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2013 saw Tiwi College begin an extensive strategic review of the pedagogies for literacy and numeracy at the school. These pedagogies provide a framework for the educational development of the young Tiwi students, and so it was anticipated that the review would yield a more effective and efficient way of teaching and learning.

Tiwi College has dedicated 2014 as the year of numeracy - the *Expanding our World* initiative is a direct result of the ongoing review.

A systemic approach will be implemented to incorporate numeracy knowledge, skills and understanding wherever possible throughout Tiwi College life. Teachers will map programs to the Australian National Curriculum and support the students’ as they work up to, and beyond, national expectations.

The continuing ethos at Tiwi College is to provide appropriate teaching in the most fitting environment and style possible. Learning what is required in a culturally acceptable, safe and nurturing environment that takes into account the nature of learning literacy and numeracy as a student who does not have English as their first language.

By the end of 2014 the college will have a clear outline for best teaching practice of numeracy, and the most appropriate resources, methodologies and programs available. Students will progress through their lives at Tiwi College knowing that they can trust in the care that is available to them and graduate towards an young adult life prepared for work adding to the value of Tiwi society.

Ian Smith  
Principal  
Tiwi College
In a secluded location on tropical Melville Island, Tiwi College is well situated to engage students in all aspects of academic life.

The students are young men and women from the local communities on both Bathurst and Melville Islands who range in age from Foundation to year 12.

While learning can be challenging for any student in any school, here at Tiwi College there is also the weather - which is monsoonal from roughly November to March but can be longer - to contend with as well as cultural responsibilities which may keep students away from school for anything from a day a to a whole week.

Students board at the college from Monday to Friday and are cared for by Family Group Home staff. Family Group Home staff oversee the daily routines of students whilst supporting learning through a life skills program.

Students learn within multi-year level classes which are managed by a teaching team comprising the classroom teacher and an assistant teacher from one of the local communities.
The Tiwi College approach to numeracy is one which begins with enrollment and continues until the student leaves school. It is a multilayered process which strives to be holistic and which is tied to country, culture and workplace pathways.

The strategy is based in sound diagnostic testing which includes looking at current numeracy levels and skills, and the health and wellbeing of the student. These are used in parallel with literacy results to assess how best to lift literacy to cope with the demands of the numeracy curriculum.

All numeracy programs are mapped to the Australian National Curriculum utilising tactile methods and real world experiences. Numeracy is apparent throughout the learning experience at Tiwi College - whether it be history or sport, numeracy can be found in all aspects of our teaching.

As students grow and progress they will be continually challenged to raise their levels of competency, meeting standards with as much confidence as possible. With the senior years girls currently working on their stage one numeracy and the senior years boys applying their accumulated numeracy skills to their SEDA course and sports and rec apprenticeships, the young men and women of the Tiwi Islands are preparing for a life of fulfillment in employment.
Assessments take place at the beginning of term one, with follow up at the end of the year.

Testing is recognized as an integral part of programming and planning with results and professional diagnosis’ supporting differentiated learning throughout the curriculum.

The school’s testing regime for numeracy includes

- Progressive Achievement Tests in Mathematics (PAT M+)
- QuickSmart: OzCAAS

**PAT M+**

PAT M+ is an online testing regime administered by the *Australian Council for Educational Research* (ACER) which is conducted in the classroom and supervised by all classroom staff. Results are available immediately which allows teachers to modify through differentiation and extension.

**QuickSmart**

*QuickSmart mathematics intervention strategies…*

- **Timed recall of basic number facts from a targeted set of focus number facts;**
- **Speed sheets that also relate to the same set of focus facts and include extension number facts;**
- **Opportunities to consolidate the use of strategies for calculating number facts;**
- **The use of a prompt scaffold to solve mathematical problems and establish knowledge of problem-solving routines; and**
- **Regular testing on tasks from the CAAS bank of mathematical tasks**

[SIMERR]
Tiwi College numeracy intervention begins either, after initial PAT M+ testing has revealed some possible problem with comprehension of basic operations in numeracy, or immediately upon enrolment.

