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

2014

Multi-Age Classrooms and Early Career Teachers

Burketown State School

Located on the Gulf of Carpentaria, Located on the Gulf of Carpentaria, Burketown is an isolated community located on the Albert River. It is the home for the Burke Shire Council, whose offices are located in the town centre. The town bears the name of Thomas Burke, co-leader of the ill-fated Burke and Wills expedition of the early 1860s which sought to be the first European explorers to navigate a south-north crossing of the continent. The town was officially established in 1865. By the mid-1860s, several large cattle stations were established in the area – most notably Gregory Downs, Floraville, and Donors Hill – and Burketown served as a port and supply depot. By 1865, the town had a population of 65, a hotel and a store were being built and the first post office was opened. The town's early history was very much a frontier town with gun-toting shopkeepers. The town fell foul to tropical 'fevers' (believed to be typhoid) that killed many of the townspeople and forced many to relocate to Mornington Island or Normanton. On top of the fever, a cyclone in 1887 devastated most of the town.

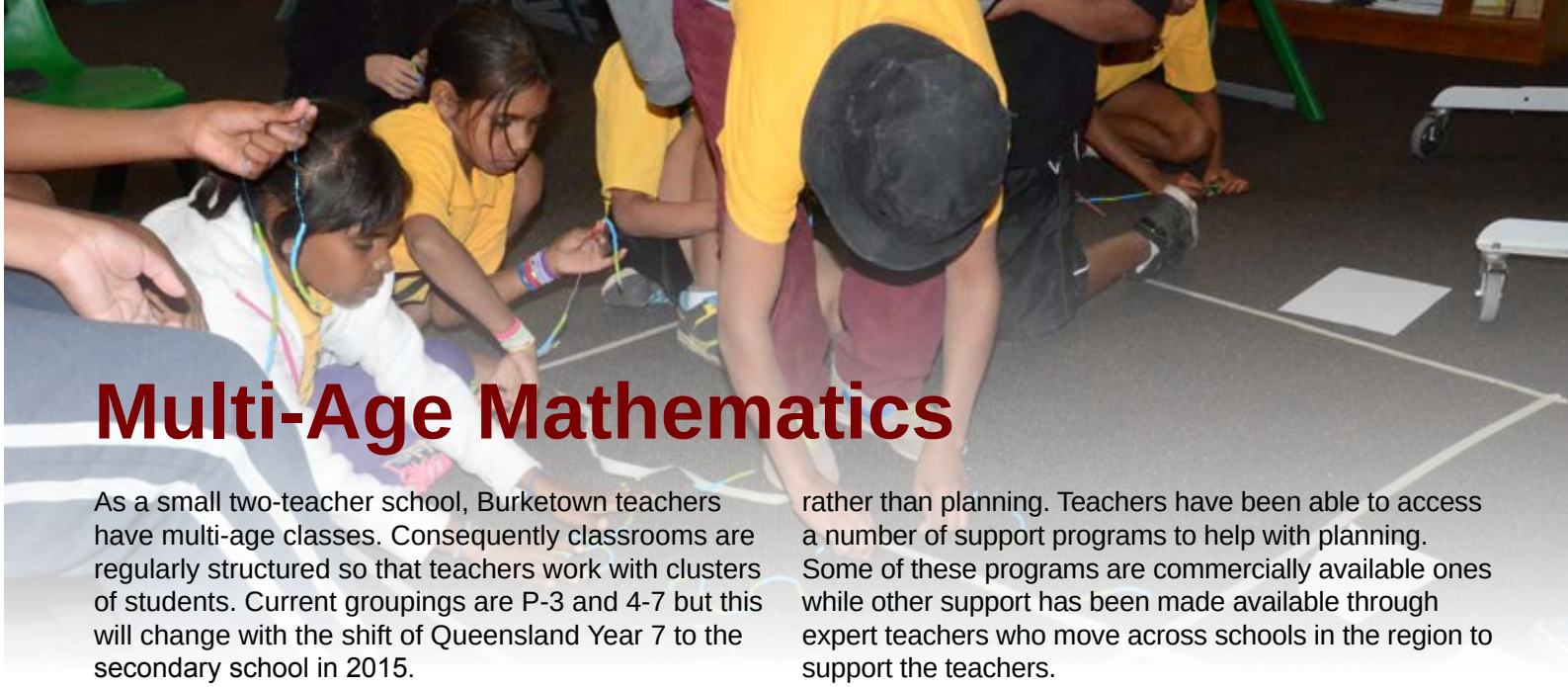
While Burketown has a long history, the only surviving building of its past is now used as the Tourist Information Centre. The historical 92 year old Burketown Hotel was razed in a fire in 2012 and the famous Landsborough Tree – where explorer Landsborough buried a food supply – was burnt down in 2002. Burketown is well known for its links

