

DTiF

Digital Technologies in focus

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Australian First Nations Peoples snapshots

Connection to Country



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

Relevant organising ideas

Country/Place

Aboriginal and Torres Strait Islander communities maintain a special connection to and responsibility for Country/Place. (OI.2)

Culture

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

On-Country learning

This resource looks at the ways in which some Digital Technologies in focus project schools have embraced on-Country learning with their students and then made authentic connections with Digital Technologies. On-Country learning refers to culturally connected learning that takes place in the field and is guided by rangers who have knowledge of traditional approaches to Science and Technologies used by local Australian First Nations Peoples.

One of the project focus groups led by Curriculum Officer, Steve Grant, was the Aboriginal and Torres Strait Islander Perspectives on Digital Technologies group. The group met online and shared how they had been supporting students to embrace Culture in the project.

Teachers in Central Australia commented that when they link on-Country learning to the curriculum students stop seeing digital technologies as game-playing devices and start to see authentic ways that digital technologies are being used every day by rangers. For example, the rangers visited the students with their iPads and showed how they had tracked bilbies through Central Australia. Teachers noted that when students see people from their community embracing technologies, they begin to see the relevance and engage with the technologies with more purpose.

Teachers are seeing on-Country connections as important learning hooks for students. One observation is that when students are on-Country they seem much more engaged and ask a lot more questions than they normally do in the classroom. They understand concepts better and take a lot more ownership of their learning. Having connection to First Nations Australian rangers and Elders brings a sense of community and depth to language.

Staff at Leonora District High School commented that having students go out and experience learning on-Country and then returning to school to give explanations of their learning with the iPads has helped the students' confidence.

Snapshots of DTiF schools

Deakin University noted in its project evaluation report:

For Indigenous students, positive impacts on engagement and general capabilities were noted and supported with accounts of particular examples of successful practices and specific students. At schools with high proportions of Indigenous students, alignment with ... Aboriginal and Torres Strait Islander Cultures and Histories was an important consideration, with learning activities making connections with community cultural and linguistic resources. (Deakin, 2020 p. 8)

The following snapshots detail ways DTiF schools incorporated Digital Technologies in on-Country learning. Snapshot 1 looks at how on-Country learning was embraced through Leonora District High School's involvement in CSIRO's Two-way Science program and how it helped create a stronger link between the school and community. Snapshot 2 looks at how staff at Jabiru Area School used Scratch programming with their students to create interactive tours of Kakadu for visiting students. Through their project, teachers were able to explore the design process with students and helped them apply a growth mindset when learning to program computers.

Snapshot 1 – Two-way Science at Leonora District High School



Figure 2: Leonora, Western Australia

Going 'out bush' is a longstanding tradition at Leonora District High School. Principal Jeanette Maxfield believes that it offers a great opportunity to build positive relationships with the community and to develop cultural understanding. It gives students and teachers the opportunity to connect the learning that can be achieved on-Country to the Australian Curriculum.

Working with David Broun, Senior Coordinator for the CSIRO Science Pathways for Indigenous Communities, Kado Muir, Cultural Protocol Officer at the Ngalia Heritage Research Council, and Fifi Harris, Aboriginal and Islander Education Officer at Leonora District High School, students

participated in a Two-way Science project where they used traditional methods to catch *Mamutjitii*, also known as the ant lion, and observe its features. This links to the Australian Curriculum: Science where students learn that living things can be grouped by observable features and how they adapt to their environments.

The Two-way Science program has enormous value to students as it reconnects them to a traditional system of learning where family members teach the knowledge. Kado Muir, local Ngalia Elder, tells the traditional story of *Mamutjitii* on-Country using Dreaming stories and song in language. Students participate in singing and dance about the story of how *Mamutjitii* ended up under the ground. The junior school teachers discuss with students that there are different ways of teaching about *Mamutjitii* and they make connections between traditional song and dance and Western science techniques of creating scientific drawings.