The OzCAAS testing is used as an indicator test for students who may require a regular numeracy intervention program and, at Tiwi College we use QuickSmart.

The program is delivered by a dedicated staff who complete both the testing and any subsequent delivery of the program. Subsequent delivery is done with student pairs who attend three thirty minute lessons per week for thirty weeks.

The QuickSmart program consists of,

*QuickSmart mathematics intervention strategies…*

- timed recall of basic number facts from a targeted set of focus number facts;
- speed sheets that also relate to the same set of focus facts and include extension number facts;
- opportunities to consolidate the use of strategies for calculating number facts;
- the use of a prompt scaffold to solve mathematical problems and establish knowledge of problem-solving routines; and
- regular testing on tasks from the CAAS bank of mathematical tasks

[SIMERR]
Tiwi College fully supports and participates in NAPLAN testing for our year 3, 5, 7 and 9 students.

In 2013, when the most recent results showing gains in numeracy scores were published - these being 2010/2012 - the whole school was extremely heartened and proud that our students had made outstanding progress.

The scores showed that Tiwi College students who had tested as year 5 students in 2010, had showed greater progress as year 7's in 2012, than students from other schools around Australia.

2014 saw students take part in NAPLAN with enthusiasm and respect for the test. Students understood that NAPLAN testing was only one aspect of their teaching and learning experience but they took pride in their preparation and execution of the test.
### Senior Years

#### Senior Years Young Women

NTOEC: Numeracy for Daily Life

- Time
- Money
- Personal finances
  - Budgeting
  - Shopping

#### Senior Years Young Men

SEDA – Sports program

- Measurement
- Statistics
- Time
- Money

### Middle School

#### Semester One

- Number properties
  - prime
  - composite
  - square numbers
  - triangular numbers
- Integers
- Indices
- Time
  - Timetables
  - Time duration problems
  - Time scales
  - Time intervals
- Fractions and decimals
- Percentages and ratios
- Irrational numbers
- Index laws and scientific notation

#### Semester Two

- Measurement
  - mass
  - length
  - area
  - perimeter
- Geometry
  - angles
  - Pythagoras’ Theorem
  - trigonometry
- Linear and non-Linear Relationships
  - Cartesian co-ordinates
  - linear equations
  - transformations

### Senior Years

#### Middle School

- Number sequences
- Telling the time
- Investigating patterns
- Collecting and analyzing data
- 2D shapes
- 3D objects

#### Senior Years Young Women

NTOEC: Numeracy for Daily Life

- Time
- Money

#### Senior Years Young Men

SEDA – Sports program

- Measurement
- Statistics
- Time
- Money

### Primary

#### Semester One

- Time
- Money
- Personal finances
  - Budgeting
  - Shopping

#### Semester Two

- Angles
- Position/movement/direction
- Symmetry
- Money
- Chance
- Modeling fractions
The primary class at Tiwi College is made up of students from Foundation to year 7 and, as with all other classes and subjects, numeracy in the primary classroom is mapped to the Australian National Curriculum.

Students’ prior knowledge of numeracy is assessed upon enrollment which immediately gives the teacher an indication of any differentiation or extension needed for each individual student.

Generally students work in small ability groups – rather than year groups - to work through their numeracy problems. The small groups have been beneficial for student confidence as they tend to ask more questions and discover more things for themselves without feeling embarrassed.

Students are encouraged to experiment and explore different ways to solve problems and answer questions. This strategy allows students to work out a strategy for numeracy which works most effectively for them and their personal learning style.

Students are encouraged to use their strengths to support each other and share learning strategies and problem solving approaches.

The teacher is supported by an assistant teacher from the local community who can help with anything from translating to relating learning to local culture.

