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

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Teachers and AEWs as Partners in the Teaching Process

Yiyili Aboriginal Community School

Yiyili Community was established in 1981 with the purchase of Louisa Downs Station by the Louisa Downs Pastoral Aboriginal Corporation. The Station, located half way between Fitzroy Crossing and Halls Creek, is still owned and operated by Yiyili community members. The community is a short distance from the highway and is clearly marked through a large billboard advertising the Gallery housed in the community.

A group of mainly Gooniyandi people shifted from the station camp at Louisa Downs Homestead to set up a new camp approximately 7km to the east. The school and the community were established simultaneously, with a mobile Kindergarten teacher employed to conduct classes in a bough shed. In 1986 Yiyili was granted an excision allowing permanent housing and a school building to be erected.

Yiyili Aboriginal Community School caters for students in Prep to Year 10 from Yiyili and the surrounding outstations of Ganinyi, Girriyoowa, Goolgaradah, Kurinyjarn, and Rocky Springs. A daily bus service operated by the school collects students from other nearby communities including Moongardie 30km away. Students who progress beyond Year 10 attend boarding school in Darwin and other larger towns.

In 1990 a building that houses the clinic and store was built, and a community office building was erected in 1996. Yiyili also has a vibrant arts community and gallery named Laarri, which was officially opened in 1998. People from the community work out of the Art studios that are housed at the school site. The Gallery is visited by many tourists passing through the region. Yiyili is also home to the successful country rock band the 'Walkabout Boys'.

The language spoken by the majority of community members is Kriol. Although Gooniyandi is the traditional language, there are few (mainly the elderly) that are fluent speakers.

The case study outlined here is one that occurred in the Yiyili Community with a single teacher. The process, over time, grew to other teachers and AEWs in the school, and has now flowed on to another school.

Defining Success

There are two measures of success with this story. The first focuses on the students, while the second focuses on the teacher/AEW.

Through the processes described in this story, the AEWs become empowered partners in mathematical success – for the students and for themselves. In the context of this case study, a greater emphasis on the 'success' of the partnerships with community members underpins the story.

Building Successful Teaching Partnerships

Building successful partnerships takes time and this story maps a long term (5 year) partnership in which the teacher worked closely with her AEW to build a very strong and genuine teaching partnership. At the outset, the partnership has taken time to develop, and for trust to be developed between the teachers and AEWs. Being open to alternative interpretations of behaviours has been a feature of the work between the partners.

Initial starting point: AEWs for Translation and Behaviour

As in many contexts described in the case studies arising from the larger project, the AEWs' roles in the classroom frequently centres on managing student behavior and in translating between what the teacher has said and the language/s spoken by the students. Focusing on translation between Standard Australian English and the language/s spoken by the students is seen to be important so that the students can make sense of what has been said, in terms of instructions, being explicit about expectations as well as around the mathematical demands of tasks.

The AEW often knows the students well and may be better able to discipline and control the students, particularly when they can speak to them in their home language. The AEW may be aware of issues within the home or wider community that may be impacting on student behavior and hence be in a better position to understand students and to find appropriate ways to work with students.

Since the language spoken in the classroom is Standard Australian English, which often only spoken at school, students enter the classroom with English being a second, third or even foreign language. When the AEW has a good grasp of SAE, he/she is able to help translate what the teacher has said into a language (either the home language or Kriol) that can support the student to understand the instructions, the concepts or expectations for learning. The translation between home language/s and SAE help the students to engage with the mathematics, and to build success.

Catalyst for Change

The roles of behavior management and translator are common but this was a low level of role within the classroom and the teacher saw much greater potential in her AEWs. The teacher sought to involve them more in the classroom and to work with students in the mathematics lessons. Rather than being 'disciplinarians' or 'translators', a new role was envisaged for the AEWs where they would have a greater role in the classroom in terms of supporting the students in their academic (and mathematical) work.

The initial change for engaging the AEWs more in the classroom was to assign them to small groups within the classroom activities so that they would have their own groups with which to work.

When AEWs were asked to go beyond the 'disciplinarian' and 'translator' roles to help with more substantive tasks, they started to come later to school. Rather than see this as something wrong with the AEWs, the teacher asked herself why there was this change in behaviour among the AEWs. By genuinely asking what the problem was, she was told that they did not feel comfortable with the lessons and needed to know more – they wanted to be successful but did not know the mathematics or how to do the lessons. Rather than feel empowered with having their small groups, they felt disempowered through not knowing how to work with the students. The AEWs needed to be taken through the activities so that they were very clear on what to do. It was not enough to just say this is what I want you to do. The AEWs needed more guidance about how to run the activities within the group and the mathematical demands of the tasks.

