



Australian First Nations Peoples snapshots

Connection through Culture



Figure 1: Conceptual framework for the Aboriginal and Torres Strait Islander Histories and Cultures priority

Relevant organising idea – Culture

Aboriginal and Torres Strait Islander Peoples' ways of life are uniquely expressed through ways of being, knowing, thinking and doing. (OI.5)

Ways of working

This snapshot looks at the ways some Digital Technologies in focus (DTiF) schools incorporated culturally relevant ways of working with Australian First Nations students to increase engagement and learning outcomes.

The DTiF 'Aboriginal and Torres Strait Islander perspectives' project focus group cluster shared ideas on what they had noticed about how students in their schools learnt best. Teachers noted that students responded to whole-body, hands-on learning and a multimodal approach to teaching Digital Technologies. Many of the schools shared that low student attendance had been an ongoing challenge and found ways of motivating the students and increasing attendance through Digital Technologies learning activities.

Nathan Ravestyne from Yirara College in Alice Springs commented on why he likes implementing Digital Technologies,

... it gives them a lot of hands-on things ... it's more than just a math equation or writing a short story. It's something that they can really engage with...actually getting hands-on with the Lego and getting hands-on with what coding and programming looks like. I was very impressed with how our kids were able to interact with the machinery and how they were able to code on the fly and they were able to interact with other students.

I was very impressed with how easily they slipped into that sort of tech focused mindset ... I think something tangible, something engaging, and a sense of ownership really made it work.

Holly Harlow from Jabiru Area School reflected

We found a lot of talk around growth mindset and overcoming challenges, thinking about a different alternative way of doing things, was really useful and trying to get them to be positive about ... trying five different ways before they get the outcome. So that was a real challenge that they needed to overcome, and I think they've done that really well.

In their paper, 'Creating your own symbols: Beginning algebraic thinking with Indigenous students', Dr Chris Matthews, Professor Tom Cooper and Dr Annette Baturu discuss a teaching approach that addresses Mathematics as storytelling to help Australian First Nations students understand mathematical concepts with a focus on algebra through development of their own symbolic notation to aid their understanding.

The approach utilises Indigenous knowledge (sic) of symbols (within, e.g., sport, driving, art and dance) as a starting point for building understanding of arithmetic symbolism in a way that can be easily extended to algebra symbolism. (2017)

Dr Matthews (2019) explained this further through the Goompi Model (formerly the Cloud Model See figure 1) and how students need to move through a process of understanding symbols through culturally accessible storytelling on to creating their own representations of symbols before being able to grasp traditional western mathematical language and notation. He encouraged the use of story and dance so that students could learn to understand concepts through whole-body movements. See also [Useful links](#) – Mathematics as storytelling – Dr Chris Matthews – QCAA).

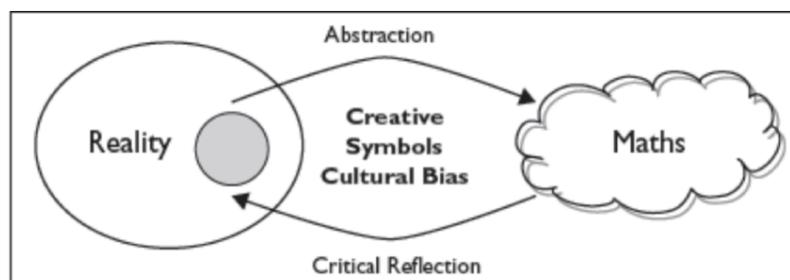


Figure 1: The Cloud model (now known as the Goompi Model)

Snapshots of DTiF schools

The following snapshots detail ways DTiF schools incorporated Digital Technologies into learning activities in culturally accessible ways.

Snapshot 1 shares how Green Hill Public School strengthened numeracy learning through computational thinking activities and whole-body movement. Students progressed from physically moving through chalk mazes to developing their own instructions for others using their own drawn symbols.

Snapshot 2 looks at how Shepherdson College used Minecraft to motivate students to learn the computer login process and improve personal and social capability through collaborative learning.

Snapshot 1 – Strengthening Mathematics through computational thinking



Figure 2: Green Hill Public School crest

Green Hill Public School is the only small school in the town of Kempsey on the Land of the Dunghutti People. It has strong links to the Australian First Nations community at Greenhill and has nearly 100% Aboriginal student enrolment. Their research question was focused on student use of existing technologies to openly discuss, critique and report about their own learning, particularly around the use of computational thinking and Digital Technologies. They were seeking ways to use a creative approach to enable student collaboration.

Part way through the project, they changed their focus to spotlight on students in the early years and investigated ways to engage students in hands-

on, authentic opportunities incorporating computational thinking strategies with Mathematics. By giving them authentic opportunities across learning areas the teaching staff helped students to develop their language and vocabulary skills along with their problem-solving skills.

Mathematics learning was taught through active participation – relating kinaesthetic activity to mental models, through a sequence of body → hand → mind (see Useful links – YuMi Deadly Maths).

Green Hill Public School Principal, Janet Haigh, taught a Foundation–Year 2 multi-aged class at the time and devised strategies for students to learn directional language and sequencing through whole-body learning activities. She created grids out in the playground, placed mini beanbags in some of the squares and had students navigate their way through the grids to avoid the bean bags. Janet discussed how students progressed on to drawing visual instructions for others to navigate their way through the grid and introduced the concept of algorithms:

We would map how we were going to navigate the grids and that developed a life of its own, looking at the language in the Maths syllabus around position and using words such as left, right, forward, backwards. So, I've been doing offline tasks but it's giving them a lot of the language and the literacy they need to be able to go online...from that, my more capable and confident kids are already starting to buddy up with the children in the other class who are working on Minecraft.