to fishing, and the annual “World Champion Barrumundi Fishing” competition is held over the Easter holiday period. During the period from August to November, the region is famous for the rare meteorological formations of a long rolling cloud known as “Morning Glory”. This event brings many gliders and light plane enthusiasts into the area. The area is also known for the many salt water crocodiles that live in the local river systems. There are two main mobs in the Burketown community – the Waanyi and the Gungalida .

Burketown State School was established in 1888 and is one of the few Band 5 schools in Queensland with two teachers and a full-time principal. There are 26 students at the school with a core group of regular attendees. Both teachers are supported with teacher aides who are needed for the multi-age classes. At the time of the study, the school enrolled to Year 7 but with the change in Queensland school structures at the commencement of 2015, the school will only be to Year 6. There are no facilities in the town for secondary education so as is common in many small remote schools, students leave the town to attend boarding schools in order to continue their education. The choice of boarding school is often influenced by where families have attended in the past, or where siblings or cousins are currently attending. Also in common with many small remote schools, the teaching staff are often recent graduates who require mentoring and professional development as they commence their careers in teaching as well as working and living in remote areas.

Defining success

Burketown has been successful in the recent past in numeracy tests on NAPLAN. Successes have been noted when compared with similar schools in Years 5 and 7. As the numbers of students at the school are low, it is difficult in some years to obtain data for NAPLAN but there has been success in numeracy in recent years.



Multi-Age Mathematics

As a small two-teacher school, Burketown teachers have multi-age classes. Consequently classrooms are regularly structured so that teachers work with clusters of students. Current groupings are P-3 and 4-7 but this will change with the shift of Queensland Year 7 to the secondary school in 2015.

The multi-age setting offers many potential advantages for learning mathematics but these demand careful planning by teachers. For early career teachers, the planning for such diversity can be challenging as this is often not part of their initial teacher preparation, and beginning teachers may lack experience or confidence in this aspect of their practice. Teachers often come ill-prepared for the diversity they find within a classroom - both in terms of multi-age settings but for the usual diversity found in remote schools. This diversity is represented in language, culture, attendance, and experience and as a result, there is a wide range of mathematical achievement within any classroom. Creating productive learning environments for the students often requires individual learning plans or small group strategies within the whole class environment. Targeted learning and appropriate scaffolding of learning becomes the focus for teachers in these multi-age classrooms.

Early Career Teacher Support

Commonly in many remote and very remote communities, schools are staffed with graduate teachers, or early career teachers. The two teachers at Burketown are in their first and second year of teaching respectively. Planning to cater for the diversity within the classroom is an essential part of teaching practice in this context. Not only are there four year levels in each classroom, but there is also considerable diversity due to the usual issues experienced in remote education around attendance and health, thus exacerbating the diversity. Professional learning opportunities and support for the teachers enable them to develop quality plans for their students' mathematical learning.

