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# Celebrating success:

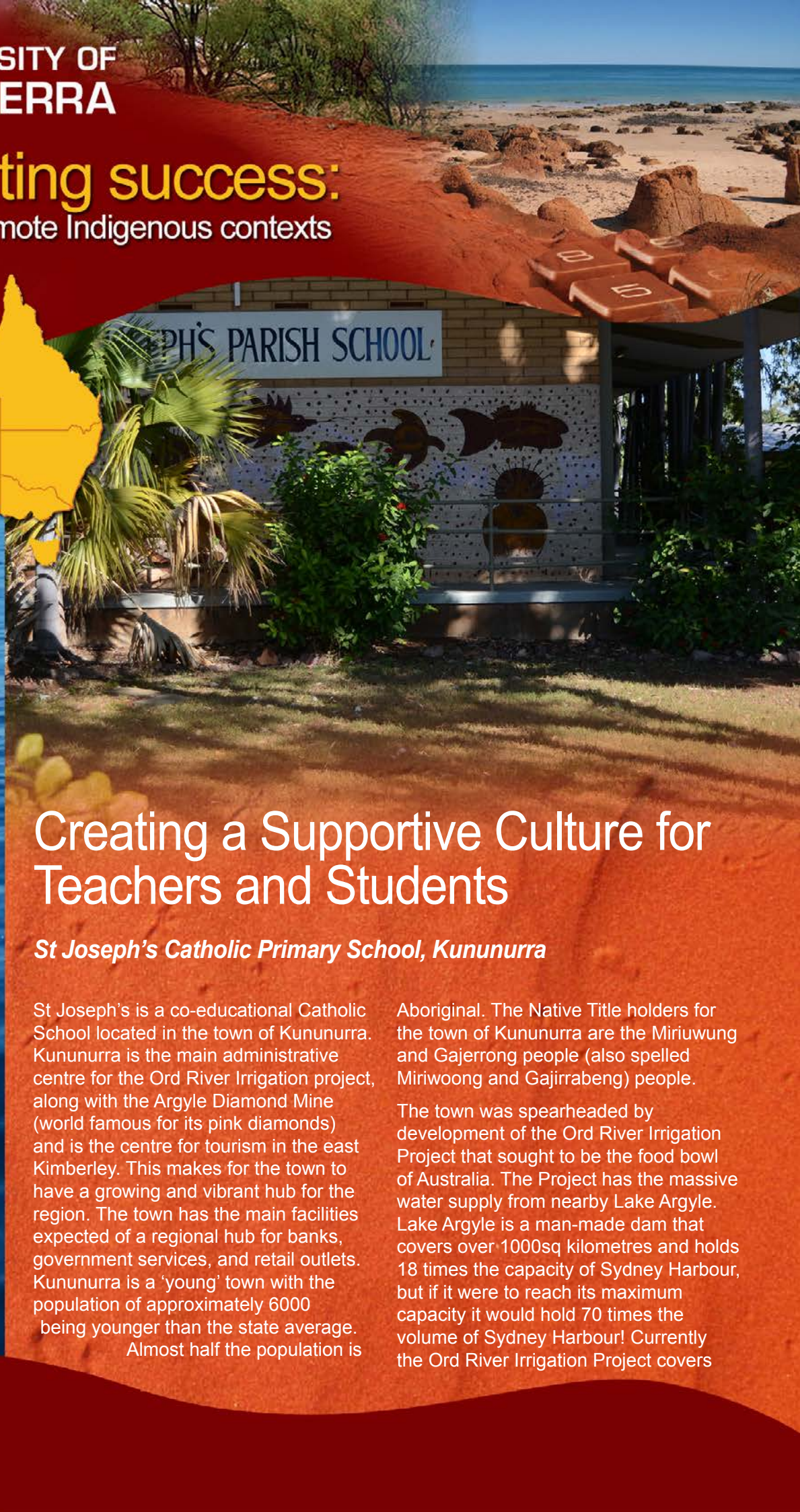
Numeracy in remote Indigenous contexts



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

2015



## Creating a Supportive Culture for Teachers and Students

*St Joseph's Catholic Primary School, Kununurra*

St Joseph's is a co-educational Catholic School located in the town of Kununurra. Kununurra is the main administrative centre for the Ord River Irrigation project, along with the Argyle Diamond Mine (world famous for its pink diamonds) and is the centre for tourism in the east Kimberley. This makes for the town to have a growing and vibrant hub for the region. The town has the main facilities expected of a regional hub for banks, government services, and retail outlets. Kununurra is a 'young' town with the population of approximately 6000 being younger than the state average.