Guided by David Broun, Kado Muir and Fifi Harris, students learn that they need to follow ethical and cultural guidelines when performing scientific inquiries on-Country. Secondary

teachers work with students to set pit traps to catch *Mamutjitii* and investigate whether invertebrates live in different habitats. Students predict and then gather data on whether invertebrates are more numerous in the school grounds or on-Country near an area built for railway workers at the turn of the 20th century, Malcolm Dam. The Walkatjurra Rangers discuss the practice of considering animal ethics and what processes students must follow when collecting specimens on-Country, showing respect for *Mamutjitii*. They also explain the cultural reasons why *Mamutjitii* should not be collected from certain areas, showing respect for Country. Students learn traditional Wangkatja words for plants, creeks and animals and make connections with Country through language to complement English words. Kado Muir hopes that by incorporating Aboriginal knowledge into the curriculum and students then seeing the world through the eyes of the Walkatjurra Rangers, students are able to learn the local knowledge with the Science curriculum.

Staff learning on-Country

During 2019, the staff of Leonora District High School, along with DTiF curriculum officers, Dee Poole and Martin Levins, headed an hour northeast to 'The Terraces' for a school development day. 'The Terraces', commonly known as 'The Breakaways', are rock formations, created through the erosion of plateaus by water and wind erosion.

The group set up camp at the top in a large clearing. A fire was lit, a makeshift kitchen constructed, and cars were parked fanned out from the fire as the shelter for the campers' swags. Fifi Harris, the Aboriginal education officer and wildlife carer, had brought along a group of 5 joeys that were too young to stay home alone. Figure 2 shows the staff assisting at feeding time.



Figure 3: Feeding the joeys

The evening's activities included viewing Jupiter and its moons through a telescope and guided scorpion hunting with black light torches.

The morning welcomed the staff with a cooked breakfast as staff who were unable to camp out arrived early Sunday morning to participate in the day's events. The school development day consisted of a trek through the Breakaways guided by Fifi who taught participants local language and stories throughout the journey. Staff were guided through looking for footprints in the dirt, identifying animal scat and explanations of various types of plants, insects, rocks and Aboriginal artefacts*. Staff located the tracks and scat of emus, dogs (possibly dingo), kangaroo and goanna.



Figure 4: Jupiter (the little white dot)

* Important note: If you find any Aboriginal artefacts do not remove them unless guided by local Elders.



Figure 5: Emu footprint - image from Measure app

Connections to the Australian Curriculum: Digital Technologies were discussed by Dee and Martin, noting that animal tracks can be seen as a way of representing data, as each print is a symbol that can convey meaning. The footprint can provide information about the direction the animal is moving, if they were running or walking and if they were being followed by a predator. A closer inspection of the scat of an emu can also indicate if the animal was laying eggs as the colour of the scat will change. This local knowledge would have been useful to those who were looking for food.

Motion sensor cameras had been placed by Dave (CSIRO) at the waterholes in this area and staff were able to view the many animals that were visiting the secluded hole in the rocks. This was a great opportunity to collect data on the variety of animals.

Samples of each variety of plant were collected as the group trekked. These were later sorted and classified into groups including plants that have a known medical use or those used as local bush cuisine. Plastic bags were placed over a range of plants to capture data on the transpiration rate.

Around the campfire lunch a mini professional learning session was delivered by DTiF curriculum officers on how to use a variety of 'fieldwork-ready' digital technologies to capture extra data and images. The group learnt how to use: Google Street View to capture 360° images for creation of virtual reality tours; a micro:bit to create a magnetometer, and the Measure app to measure and take images of items.

The final activity for all staff was a task that the student rangers regularly practise. Teams of staff had to start a fire with a flint. This required collaboration along with skilful technique and stamina. All teams completed the task although one team switched from the flint to using a pair of spectacles to start the fire.



Figure 6: One team working hard to light a fire with glasses.

The Leonora teachers headed home late Sunday afternoon, inspired with activities and knowledge that link Science, Digital Technologies, Literacy and Numeracy with Cultural knowledge and Wangkatha language. Back in the physical school, teachers enthusiastically incorporated new ways of having students digitise what they were doing through the CSIRO Two-way Science program. Using Scratch and ScratchJr, students used visual programming to control and animate sprites representing *Mamutjitii*.