The classroom is equipped with an interactive whiteboard, a laptop for each student, and iPads for specific application learning. This wide range of digital tools means that learning is up to date and embedded with ICT skills which are relevant throughout the curriculum.
Group work
Three days a week students are placed in groups to complete activities, one is generally explicit teaching, one independent (computers or workbooks) and one is a hands on activity.

Hands-on learning
Using concrete materials including MAB blocks, clocks made by the students, Unifex cubes, small whiteboards etc.

Open-ended questioning
Using open ended questioning allows students to explore various ways to solve problems and encourages them to think outside the box. It also encourages them to use the strategies they already know.

Visual teaching aids
These include anchor charts created by the class, posters displaying information about topics covered and aids used on the interactive whiteboard.

Whole class learning including class discussions
Students are able to explore ideas together, ask questions and use their knowledge to teach each other while working in the group.

Explicit teaching
This happens both in small groups and as a whole class, the amount varies from day to day and student to student.

Scaffolding
Students work in groups of varying abilities and are able to learn from students who have a higher level of knowledge than themselves as well as teach students who may not have a broad understanding of a subject.
The Tiwi College Middle School Girls (MSG) class is made up of girls from years 7 to 9 who have a varied educational background. Some Students have only ever schooled in remote community schools whilst others have spent various amounts of time in mainstream schools and often boarded away from family. Some of these schools have been interstate.

The resulting combination of background and ability level can make the MSG class a challenge when it comes to programming at an appropriate level for the whole class. In order to facilitate this, a flexible base program is written at the beginning of the year and then it is differentiated and extended as required for each student.

An understanding of individual needs comes from an analysis of student testing results. MSG participate in the enrollment program including the QuickSmart – OzCAAS testing and the PAT M+ assessment for numeracy.

The MSG numeracy lessons have been developed to include a variety of teaching strategies that are used to suit an individual student, an ability group or the whole class.

These strategies are based on Tiwi strengths which are sport, art and culture.

Team teaching plays a large part in the smooth running and effective teaching of the MSG subjects - especially in numeracy. The value of local knowledge and language is invaluable as the students find an anchor in familiarly worded explanations of new mathematical concepts.
Using the whiteboard and SMARTboard
Demonstrating how to work out a question or interact with the Smartboard. Students can show the class how to solve a problem on the board.

**Mini white boards**
These are used individually or in group games. The student can work out their question without wasting paper. These are great for playing team games. The students are given a question or problem to solve which they can display and show the class.

**Mathletics**
Each student has their own account. They can play games on their own, have competitions on a live math challenge against other peers or students from other countries. The teacher has the ability to set tasks for each individual student’s capability and areas they may to work on.

**Hands on activities**
Teacher demonstrates and students participate in activities. This strategy is great for measuring and weighing. Students can visually see and take part in working out their answer.

**Flash cards**
Students can quiz each other e.g. timetables and shapes.

**Work booklets**
Students can work independently on the current topic.

**Mental maths**
Teacher verbally gives the question, students write it down and work out the answer. This is great for students to work on their listen and interpreting skills.

**Group work**
Staff take a small group of students and work on a topic. This allows staff to identify students who are struggling and differentiate work as necessary.

**Peer support**
Students are the best teachers to teach their peers in class.

**AT or teacher**
Students work individually with a classroom staff member for detailed and one-to-one attention.
The Middle School Boys (MSB) numeracy lessons are run to a strict routine which ensures that there are no surprises for the boys. It is an important factor in the success of this class that the boys understand what they are going to be doing and that they know what is expected of them from the moment they arrive at class.

It also starts the numeracy lessons with students feeling successful and with the same routine each day, takes away any potential anxiety about coming to class.

The shared teaching input of the classroom team reaps valuable rewards and allows students to speak in their first language to gain understanding of mathematical concepts and basic operations.