Almost half the population is

Aboriginal. The Native Title holders for the town of Kununurra are the Miriung and Gajerrong people (also spelled Miriwoong and Gajirrabeng) people.

The town was spearheaded by development of the Ord River Irrigation Project that sought to be the food bowl of Australia. The Project has the massive water supply from nearby Lake Argyle. Lake Argyle is a man-made dam that covers over 1000sq kilometres and holds 18 times the capacity of Sydney Harbour, but if it were to reach its maximum capacity it would hold 70 times the volume of Sydney Harbour! Currently the Ord River Irrigation Project covers



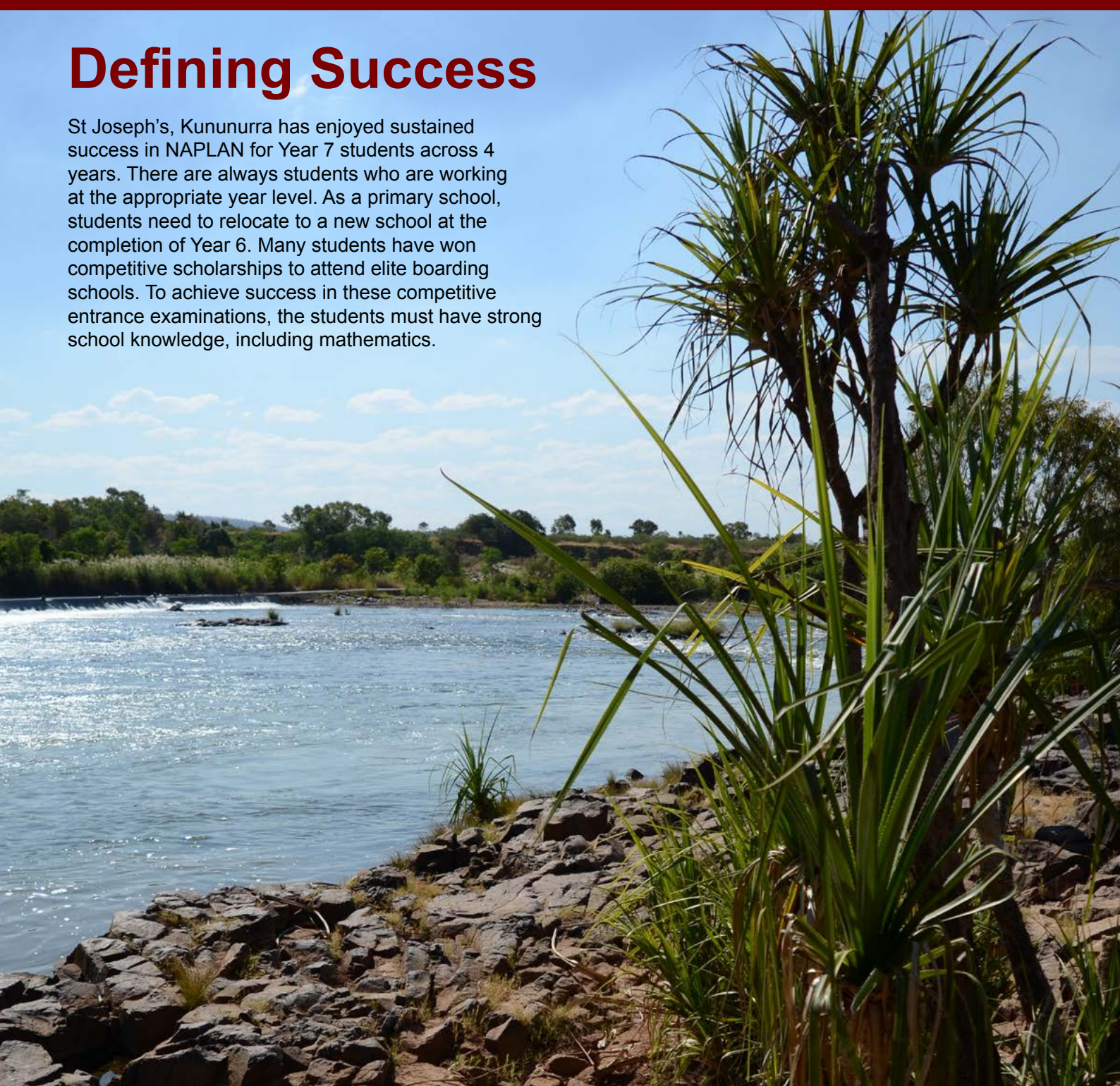
13000 hectares making for considerable employment, albeit seasonal, in Kununurra. Crops include melons, mangoes, and sugar cane. While crops of cotton, safflowers and rice were originally trialled, they are also being retrialled as viable options for the region. More recently farmers have turned to lucrative sandalwood plantations.

