UNIVERSITY OF CANBERRA

Celebrating success:

Numeracy in remote Indigenous contexts

What makes for successful numeracy education in remote Indigenous contexts: An ethnographic case study approach

Stories on remote indigenous mathematics successes compiled by Professor Robyn Jorgensen

2013

The Influence of Boarding on Learning

Woolaning Homeland Christian College

The college was originally established in 2002 after a realisation of the local people who were concerned about their children receiving a good education. As is common in many Aboriginal communities, there were many issues that had thwarted the education enterprise. Most notably, children in community were not attending school. It was thought that the college offered a better option for education, by taking students from the communities to a remote site where there were no distractions, and where basic needs for food, shelter, and safety were met. Initially, the college drew students from particular communities and, given their history of very low attendance, the adolescent learners (many of whom had gone through ceremony and thus were regarded as adults) were significantly behind the norms for educational achievement for students of their age. However, over more recent years, the student cohort has been drawn from a wider area and some students now attend from communities with better results in literacy and numeracy.

The college has a strong Christian faith underpinning its foundations and with this comes a belief among members of staff that they are doing God's work at the school. The strong Christian ethos is seen by staff to support and sustain them in their work, and to help them to remain at the college. Two of the staff members were in the foundation year, while many of the other members have been at the school for extended periods of time. This staff stability is rather unique in remote education. Similarly, despite the fact that there were three interim principals in 2012, there is a history of long-term principals. This stability in staff has provided a coherence to the school in terms of programs; history; and working with students, their families and communities. Stability, or the lack of change, was valued by staff, and benefited their relationship with students and the wider communities. Students were confident that teachers would be at school when they returned after break. The sense of belonging to a community was very tangible and expressed (and valued) by the staff.

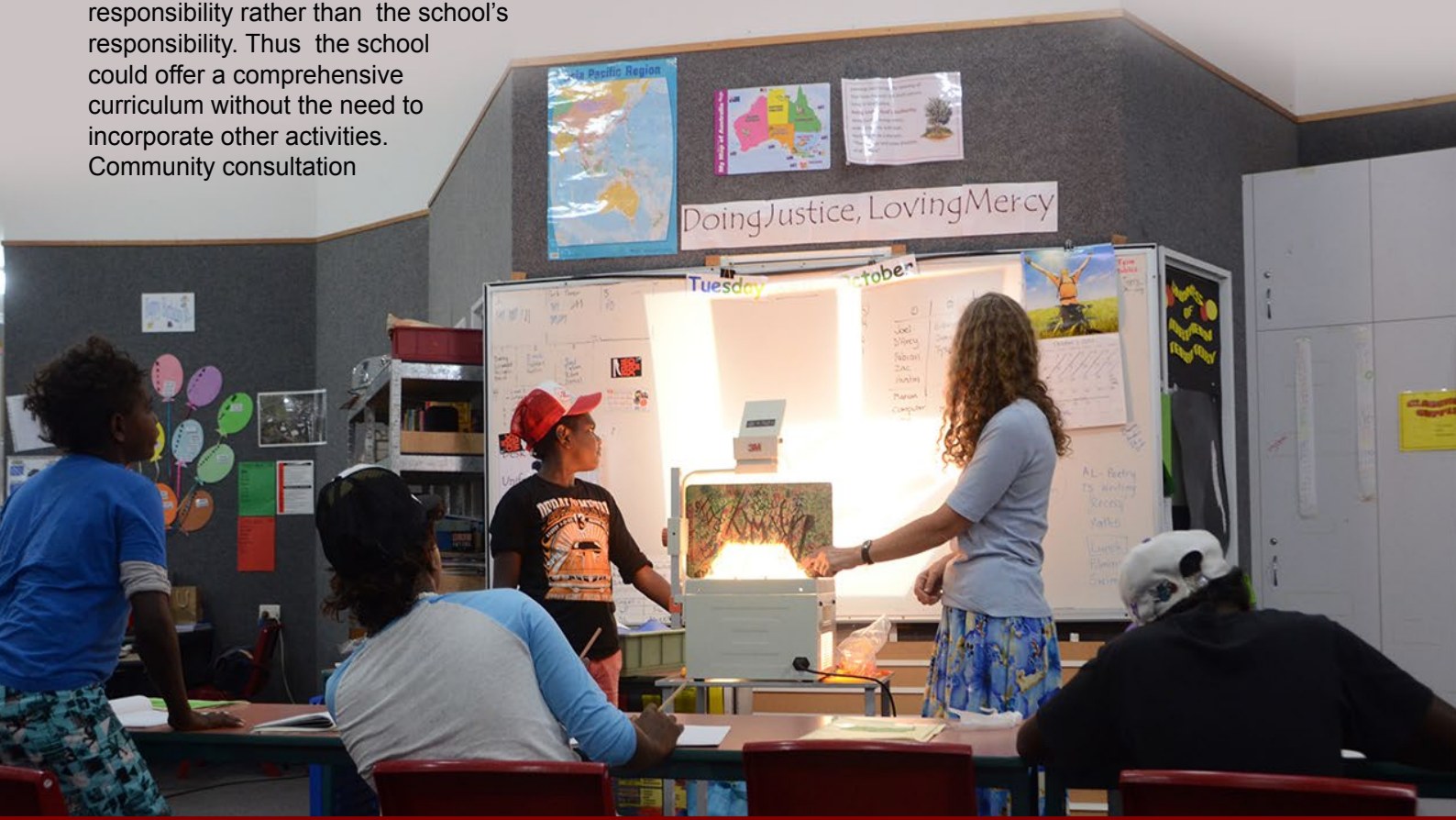
Literacy and numeracy are the two core learning areas at the college, and they take priority in the timetable. Many of the students are seen as adults in their communities, and with this comes responsibility about interactions. Relations and interactions with others are frequently bounded by cultural rules, and having mixed-gender classes had created situations where some lads could not talk or interact with the young women. In addition, mixed-gender classes created considerable showing off, teasing, and shaming within and between genders. For this reason, since 2013, the early intake of students has been separated by gender.