Students learnt that digital technologies could be used to aid their learning in many different ways. They used a digital microscope to zoom in and study *Mamutjitii* in specimen jars in the classroom.

In an [Aboriginal and Torres Strait Islander Histories and Cultures Illustration of practice](#) on the Australian Curriculum website, Fifi Harris discusses how important learning on-Country is to students' personal and social capability and sense of identity: "The kids are learning who they are and when they find out who they are, they're going to be stronger people. If they have success out there, then they're going to have success in the classroom."

Teachers reported that student engagement increased through the project. Where students had previously been hesitant to record anything about their learning, conducting scientific investigations and recording their findings are now frequent occurrences. Teachers commented that learning on-Country has created a stronger link between the school and community.

Snapshot 2 – On-Country learning at Jabiru Area School

DTiF Curriculum Officer, Simon Collier, worked with teachers at Jabiru Area School in the Northern Territory. Students participated in learning on-Country with Kakadu National Park rangers who told them stories of Namarrkon, the lightning man. The stories of Namarrkon are told in rock art at Burrungkuy (Nourlangie) in East Arnhem. Namarrkon is an important ancestor who makes the lightning storms every summer. Students created tours of Kakadu for visiting students in Scratch. See Useful links for further information about Namarrkon.

The teachers at Jabiru Area School embraced computational, systems and design thinking skills in the Australian Curriculum: Digital Technologies and applied them through local knowledge sharing. Jabiru Area School has been popular with visiting schools, and teachers wondered if they could have the students produce a digital product that engaged the students with the Digital Technologies thinking skills and have an authentic audience (visiting students) with Kakadu as the context. The product of the teachers' discussions was that students created Kakadu virtual tours using Scratch.

The staff created authentic learning connections for students that catered for all students including those who had learning difficulties. They were delighted with the results as students showcased their thinking and their projects. Teachers used a design process with students to clarify what their learning intentions were. Students discussed who their audience was and designed their user interface on paper before doing any programming. This gave students direction to design virtual tours with interactive navigation buttons. Some students incorporated sounds and photographs. They all have text elements which motivated students to write. The school held a Digital Technologies Expo where students showcased their projects with community who were fascinated and amazed at what the students had produced. Sample projects on the Scratch platform include:

[Kakadu Virtual Tour 1](#)

[Kakadu Virtual Tour 2](#)

[Kakadu Virtual Tour 3](#)

Jabiru Area School teacher, Holly Harlow commented on how important their work with students on growth mindset was, "Coding can be very difficult and they were very easy to go 'I can't do it, I'll give up' so 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 5 different ways before they get the outcome."

Holly observed that one of the students had initially been upset that other students had copied his ideas but after some discussion his despair turned to the positive realisation that the other students had learnt something from him and they wanted to incorporate his ideas into their projects. She noted this as a turning point for the whole class on the value of collaboration. Students experienced great success collaborating with each other and then sharing that learning with younger and older students on the day of the expo.

Reference

Lynch, J., Auld, G., Cloonan, A., O'Mara, J. & Speldewinde, C. (2020) *Supporting the Implementation of Digital Technologies in Disadvantaged Schools: Case study of impact, outcomes and sustainability*, Deakin University, p. 8.

www.australiancurriculum.edu.au/media/7213/deakin-university-report.pdf

Resources

Two-way Science at Leonora – Illustration of practice

australiancurriculum.edu.au/resources/aboriginal-and-torres-strait-islander-histories-and-cultures/illustrations-of-practice/two-way-science-at-leonora-investigating-the-mamutijiti-antlion-and-other-invertebrates/

Useful links

CSIRO Two-way Science www.csiro.au/en/education/programs/indigenous-stem-education-project/science-pathways-for-indigenous-communities/resources

Kakadu National Park – Stories – Namarrkon
parksaustralia.gov.au/kakadu/discover/culture/stories

Narragunnawali early learning, primary and secondary resources (free to join and log in)
www.narragunnawali.org.au/curriculum-resources

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