Founded in 1967, St Joseph's School was founded by the Sisters of St Joseph. The school serves the Parish Community of St Vincent Pallotti. The school is a primary school that until 2014 served Aboriginal and non-Aboriginal students to Year 7. With the changes to the schooling years from 2015, Year 7 transferred

out of the primary sector, the school now only caters to Year 6. The school was established to cater for the growth of the Kununurra township, and for the Aboriginal students whose lives had changed due to the National Referendum on the status of the First People of Australia. As a 'town', there is not a common indigenous language for the area and students speak Kimberley Kriol and have a relatively strong grasp on SAE. At the completion of primary school, students have a number of options including boarding school, school in Broome or Derby, or the local District High School.

## Defining Success

St Joseph's, Kununurra has enjoyed sustained success in NAPLAN for Year 7 students across 4 years. There are always students who are working at the appropriate year level. As a primary school, students need to relocate to a new school at the completion of Year 6. Many students have won competitive scholarships to attend elite boarding schools. To achieve success in these competitive entrance examinations, the students must have strong school knowledge, including mathematics.







# Supportive Culture

An outstanding marker of the St Joseph's community is its supportive culture that has been developed among the staff. There are many long serving staff, some who have been at the school for more than 5 years and looking to remain longer at the school, through to new graduates or staff new to the school. Most of the incoming teachers are also new to working in remote contexts and working with Indigenous learners and their families.

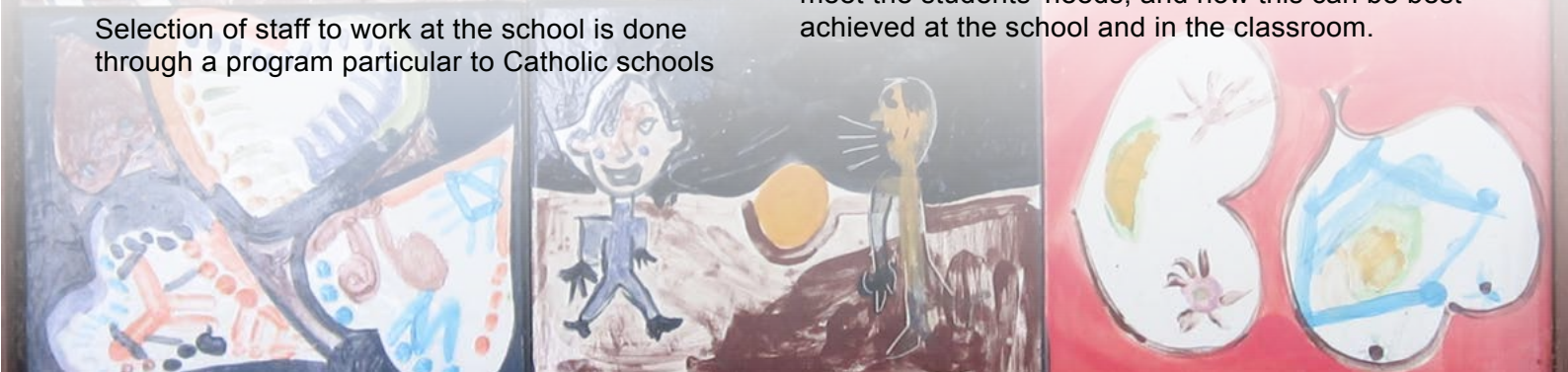
There is a strong culture around teachers working with each other, and staff observing and sharing their work with each other. Walk-throughs by the leadership team are seen to be supportive activities to help teachers develop their skills and knowledge of teaching. Teachers are very collaborative in their sharing of resources and ideas, and there is a strong dialogue among the teachers in terms of teaching mathematics and a shared vision for mathematics at the school.