Some of the children from Year 2 visited and worked with students in Years 3–6 as part of their transition program. They were able to transfer their computational thinking skills to collaborate with older students in the Minecraft online environment. Janet commented,

It's also been very good for our senior class to see themselves as leaders with our younger children. And that brings us to the highlight where the collaboration so far has been unreal to watch, and different heroes are emerging in the classroom ... I think it's really great to see and there's some connections between kids that you would never have thought would ever mix.

Snapshot 2 – Teaching skills through Minecraft

Shepherdson College is a bilingual school located on Yolŋu land at Galiwin'ku, a small island community in Northeast Arnhem Land in the Northern Territory. Traditional ways of language, living, and hunting remain strong on the island.

Marion Hooper teaches Literacy and Personal and Social capability at the school and was interested in the richness Digital Technologies could bring to her students by providing motivating ways to learn.

The school initiated a change to their teaching and learning program by switching the focus for upper primary classes to Minecraft. In doing this they focused on individual student information and communication technology (ICT) capabilities and social-emotional learning reinforcing communication, cooperation, and resilience. An immediate challenge was that primary students had not used individual logons before which had been a barrier to the use of both ICT and implementation of Digital Technologies programs. Marion commented:

At first it was difficult and time-consuming logging into Minecraft using individual (NT schools) logons, but this became easier over time. Engagement in the Minecraft program has been extremely high. The school is currently engaged in using this platform to develop our students' ICT capabilities and DT [digital technologies] skills and to pursue the goals of our DTiF project. We are finding ways to do this across the curriculum in a way that also meshes with the Big Idea for each teaching period. It has become obvious to us that we

need to find a way to engage and facilitate the involvement of teachers in this project. In order to do this, we are offering teaching sessions where teachers and students are supported by experienced staff in their use of Minecraft as a learning environment.

One teacher developed an 'escape room' challenge in students' first language using Minecraft. The introduction of Minecraft was credited with improvements in student confidence and resilience across the school. There was also evidence of development of stronger peer-to-peer relationships with improving communications and problem-solving skills. Girls were observed to be more willing to engage in learning through Minecraft.



Figure 3: An example of the Minecraft learning environment

Once students had mastered the basics of logging on, exploring the world and basic building they quickly began planning buildings and houses, working together and purposely creating spaces in which to play games using their avatars. Some students felt more confident and explored using code to control the Minecraft environment.

Marion presented at a workshop on Groote Eylandt in 2021 on her work in using Minecraft to develop skills in Personal and Social capability and in developing ICT skills. During her presentation she commented on how the move to Minecraft from Scratch had improved student interactions:

The use of Scratch, then Minecraft has made significant inroads into the Personal and Social capability realm. Sharing of Scratch projects initially resulted in sabotage, but this morphed into a more caring environment as students shared knowledge and skills with their class. The generation of personal worlds in Minecraft meant that rules had to be made before any other student was allowed in. While this didn't necessarily generate a lot of discussion, it became obvious to each student that acceptable behaviour needed to be worked out and then adhered to.

Marion highlighted the following observations regarding students' social-emotional learning and the value of Minecraft:

- when students collaborated in shared worlds, they were able to play cooperatively
- it was important to include explicit discussion of shared rules so students would show respect for one another's creations
- appeals to both boys and girls
- offers ease of access to students from a variety of age groups

- existing skills are transferred to the Minecraft environment.

The school found that Minecraft was the perfect vehicle for allowing students to be creative thinkers and have positive interpersonal experiences while working in their first language. Students found the learning environment extremely motivating and were enthusiastic about attending school.

Resources

- Aboriginal and Torres Strait Islander connections to Digital Technologies
bit.ly/3jIW34
- National Literacy and Numeracy Learning Progressions
www.australiancurriculum.edu.au/resources/national-literacy-and-numeracy-learning-progressions/
- Activities that promote Digital Technologies concepts and incorporate Numeracy (webinar series)
www.australiancurriculum.edu.au/resources/digital-technologies-in-focus/professional-learning/webinars/ (Scroll down to content)
- Classroom ideas – F–2 Understanding algorithms and the smiley face biscuit challenge
bit.ly/3pmA2dp

Useful links

- Mathematics as storytelling – Dr Chris Matthews – QCAA
www.qcaa.qld.edu.au/about/k-12-policies/aboriginal-torres-strait-islander-perspectives/resources/mathematics-storytelling
- YuMi Deadly Maths
research.qut.edu.au/ydc/about/yumi-deadly-maths/
- Narragunnawali early years and primary resources (free to join and log in)
www.narragunnawali.org.au/curriculum-resources

References

Matthews, C, Cooper, T & Baturo, A (2007) 'Creating Your Own Symbols: Beginning algebraic thinking with Indigenous students'. In J Woo, H Lew, D Seo & K Park (Eds.), *Proceedings of the 31st Conference of the International Group for the Psychology of Mathematics Education*. The Korea Society of Educational Studies in Mathematics, Korea, pp 249- 256. Available from: <https://eprints.qut.edu.au/14627/>

Matthews, C (2009) 'Stories and symbols: Maths and storytelling', *Professional Voice* 6 (3), pp 45–50.

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