In single-sex classes, behaviour is less disruptive and, consequently, these classes are thought to assist with students' socialisation into school practices. The girls in particular appear to benefit from the single-sex classes; they work constructively without the boys present. Although the boys' class is more rowdy than the girls' class, it is more settled than the mixed-gender classes were. Teachers are assigned to specialise in either literacy or numeracy, and they rotate between the boys' and girls' classes, in order to keep the workload manageable.

The first two sessions of each day are for literacy and numeracy. The final session is for other curriculum areas, such as art, science or social studies. Cultural activities are seen by the communities to be their responsibility rather than the school's responsibility. Thus the school could offer a comprehensive curriculum without the need to incorporate other activities. Community consultation had yielded the view that families wanted the students to be literate and numerate so that they could walk in both an Aboriginal world with learnings acquired from home, and a Whitefella world that they acquired from school.

Drawing on long-standing practices developed by staff, the school has established a senior class that students enter when they reach a certain level of achievement, not when they reach a certain age. Students appreciate the status of being in this class and it offers a goal for them to achieve. The seniors wear a different shirt that distinguishes them from their peers, and this helps motivate and engage the students. The senior class draws on the NTOEC which has curriculum materials especially written for remote learners. If this is completed satisfactorily, then students are accredited with Year 12 achievement.

Currently, students are tested upon entry and then assigned to a class. In the recent past, the college has attracted students from communities where the schools had experienced good levels of success, and those students quickly progressed through the entry class. However, many of the students at Woolaning have very poor records of attendance at schools in the community; thus, many students who attend Woolaning do so because the boarding ensures that they attend school.



Defining success

Drawing students from many communities with very diverse attendance and educational experiences often means that some students enter Woolaning with very low levels of literacy and numeracy.

The college offers a unique boarding program where students attend for 6 terms, each lasting 6 weeks. This is outside the funding agreements (for 4 terms) so the extra transportation costs to and from community are borne by the school. There is a strong commitment to this structure, as it was felt that the 6-week term caused less homesickness than did the standard 10-week term, and thus was less likely to negatively affect learning and well-being. At the start of each term, staff members visit communities to collect students to bring them to the college. Ideally, students should come each term but this is not always the case. In 2013, only one student had 100% attendance. However, approximately 83% of students achieved 80% or more attendance, which is defined by DEEWR as the minimal requirement for sustained learning.