Where teachers can be provided with planning support to cater for the multi-age, then there is a lot less stress and work on the teacher. To this end, there has been considerable emphasis at the school to support teachers' planning through skill development and through external support. Once planning has been developed, the teacher is then able to focus on teaching rather than planning. Teachers have been able to access a number of support programs to help with planning. Some of these programs are commercially available ones while other support has been made available through expert teachers who move across schools in the region to support the teachers.

The school is supported by roving experts provided by the Department but as a small school, this entitlement is limited. Subsequently the school has focused on a number of other strategies to upskill teachers in mathematics. These have included the purchase of a commercial package but this has been very costly. The package provides teachers with access to resources and some support in lesson planning, however there exists some tensions as to the best value for money – the commercial resource or more human resources based at the school. This commercial product is currently under review.

As the school has a full-time principal role, the principal takes classes while teachers attend professional learning activities. These have included extended professional development activities (of one week) outside the region and opportunities for teachers to work in other schools to observe experienced teachers and be mentored by them. The full-time principal role enables flexibility in the management of classes since it is almost impossible for remote schools to access supply/relief teachers.

On-line resources have been particularly successful for the teachers since the capacity and opportunity for curriculum or other departmental support personnel to visit the school is limited. Teachers reported that programs with curriculum support documents, and/or human support have been most beneficial since these allow access to the expertise they need to enable them to cater for the diversity within their classes. Access to personnel to provide input into planning was identified by teachers as most effective. When the teacher is able to phone or email to seek advice on strategies to support teaching, this has been invaluable. The teachers have found access to 'in-time' help at particular moments the most beneficial tool for their learning to teach mathematics effectively. This assistance has been sought and provided across a number of areas including how to teach a particular concept that the teachers identify they have been struggling with in terms of their teacher knowledge; how to create a teachable moment; or how to differentiate particular mathematical concepts for the diversity within their classes.

Multi-age Classrooms and Differentiation

The context of the small school with multi-age classes, the early career status of the teachers, the demands of living remote, and working in a cross-cultural setting places considerable stresses on an early career teacher exaggerating the usual demands on new teachers. The demands on new teachers are high as is their need for support in planning mathematics. Similar with many other remote communities, at Burketown there are students working at or above year levels alongside students who may have considerable disabilities or who have had long periods of absence or sporadic attendance across many schools. The multi-age setting exaggerates the diversity. Being able to assess students' learning needs and then plan for teaching to the diverse needs in the classroom are the touchstone to success in these multi-age settings.

Teachers seek to differentiate their teaching to meet the needs of the students but without drawing attention to the differentiated learning experiences. Often a lesson commences with the teacher introducing a topic so that the task – for example, splitting numbers – may be revision for some while for the younger students it may be the introduction to the topic. During an observed lesson, the younger students undertook multiplication of two-digit numbers by a single digit number, thus reminding the older students of the strategy to be used. The younger students then went to their desks and worked on problems while the teacher then worked with the older students who did three-digit by two-digit multiplication using the splitting strategy. In lessons of this type, the teacher aide will work with one of the groups, while the teacher works with the students in a more direct-teaching role. Students are also actively encouraged to assist one another.

Teacher Aides

As members of the wider community, teacher aides often have considerable knowledge of the students and their families. Frequently, the teacher aides are long serving members of the school and have a collective wisdom of past practices. They can provide teachers and leaders with information about what has worked (or not) in the past in terms of various teaching programs. It is an important strategy to work with the teacher aide, making them feel a valued part of the school community and ensuring their knowledge is valued within the teaching community.