One: Commencing Co-planning

In order to support the AEWs with the transition to greater involvement in the classroom activities, time was sought to work with the AEWs and support their learning. The Principal reorganized the school timetable so that each teacher could have 30 minutes planning time with the AEWs to work through the activities that they wanted the AEWs to undertake. The meetings were held in the classrooms where the AEWs felt comfortable. The classrooms were seen to be a neutral but shared space where both the teachers and AEWs were co-owners of that space. The meetings were not official meetings but were a much more supportive meeting where the AEWs could be skilled up in the activities per se, but also the learning intent of the activities. The AEWs needed to know what the outcome of the lesson/activity would be; how the activity would be undertaken and how the AEW could work effectively with the students.

The initial allocation of 30 minutes planning time gave the teachers and AEWs a specific time to give to planning but also to develop skills of co-planning and

working together. Over time, the 'official 30 mins' was not necessary as the skills for planning had become a practice that both the AEWs and the teacher/s could effectively undertake. However, the initial allocation of time was necessary to commence a culture of planning.

Once the AEWs knew what the activity was that they were to do and felt comfortable in delivering the activity, their confidence increased so that less time was needed for meetings, and they were more assured in themselves in delivering activities.

Two: Tapping into the Strengths and Interests of the AEWs

As the AEWs grew in confidence in working in small groups, they also grew in confidence in talking with their teacher about their own interests. The teacher became genuinely interested in what they liked to do, what they saw as their strengths, and what they thought would help the students. Drawing on these conversations, activities were planned that tapped into the strengths of the AEWs. So if the AEW liked fishing, then the teacher, with the AEW, would use this interest to illustrate concepts to the students. For example, they could tell a story about fishing where the AEW caught a larger fish (in Kriol 'biggest wan') than the teacher in order to teach the concept of greater/less than.

While their original role had been about translation between SAE and home language, the AEWs also saw a strong need for this to be more formalized and structured rather than the ad hoc manner of their previous work. AEWs were experts in the home language but their expanded role in the classroom also gave legitimacy to their role as an educator in language (rather than just a translator). The AEWs presence in the classroom was moving from a peripheral role, to a much more central role as both a group leader as well as a key role in code-switching between the languages used in the mathematics lessons.

Three: Creating Stories in Kriol and English

The transition into a more formal teaching partnership emerged around language and mathematics. The teacher and AEW assumed central roles as co-teachers at the front of the classroom, collectively working through mathematics resources. The teacher would read the text in SAE. The AEW would then translate the text into Kriol (or home language or between both Kriol/Home language) so that code switching became a more formal and structured process. Students could hear the teacher articulate mathematical concepts in SAE in the mathematics register, and then hear the translation of those mathematics concepts and processes into their home language. The explicit code-switching by the teacher and AEW enabled students to access concepts in both language forms.

The AEW took a lead role in the translation of the mathematics text into the other languages of the students. This resulted in a more explicit teaching of the language of mathematics – both the terms and the processes being used. Many mathematics terms are not in Kriol or the home language of the students, so the mathematical terms remained. But the AEW could now scaffold the concepts in Kriol (or the home language) so that, for example, positional terms could be expressed in Kriol with the mathematical term being emphasized. For example, during lessons on mapping, the teacher and AEW would create interactive stories about going to the store, with the AEW explaining that the students would need to go across the road (in Kriol 'sideway') in order to arrive at the store. In this process, the students were strongly scaffolded in transitioning from their home language into the formal mathematics register.

When concepts were being explained, the AEW could explain these in the home language and create bridges between the mathematical concepts (such as addition) and the ways that such processes would be explained in the home language (put them together but said in Kriol). This gave the students greater access to meaning, and helped with the transition from the home language into both the SAE as well as the mathematical register.

Four: Explicit Teaching of Code Switching

Through the interaction with the teacher and the AEW with regard to the scaffolding of the texts, the students come to learn the processes of code switching in an explicit way. The teacher, whose command of the home language/s is minimal or nonexistent, relies on the teaching skills of the AEW. The AEW is able to explain and model to the students how to negotiate mathematical meaning through which ever language makes the process of meaning making easier. It was the AEW who took responsibility for explicit teaching of code switching.

The teacher worked closely with the AEW to help them – collectively – to identify the specific language problems that students were likely to encounter.

A typical problem faced in the classroom is words that do not have direct translations, particularly those that describe quantities, such as the word 'enough'. In the language of mathematics it refers to having as many or as much as required. In Kriol however, it is used to refer to distance as 'good enough' means a 'long way'. So, a problem posed to students that asks how do they know when they have enough of something, when encoded into the mathematics register it requires the students to use arithmetic, but when interpreted within a Kriol framing, it is interpreted in a more spatial sense.