When considering success at the college, the various starting points of students need to be acknowledged. Value adding is a most appropriate measure of progress given the diversity among the students. Although data vary, there is a strong correlation (unsurprisingly) between regular attendance and achievement. Examination of the data showed that students who attended regularly showed gains in their numeracy learning that were above what could be expected. Students are tested on intake and then towards the end of each semester. A nationally accredited testing system that calculates numeracy age equivalence showed that regular attendees gained between 2 and 2.5 years in numeracy age in a 1-year period. Conversely, students who attended irregularly did not show gains in their numeracy age, and many showed a decline. The data below illustrate typical stories in terms of value adding.

Stability and change

The school has enjoyed a very stable teacher and principal staff. Most teachers have stayed for long periods. All the current teachers have been at the school for more than 5 years, and the two founding teachers remained at the school for 12 years. This stability brings a strong sense of what has worked historically and what elements need to change. This does not mean, however, that teachers are complacent about their practice. Indeed, they continually try new ideas but preserve the elements that they know have been successful. For example, the long-standing teachers entered the context with a belief about elements of good numeracy practice, such as group work. They learnt, however, that some practices do not work well with the students.

Stability in Numeracy Practices

Keeping practices consistent is foundational to Woolaning's approach to education. Consistency was viewed as necessary, because students experience much change in their home lives. Past experiences had shown that changes caused confusion for the students and frequently resulted in disruptive behaviour and / or disengagement. Consequently, if changes were to be implemented, considerable scaffolding and forewarning was necessary.

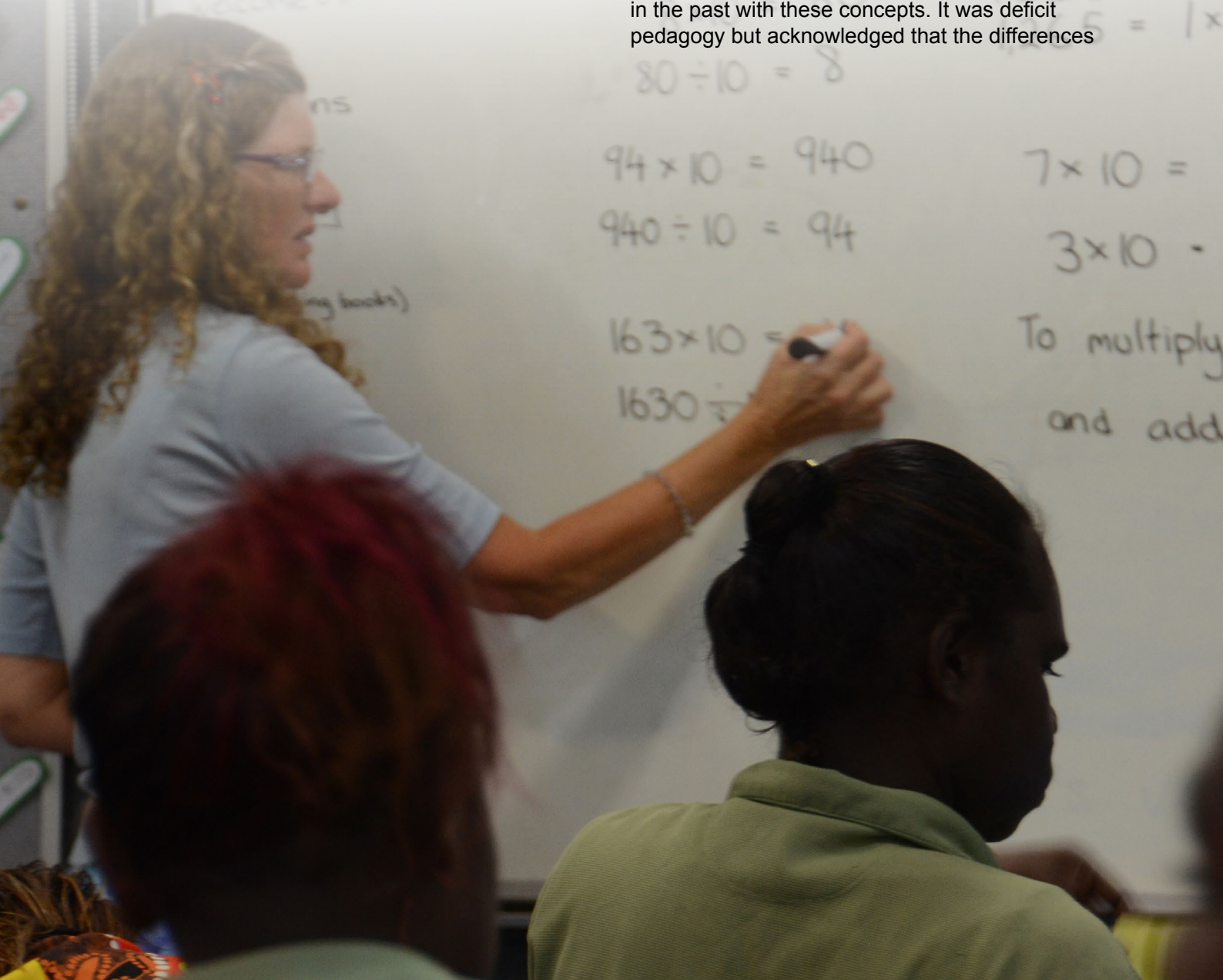
Stability of staff meant that staff were able to refer to previous times when siblings or other relations of current students attended the school.