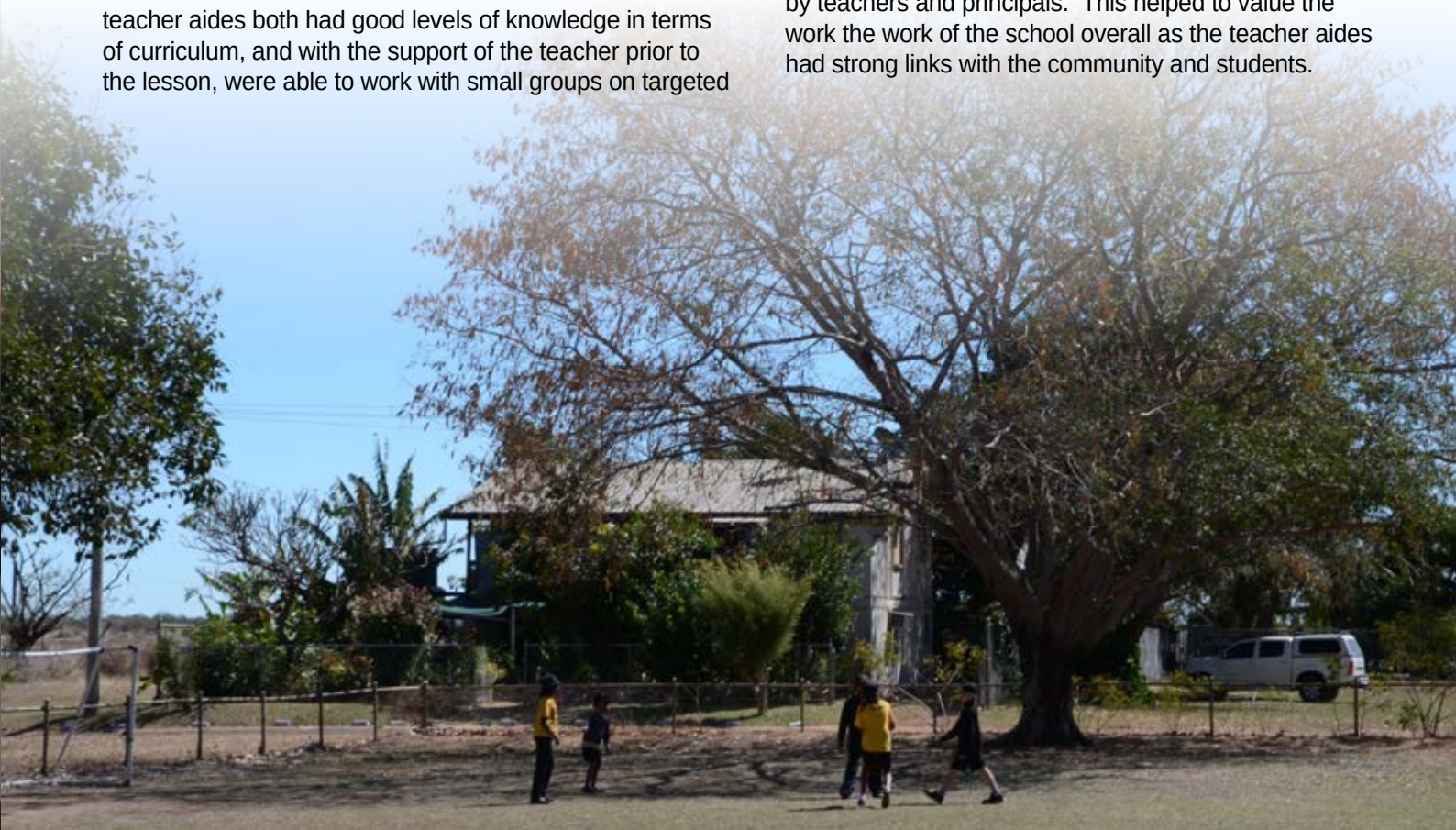
The teacher aides serve various roles within the multi-age setting. One of the key strategies was for the teacher aide to work with one group for the lesson often on reinforcing established knowledge and building existing knowledge. This enabled the teacher to work effectively across other groups – introducing new knowledge and monitoring one or two groups working on their own. In the early years of schooling, the teacher aide has for many years worked with the prep students and so has developed a strong repertoire of skills and activities for this age group of students. As they were often very noisy and engaged in play activities that could disrupt the other year levels in the multi-age setting, she would often taking them out of the classroom to work in a different space. By taking the students into a nominated 'prep' learning area, activities and rotations were established. This meant that the students could learn both academic and social skills that are a key part of the introduction into formal schooling. By removing this group from the classroom, the teacher was then able to undertake more focused learning activities with the remaining students.