Enabling students to see the difference between the two codes (mathematics and Kriol) helps them to correctly identify the correct genre from which to interpret the question or task.

Being able to move between the two registers – SAE and Kriol – enables students to successfully navigate between the two different forms, and specific (and different) meanings of words within a particular register. The proficiency of the AEW to navigate, and make explicit to the students, between the two forms is critical to making the links between the two languages.

Five: Seeking Input from AEWs around Language Issues in Mathematics

Collectively the teacher and AEW began to identify specific language challenges for the students as they moved between codes. The AEWs recognized the specific language concerns and barriers faced by the students. For example some of the concepts/terms in mathematics, such as 'each' or 'equals', do not have Kriol or the home language equivalents. Other terms may have approximate equivalents, so the AEWs used Kriol ways of speaking to create equivalent meanings for the students.

Mathematical term	Kriol way of saying
Over	On top way la
Same	Same same
Before	In front way la / Behind la
Little	liliwan
Big	Bigiswan
To go across	Sideway

By creating a process whereby mathematical terms could be referred to in Kriol (or the home language), students were now able to access the embedded mathematical meaning within those terms.

Six: Professional Learning

The processes outlined in this case study have been shared across a number of forums to model to other schools. Initially, the teacher took the lead, but as the AEWs gained confidence in what they were achieving in the school, and with the teacher scaffolding the presentation process, the AEWs have also gained in confidence in their presentation skills. The teaching partners have presented their work at many forums, including national conference, teacher professional development, AICS conferences and with other forums. Over time, the AEWs have grown in their confidence with regard to knowledge of the scaffolding in code switching and their own confidence to present in public forums that they are now able to present without the teacher. They have taken ownership of this important strategy in supporting their students to gain access to mathematics.

The AEWs also engaged in further learning through Cert III and Cert IV qualifications.

Seven: Future Directions

As the AEWs had become empowered in the code switching process, they became more confident in their interactions with teachers. They are the ones who remain in community and at the school when teachers move on. The confidence of the AEWs in their knowledge and skills - of both the code switching process and their capacity to present their work – will enable them to work with incoming teachers, and to model their approach to others who are new to the school.

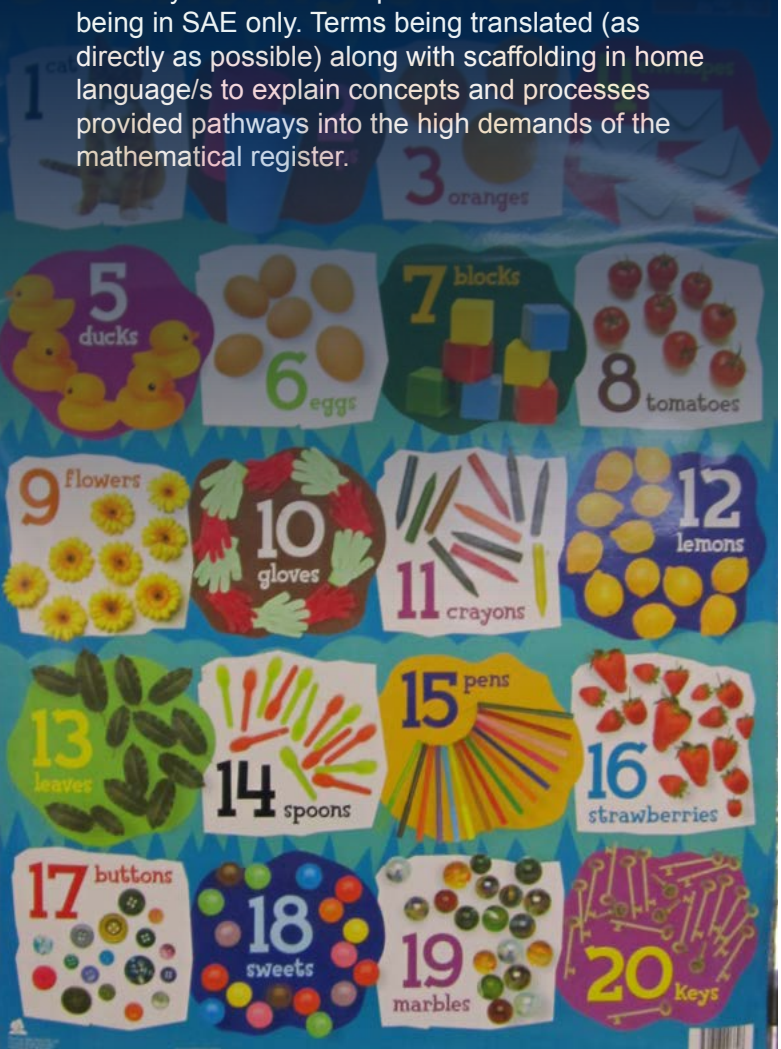
Benefits for Learning and Learners

The processes adopted by the teacher and AEW benefitted all learners – students, AEW and teacher. In this case, all parties learned considerably from each other.

