid. This is often despite the physical proximity of wider (white) communities where this acknowledgement is not prevalent and which are characterised by racism directed towards the Aboriginal communities. At Sites 1, 2 and 4, despite school and organisational policies which aim to acknowledge Aboriginal validity, the influence of those outside communities appears to pervade the school community, somewhat regardless of whether Aboriginal students constitute a minority or a majority in the school, limiting the transfer of that policy into effective practice. This appears to be due to differences in the distribution of power; here Aboriginal communities have less power to act independently and “white” communities hold not only control of resources, but may also hold paternalistic notions of who is best qualified to make decisions for whom. Such notions may result in a self-fulfilling prophecy based on “deficit theory”, characterised by lower expectations for Aboriginal people’s capability as learners and as citizens. It is not clear to what extent these Aboriginal communities hegemonically accept or comply with this prophecy, although expectations for student
achievement appeared to be lower from within Aboriginal communities at Sites 1 & 4 (Site 2 data was incomplete), which had little influence over their children’s education. Aboriginal students and communities are less likely to feel validated or accepted in such school environments (as described above) and may in turn not see the school as working in their interest. This perspective can elicit a range of responses, but whether Aboriginal communities accept schools as valid or not, the reality, especially in rural and remote locations, is that they often have few other options for providing educational opportunities for their children.

It is possible that some commentators may also see as apologetic this study’s contention that recognition of community definitions of numeracy achievement may be equally as legitimate and important as externally applied definitions. Alternatively, they may be seen as an excuse for continued poor performance by Aboriginal students in numeracy. This is not the case as the research has shown that where those internal definitions are allowed to inform policy and practice, either by Aboriginal communities having control or by being given external validity and support, numeracy achievement is greater, by both internal and external standards.

Although the term ‘achievement’ may take on a slightly different interpretation in some Aboriginal contexts, as measured by external standards it will still be valued by Aboriginal communities in a Western sense. This is the case because it is a necessary pathway to improved access to training, employment, life-chances and political influence. Also, it is one criterion on which these communities will be judged by the wider community. However, the internalised cultural security provided by community-consent and community self-determination may be seen as an equally, and in some cases more important, outcome. It may also be a vital link in the process of developing community sustainability. While political and social processes outside of the influence of education have a large bearing on the development of healthy, sustainable communities, healthy schools are an integral part of that complex. Educators have a responsibility to not only challenge systems and practices that may inhibit the development of healthy schools and communities, but also to actively support schools and communities that are healing themselves. In this way, we can learn from their lessons and thus educate others.
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