This created links that the student valued: Knowing that other students, including relatives, had done the same work gave an authenticity to the activity for the students.

Numeracy lessons embraced a traditional view of pedagogy so that students were explicitly taught concepts. This approached seemed to suit the learning needs of the students since there was no second guessing about teacher intent. Teachers used worksheets as part of the lesson as they found the students liked the sense of "completing" something they could see and enjoyed having a tangible record of their work. The students also did not have to write in their books. For these reasons, worksheets were used as a component of the lesson, but certainly not as the main learning activity.

The practice for numeracy education has evolved into the following system:

Lessons begin with revision but with the intent and knowledge that the students may have succeeded in the past with these concepts. It was deficit pedagogy but acknowledged that the differences



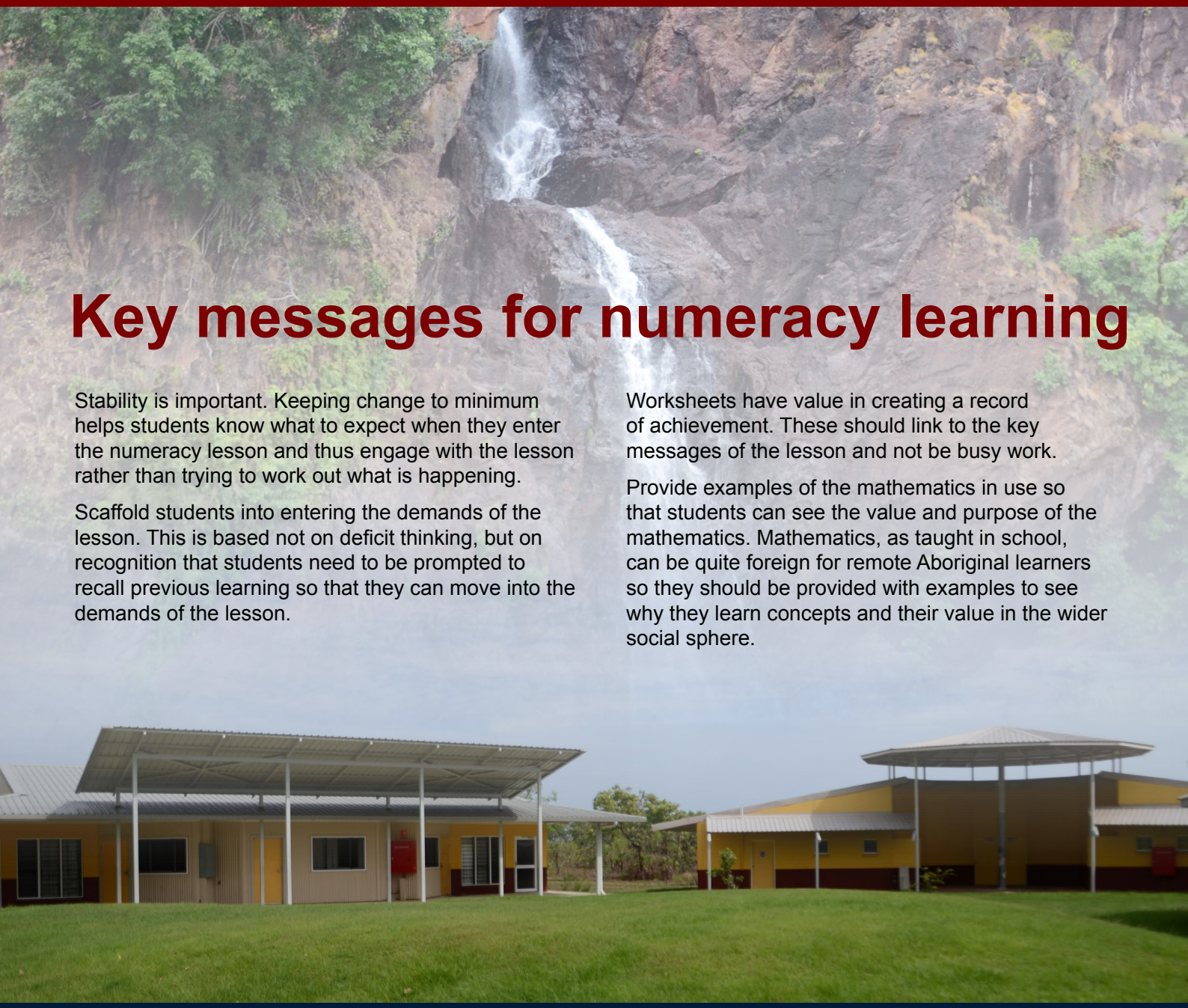
in worldviews made retention of school knowledge somewhat challenging. Many of the concepts taught in mathematics are not practised in students' home culture or language, so they are readily forgotten. Consequently, students need to be clued back into these learnings if they are to move into more complex learnings. For example, if the lesson were on place value, the revision activity drew on students' knowledge of grouping in 10s.