The diversity within the classrooms meant that teachers tended to group students according to their levels of mathematical achievement. This worked well as students could work with others on a commensurate level. The teacher aides both had good levels of knowledge in terms of curriculum, and with the support of the teacher prior to the lesson, were able to work with small groups on targeted teaching. Working with the teacher aide prior to the lesson enabled the aide to feel confident in what she/he would be teaching to the students.

One teacher aide was a local woman who had been at the school for thirty years. In that time, she had seen many changes, and interacted with many teachers and principals. It was evident she had built a wealth of resources for the younger grades in particular. She also had a strong working knowledge of what students were capable of doing and where issues were likely to arise with students. She also had a very strong knowledge of the families and community so could incorporate this informal knowledge into her teaching. Knowing if students were having problems at home enabled her to better scaffold the student (socially, emotionally and academically). This information also was invaluable for incoming teachers, particularly those who were early career or new graduates. As a teacher aide and community member she had a strong knowledge and insight into the well-being of students and families that could support teaching and learning – in her class as well as across the school.

Teacher aides were encouraged to participate in professional development that was targeted for teacher aides in remote contexts. The most valuable experiences for classroom work were workshops that had helped build resources and understandings of good practice aimed at the early years. Many of the make-and-take resources had been useful for implementing in the classrooms. Most useful were those resources that aligned with the approaches being taken by the teachers at the particular time.

It was particularly salient for teacher aides to feel valued by teachers and principals. This helped to value the work the work of the school overall as the teacher aides had strong links with the community and students.



Rapport and Respect

As a small town of 200, the teachers are part of the local community. Their homes are in the centre of the town, next door to the school, so they have high visibility in the community. The teachers make concerted effort to be part of the community and take part in fishing trips with community members and generally join in all the community activities. This is valued by the community members who see it as a vital part of the teachers' success with students if they demonstrate a genuine interest in the students and the community, and participate in community life. Getting to know the students and their families, demonstrating interest in them, and caring about the students breeds success. If the students feel that the teachers are interested in them, and don't talk down to them, then they are more likely to want to listen and learn with that teacher.

In order to gain community respect and cooperation, it is critical in small towns that teachers and support staff are role models for their students. As educated professionals, teachers need to gain the respect of the community by modelling appropriate professional and social behaviour. It is very easy to lose the respect of community, parents and students when/if teachers are too familiar with community, behave inappropriately, disobey regulations or frequent the local hotels or town parties. Small towns can quickly pass judgment on teachers for unruly or unprofessional behaviour which is then hard to redeem. Early career teachers may need induction into appropriate community behaviours and understand the educational consequences for injudicious behaviours. It may be difficult to transition from "party mode" of university years and city life, into the life of a professional in a small community but it is essential if teachers are to gain the deep respect of community personnel. The leaders of the school and the community are good mentors to the neophyte teachers on what behaviours are important in the community.

Benefits for Learning and Learners

Building rapport with the students is critical for the on-going relationships with them and their families. All staff acknowledged that in small communities teachers are highly visible. It is important to get to know the students and their interests, their families, and so on, so that this be a genuine interest as the students are able to determine very early on if interest is feigned. If the latter is the case, then there is a high probability that the students will disengage, have little respect for the teacher, and the rapport building and consequently learning will be set back significantly.

Multi-age classrooms, when organized effectively and with good planning, can operate well. They allow for teachers to cater for the diversity of learners through assessing learning, grouping according to levels of understanding (regardless of age levels) and without shame for students who are working at levels below their same age peers.