Selection of staff to work at the school is done through a program particular to Catholic schools

in the Kimberley. Applicants are interviewed by a school interview panel. On appointment existing staff often make contact with new teachers before they come to Kununurra to make them feel welcome and to help with the transition process.

Teachers felt that the leadership team was supportive of their needs, and 'covered their backs' so that they could get on with the job of teaching. The leadership team provided guidance in curriculum design and teaching strategies so teachers could feel part of the school and experience success.

Teachers expressed that a major strength of the staff that they were all committed to the students (as opposed to the profession). This meant that across the staff, there was a strong conversation and commitment about the provision of experiences to meet the students' needs, and how this can be best achieved at the school and in the classroom.





# Professional Learning Communities

Being remote, it is often difficult to access professional learning activities or have relief teachers to cover teachers to undertake further learning. Similarly, there is a high turnover of staff as is common in remote communities. The school community works closely to support the learning of all staff. One day each week, there are meetings to undertake the usual managerial tasks of school work, but St Joseph's has proactively sought to develop a Professional Learning Community (PLC) and built this into the regular meeting timetable.

Focused meetings are held to discuss innovations in teaching around particular topics. Often these had, in the past, focused on literacy, but the school now focuses on numeracy, but more specifically mental computation strategies. At these meetings, the numeracy coordinator will lead the activities and discussion on various strategies for mental computation.

In the past years, there has been a strong focus on literacy at St Joseph's but in 2015, the school has taken focus on numeracy. The staff room has the question that is framing the PLC work for the year:

*"How do we ensure that all the students can select and apply a range of effective mental computation strategies in mathematics?"*

This question forms the basis for the PLC work. The numeracy coordinator plans and leads activities to support the learning of the teachers around this question. Teachers also share activities and strategies that they have been using in their classrooms.

## Numeracy Coordinator

For a number of years, St Joseph's has had a nominated numeracy coordinator at the school. The numeracy coordinator has typically been a classroom teacher who has an interest in mathematics. The Numeracy Coordinator takes responsibility for leading the PLC and activities for to support teachers in developing quality learning environments within the school. The current focus on mental computation strategies has seen the numeracy coordinator working with teachers to develop strategies within their classrooms. The strategies being used by the teachers reflect the needs and achievement levels of the students. Strategies are modeled and shared in the PLC meetings as well as working with teachers in their classrooms.







At the commencement of each year, teachers undertake an intensive assessment interview to identify where students are in terms of their mathematics learning. Their current achievements are then mapped against growth points and plans are developed so that learning can be planned for the students to achieve mathematically. Over the year, teachers use a range of assessment tools – both formative and summative – to map progress and plan for future learning. Teachers may choose their own tests for on-going monitoring of students, but data must be collated in a student portfolio. Teachers often use checklists to record student achievement, with the notion that evidence of the anticipated behaviours to be shown three times to be sure that the student has learned the concept.





## Whole-Group-Whole Teaching Model

Within each classroom there is a wide diversity, so teachers adopt a whole-group-whole approach to their teaching.

The initial “whole” group is an orientation to the lesson so that there is a consistency to the lesson. The teacher introduces the topic, and targets questioning to the levels of the students.

Students then break into smaller groups that are targeted for their learning levels on the nominated concept. In classes, there could be as many as five groups operating given the diversity of levels. The teacher often works with one group in the teaching of a concept. With five groups, it enables the teacher to ensure that he/she will work with each group over

the week in a teaching episode. Computer assisted learning features in the classroom so the teacher monitors the activities that the students should be engaged with. Students enjoy working on the computer, and engage with the activities. A group will be taken by the teaching assistant who is often an Aboriginal person.

The final “whole” group session is a reporting back where students are required to talk through their work, and their thinking thus encouraging students to develop a meta-language of mathematics. The talking “about” and “through” mathematics was seen to be a very important strategy used by the teachers given the language background of the students.







# Benefits for Learning and Learners

Having targeted strategies and concepts enables a whole-school approach to building the mathematics at the school. Having a clear focus has enabled the PLC to focus on effective practices and then sharing of learning among the staff. In some cases, it is the teachers who are the learners, and in other cases, it is the students who are the learners.

Having differentiated practices meets the needs of the students. With considerable diversity in each classroom, it is important for the teachers to target their teaching for individual students who may work individually or in small groups.