Where AEWs had been initially employed to manage behavior, they were limited in what they could talk to parents and families within the community. Often their feedback to families centred on the behaviours of the students. In this expanded model of co-teaching, the AEWs now knew considerably more about mathematics and were able to share with families about what was being taught, how culture and language were being incorporated into the teaching of mathematics, and how students were progressing in their mathematics learning. This was a much fuller account of learning – for all parties. The AEWs' role had changed from being a disciplinarian to that of co-teacher.

Within the context of the classroom, having the teacher and AEW working together as a teaching team models a strong partnership between the teachers and community.

The strength of the AEW in home language enabled a greater access to the discourse of mathematics that may not have been possible with instruction being in SAE only. Terms being translated (as directly as possible) along with scaffolding in home language/s to explain concepts and processes provided pathways into the high demands of the mathematical register.



Advice to Teachers

Change takes time. The process outlined in this story took five years. Believing in the possibilities and then finding ways to achieve what is desired takes times and the belief in the outcomes.

The teacher worked closely with the AEWs and throughout the process, and took a positive affirmative approach to working with the AEWs. Rather than see problems or failings throughout the process as something that the AEWs did not or could not do, she constantly sought feedback to try to understand the issues that were creating barriers and to find ways to redress problems. This took time, and time to develop trust and rapport with the AEWs.

Seeking and developing strategies to enable change to happen (rather than focus on what 'can't' be done enables change to happen. The strategies that may be required initially to enable change to occur may become redundant as the practices become embedded. Making spaces available to support the AEWs (and teachers) to implement change is essential. But equally, it is important to note that the spaces that were originally created (such as the 30 minute planning) may not be needed as AEWs and teachers learn together. Being reflective on the process as it unfolds enables good choices to be made.

Providing access to further education, such as Cert III and Cert IV, enabled the AEWs to be further empowered as they were learning skills to support their work in the classroom.

Model for Quality Learning

General Principle	Implications for Mathematics	Focused Strategies
AEWs are the backbone of the community and often remain in community after teachers leave.	Build the teaching capacity of the AEWs to teach mathematics in both small groups and whole class teaching episodes.	• Create opportunities for the AEWs to be 'teachers of mathematics' in the classroom. • Create opportunities to support AEWs to become teaching partners within the mathematics classroom.
Change takes time – be prepared to take time to embed the practice.	AEWs need to build their mathematics knowledge and their pedagogical knowledge over time.	• Build trust and rapport with AEWs to enable productive dialogue. • Listen to AEWs input and concerns and build these into the teaching approach. • Support the learning of AEWs to build their confidence in mathematics and pedagogy so that they take ownership of the approach.
Switching codes helps to build mathematical understanding.	AEWs have a strong background in home languages that can support mathematics learning.	• AEWs create resources to scaffold learners in the language of mathematics. • AEWs identify ways of speaking in Kriol or home language to enable learners to transition into the register of school mathematics. • AEWs model and explicitly teach code-switching in mathematics.

Key Messages – Summary

Building positive relationships between AEWs and teachers is important to creating success and benefits everyone in the school community. Be reflexive and ask genuine questions so that positive relationships can be created.

Change takes time. Take small steps that build towards success with trust and respect.

Recognise that many barriers to understanding the language of mathematics are translation or language-based rather than purely conceptual. Creating opportunities to switch between languages enables students (and AEWs) to create opportunities for meaning-making in mathematics.

AEWs often remain in community beyond the time spent by teachers. Building capacity of the AEWs in quality mathematics teaching and learning helps to build and maintain quality learning for the students, and create valued spaces for the AEWs.

School Demographics

Year range	P-10	FTE teaching staff	7.5
Total enrolments	69	Non-teaching staff	13
Location	Very Remote	FTE non-teaching staff	11.9
ICSEA (school)	621	Indigenous students %	100%
ICSEA (distribution of students) *(bottom quarter to top quarter)*	88% | 8% | 4% | 0%	Enrolments: Girls/Boys	35/34
		Language background other than English	78%
Teaching staff	8	Student attendance rate %	75%

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