Advice to Teachers

When commencing in small remote communities, it is important to become part of the community but retain a professional identity. Being genuinely interested in the students, their families and the communities builds rapport with the learners. Where there is rapport, the students are more likely to respond positively in the classroom and engage with learning.

Planning support for early career teachers to cater for multi-age classrooms enables teachers to cater for the diversity within mathematics. Having a clear structure to lessons so that students can identify with the transition into mathematics, through activities (such as warm up, fast facts, number patterns), and then move to whole class, group, or individual work enables students to gain a sense of familiarity with the ways in which mathematics is taught.

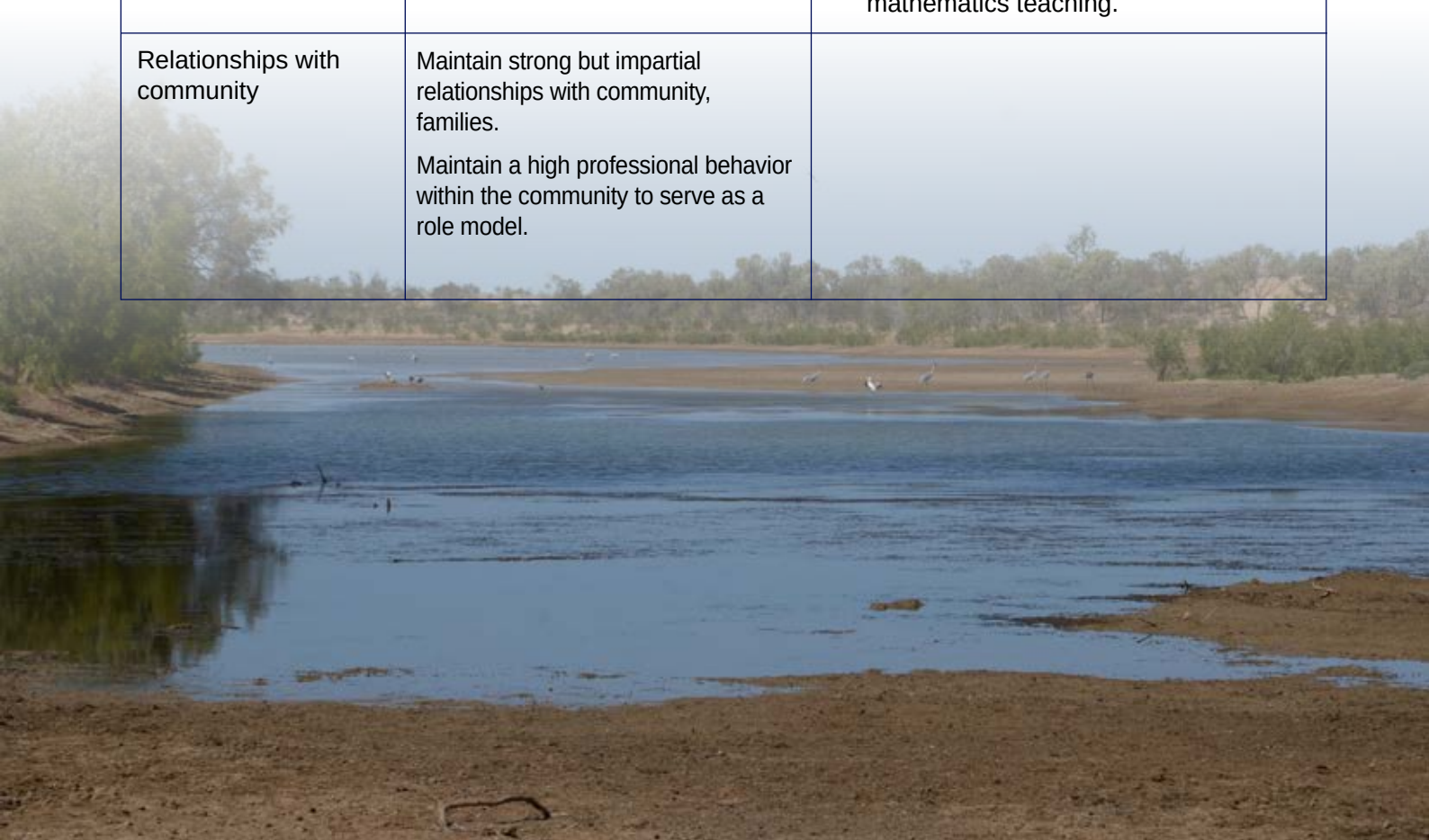
The capacity to plan in multi-age classrooms for beginning and early career teachers needs to be developed as many beginning teachers have not had this experience in their initial teacher training. This planning is important so that teachers are certain that the diversity of learners is addressed in mathematics.