Lessons then transition into the intended learning. One activity had a container of seeds and students had to estimate how many there were. Estimates were recorded. Students then collectively worked on counting the seeds, first placing groups of tens into egg cartons (cut back to ten rather than twelve indentations) so as to create hundreds. When these were all used, the students created piles of 10s and, when this was completed, they grouped the seeds into 100s. Throughout this they shared spare seeds to create whole groups. Upon completion, the groups of hundreds, tens, and ones were recorded in words, then on a chart. This revised the number system and the place value chart, enabling students to move to the next phase, where they multiplied and divided 10s and 100s. Revising and building concepts were foundational to the pedagogy.

A worksheet was used in which the students practised activities involving multiplying and dividing. The purpose of the worksheet was to articulate a pattern and, importantly, to address misconceptions. In this case the misconception arose that 300/3 was 3 so 3000/3 was also 3. The teacher spent time problematising this thinking and addressing the misconception.

Links between the mathematics being taught and the world beyond schools were embellished in lessons. For many students, the need for mathematics in their community was limited. Consequently, the teaching involved making links and justifying the teaching of the content. Not doing this kept mathematical concepts in a very abstract form. Teachers recognised that students' home culture was different from their school culture, and that this created challenges for learning abstract knowledge. For this reason, the teaching provided opportunities for learning why maths was relevant. For example, the students undertook "The Biggest Morning Tea" challenge where they had to budget, create balance sheets, bake the food and so forth.

Opportunistic affordances were also presented through the boarding context. The house parents would undertake baking activities, and the shop keeper would ask students how much change could be expected.



Key messages for numeracy learning

Stability is important. Keeping change to minimum helps students know what to expect when they enter the numeracy lesson and thus engage with the lesson rather than trying to work out what is happening.

Scaffold students into entering the demands of the lesson. This is based not on deficit thinking, but on recognition that students need to be prompted to recall previous learning so that they can move into the demands of the lesson.

Worksheets have value in creating a record of achievement. These should link to the key messages of the lesson and not be busy work.

Provide examples of the mathematics in use so that students can see the value and purpose of the mathematics. Mathematics, as taught in school, can be quite foreign for remote Aboriginal learners so they should be provided with examples to see why they learn concepts and their value in the wider social sphere.

School demographics

Year range	U,7-12	FTE teaching staff	6
Total enrolments	67	Non-teaching staff	13
Location	Remote	FTE non-teaching staff	12.3
ICSEA (school)	598	Indigenous students %	100%
ICSEA (distribution of students) *(bottom quarter to top quarter)*	100% in lowest quarter	Enrolments: Girls/Boys	37/30
		Language background other than English	—
Teaching staff	6	Student attendance rate %	83%

Contact: Robyn Jorgensen | robyn.jorgensen@canberra.edu.au