The use of quality digital resources can be a very useful tool to support a differentiated classroom. The resources should be carefully chosen so as to engage the students, but with a focus on mathematics. If possible, the program can also monitor how students are progressing through the levels within the program. Teachers have found that the students appear to enjoy and engage with the computer programs, which has been very useful in terms of enabling the teacher to circulate around the classroom while keeping students on task.





# Advice to Teachers

Working with other teachers can create a very positive working environment. This can create a working environment where teachers feel part of valuable team working towards a common and shared goal.

With diverse classrooms teachers should prepare targeted activities that are differentiated to meet the needs of the students.

Digital media can be very useful in helping to create learning experiences that not only meet the needs of the learners, but also engage the students. When the students are engaged in activities, this reduces behavioural problems, and allows the teacher to work with other groups. The activities used in the digital space should be carefully selected so that there is solid mathematical content.





## Model for Quality Learning

General Principle	Implications for Mathematics	Focused Strategies
Develop a supportive mathematics learning community among teachers	Teachers are supported in their learning with regard to strategies for teaching and assessing student learning.	<ul style="list-style-type: none"> <li>The Professional Learning Community is a forum for sharing learning, resources and professional development for the teachers.</li> <li>The school leadership team encourages and supports teachers to be innovative in their teaching.</li> <li>Ensure that newcomers to the school fit the ethos of the school.</li> </ul>
Differentiate mathematics learning to meet the needs of the learners	Identify current levels of achievement and then match learning activities to suit those needs.	<ul style="list-style-type: none"> <li>At the commencement of the year, identify comprehensively students' levels of achievement.</li> <li>Continue to monitor achievement and success, and adjust programs to meet the changing needs of students.</li> </ul>
	Within the lesson, develop a range of activities to meet the individual/group needs.	<ul style="list-style-type: none"> <li>Develop activities to meet the needs of learners, including the use of ICT-based resources to engage the students in targeted activities.</li> </ul>
Develop meta-language of mathematics	Due to the language backgrounds of the students, developing the meta-language of the students is important.	<ul style="list-style-type: none"> <li>Whole-small-whole groups strategies work well, with the final whole group/class component focusing on students articulating their thinking and processes to the whole class group.</li> </ul>





# Key Messages – Summary

St Joseph's has the 'luxury' of being in a relatively urban setting – Kununurra – that allows students access to a range of numeracy resources in the town. This helps to provide a context for learning mathematical concepts.

There is strong and collegial support across the school. The teachers have created a professional learning community, supported by the leadership team, to build the educative practices around mathematics learning. Focussed activities and discussions for teachers occur which, in turn, helps to build the teaching repertoires at the school.

St Joseph's has created a numeracy coordinator position at the school. This role is to support the teachers in their work, and through the work of the PLC. The Numeracy Coordinator facilitates discussions at the regular curriculum meetings where teachers share their classroom activities and learnings in a friendly and collegial atmosphere.

The leadership team – principal, deputy and numeracy coordinator – are very supportive of teachers and encourage teachers to take risks in their teaching. Initiatives proposed by teachers are typically supported

(and encouraged) by the leadership team so that teachers feel valued and supported in their work.

The diversity across the school and within classrooms requires teachers to differentiate their activities within their teaching. Identifying the current levels of students' mathematics learning, and then targeting teaching and activities to meet (and extend) those levels is adopted throughout the school. The teachers tend to teach the whole class, then break into small groups where the activities are differentiated for the targeted learners, and then the class is brought back to a whole group for discussion and reflection.

The meta-language of mathematics is a feature of mathematic learning due to differences between the home language of the students and that of school mathematics. Teachers refer to the language of mathematics and make this explicit to students. Teachers may repeat questions or terms in a number of ways to support students with their engagement with mathematics. For example, when adding numbers, the teacher may use many terms to refer to the addition concept but also make these explicit to the students so that they come to learn that the many terms may be used for the same concept.

## School demographics

Year range	PP-7	FTE teaching staff	14
Total enrolments	169	Non-teaching staff	18
Location	Very Remote	FTE non-teaching staff	15.1
ICSEA (school)	854	Indigenous students %	60%
ICSEA (distribution of students) (bottom quarter to top quarter)	45%   21%   21%   14%	Enrolments: Girls/Boys	94/75
Teaching staff	17	Language background other than English	25%
		Student attendance rate %	82%