Teacher aides are often long-standing members of the school community and respected people within the larger community. They are often the longest-serving members of the school and so have a key role in the history of the school. Building relationships with the teacher aide can be useful in learning about the history of mathematics teaching in the past, what has been successful (or not), and building relationships with the wider community. Teachers' aides have a strong knowledge of what works (and what does not) in the context of the school. It is prudent to draw on this wisdom in planning for learning.

It is important for teachers not to align themselves with the politics of community. Being able to stand outside the family interactions helps maintain a distance from the community politics. Remaining neutral but respectful enables teachers to interact with all families within a small community.

Model for Quality Learning

General Principle	Implications for mathematics	Focused strategies
Multi-age classrooms	Mathematics teaching can be targeted for learners, regardless of age level.	• Grouping within the classroom around students' levels of mathematics.
	Working across a number of mathematical learning levels means that students remain in the classroom and there is no shame.	• Students remain within the classroom and with their peers.
	Whole group teaching of concepts and then breaking into smaller groups allows for revision of concepts for higher level students and the introduction to new concepts.	• Whole group teaching of a concept, and then breaking into targeted learning groups based on achievement.
Early career teacher support	Development of materials for multi-age classrooms to enable differentiated learning of the same mathematical concepts.	• Accessing online materials and support to help with planning • Providing opportunities for teachers to work (observe, talk) with other teachers at different sites.
Teacher Aides	Teacher aide	• Teacher aides can take responsibility for small groups within the multi-age setting • Teacher aides often have a long-standing history of the teaching that has been undertaken at the school and can be invaluable in terms of successes in mathematics teaching.
Relationships with community	Maintain strong but impartial relationships with community, families. Maintain a high professional behavior within the community to serve as a role model.	



Key Messages – Summary

Multi-age classrooms enable teachers to cater for diversity within the classroom. Some students may be below or above their same age peers in mathematical levels (as described on the National Curriculum). In the multi-age classroom, teachers are able to organize targeted learning for small groups and students, regardless of age, are able to work in those groups where the learning is appropriate for the individuals. Remaining in the same class means that the students are not shamed if they are working with peers.