The MSB classroom is fully equipped with laptops, personal computers and iPads. This gives students time to work individually on their Mathletics or work on problems set by the staff using software such as MS Excel™. Digital technologies that can be monitored for progress, such as Mathletics, means the teacher can use immediate analysis of results to plan the next set of problems for students individually. Students find this type of task stimulating and fun; they challenge themselves by completing personal goals whilst also being able to pit themselves against their peers nationwide and sometimes from other countries.

It is hoped that becoming used to real world software such as MS Excel™ will benefit the boys as they move into senior years and eventually on to the workplace.
Tactile learning experiences
A hands on approach caters to the visual/kinaesthetic preferred learning styles of most Indigenous students.

Groups based on levels
Students work better with students who have similar levels, in mixed ability groups higher students tend to dominate the others and take over lower students learning space.

Mental maths
This is a vital skill for the students as they perfect their automatic recall of basic operations and can begin to move forward with more complex problems.

Rotations
Rotations allow classroom staff time with each student. Working individually with each student provides staff the opportunity to monitor differentiated and extended work.

Shared teaching
All classroom staff deliver lessons and planning is shared. Regular meetings between classroom staff in order to prepare for lessons enhances the efficiency of learning for the students.

Skills for the workplace
Whenever possible the MSB are shown how to apply their numeracy skills to a workplace setting. It is a firm belief that numeracy skills should be transferable to life outside of school and, generally, tasks are set with real world applications.
The Senior Young Women are currently split into two groups for mathematics. One group consists of all year 11/12 students, aged 16-19 years and the other group consists of year 10 students, aged 15 years. Each lesson follows the same routine.

**Mental maths**
This helps the girls learn mathematical language, dictation of problems, such as listening, writing it down and interpreting the question, working out maths problems with automaticity. Mental maths is always marked as a class on the board and discussion happens around new and unfamiliar questions.

**Speed and accuracy of all operations**
This has helped all girls to increase their automaticity of operations. It is essential for students to improve immediate recall of basic maths as students then can move on to more complex maths.

**Word problems**
A word problem is placed on the board for all students to solve. Students are given a whiteboard for working out and once a number of girls manage to solve it, they then go up to the front of the class to explain their method.

If different methods have been used then each is demonstrated. In this way students see that problems can often be solved with alternative thinking.

**Group work**
At the end of the class routine, each of the two groups splits off with a staff member and works on different aspects of maths. This is often done by relocating the younger group into a different classroom.

**Team teaching**
The SYW staff work as an effective team and share both the work and planning load. Liaising daily means any pressing issues can be dealt with immediately and the formal numeracy discussions can focus on any matters relating to the year 10 cohort. The formal meeting is also the venue for shared work on lesson plans and establishing how students are progressing.
SEDA - VET: Cert II in Sport and Recreation
In preparation for the workplace, the Senior Young Men (SYM) undertake a course of study based in VET qualifications and specifically the CDU based, SEDA program. Numeracy knowledge, skills and understanding are derived from a variety of tasks and situations which are embedded within the VET course – these are a few.

**Measurement**
Various sporting events, such as the school athletics carnival, AFL matches, and drill areas, mean various methods of measurement are utilized and they must be accurate.

**Budgeting**
Students must calculate the cost of a ticket to a sporting event. All incurred costs must be accounted for and reckoned within that cost, the event must be held, as planned, within that calculated cost.

**Tables**
The students are responsible for the maintenance of an equipment inventory and a login/logout system; this is kept as a tabled document. There are also many occasions where students must check timetables for travel arrangements, match fixtures and team progress in leagues.

**Number**
While number is evident throughout the course it is also discrete in that students must manage younger boys in games and drill where they must divide large groups into teams, mange the timing of quarters and halves, as well as provide sufficient refreshments for all concerned.
Tiwi College

My School

QuickSmart

QuickSmart Numeracy Report

PAT Maths+

Targeting Maths - Books

Mathletics

Maths Plus Books


South Australian Teaching for Effective Learning: Framework Guide
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