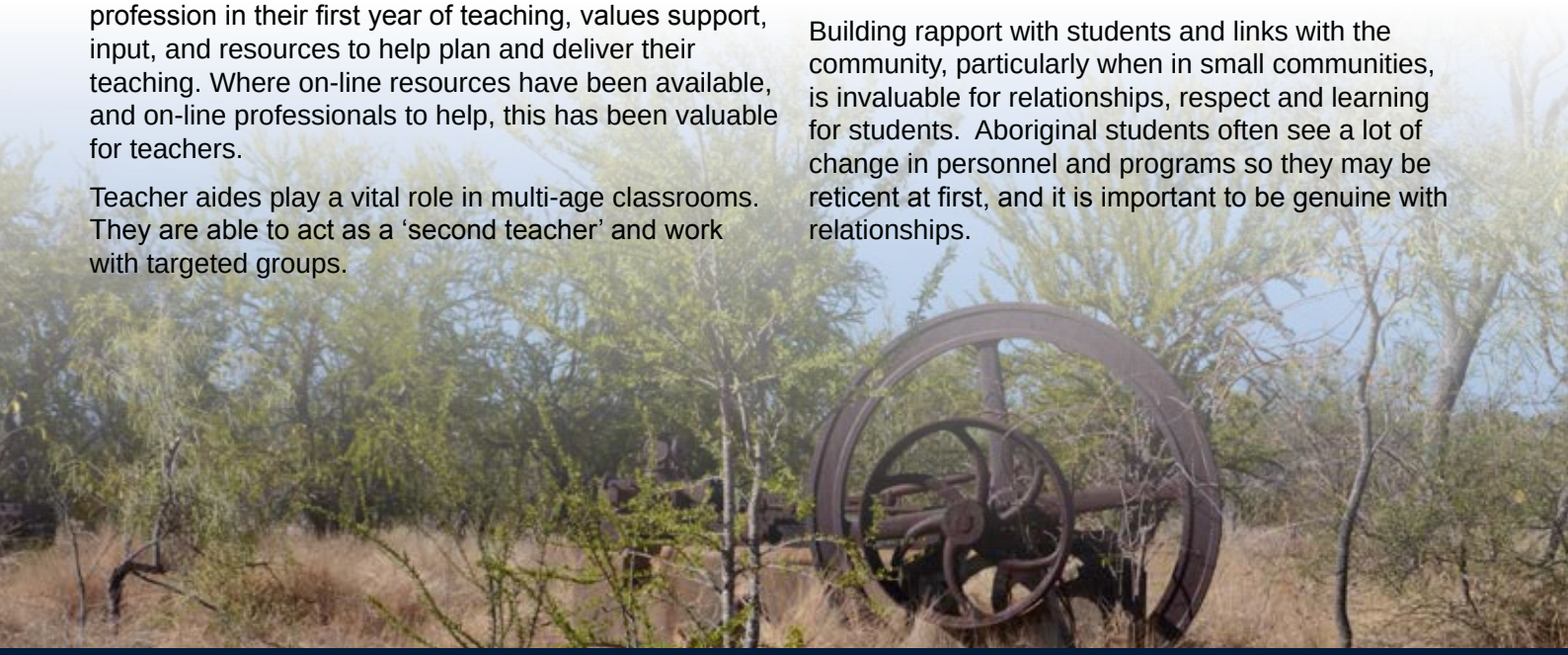
Early career teachers value professional support when planning in multi-age classrooms. The early career teacher, often overwhelmed by the demands of the profession in their first year of teaching, values support, input, and resources to help plan and deliver their teaching. Where on-line resources have been available, and on-line professionals to help, this has been valuable for teachers.

Teacher aides play a vital role in multi-age classrooms. They are able to act as a 'second teacher' and work with targeted groups.

Support for teacher aides needs to be targeted to their needs, and be practical so that they are able to implement ideas in the classroom. Teacher aides are likely to value professional development when the workshops and presentations are aligned to their contexts. What works in large urban settings is often different from that which works in small, Aboriginal towns or communities.

Teacher aides value conversations with the teachers about what they are to do in mathematics lessons. The relationship works best when the work is cooperative and the teacher aide feels valued by the teacher and principal.

Building rapport with students and links with the community, particularly when in small communities, is invaluable for relationships, respect and learning for students. Aboriginal students often see a lot of change in personnel and programs so they may be reticent at first, and it is important to be genuine with relationships.



School Demographics

Year range	Prep-7	FTE teaching staff	3
Total enrolments	33	Non-teaching staff	4
Location	Very Remote	FTE non-teaching staff	2.3
ICSEA (school)	724	Indigenous students %	88%
ICSEA (distribution of students) *(bottom quarter to top quarter)*	72% | 16% | 8% | 3%	Enrolments: Girls/Boys	18/15
		Language background other than English	6%
Teaching staff	3	Student attendance rate %	83%

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