INTERNATIONAL PIECE

Old Ways, New Ways: Coming together to learn

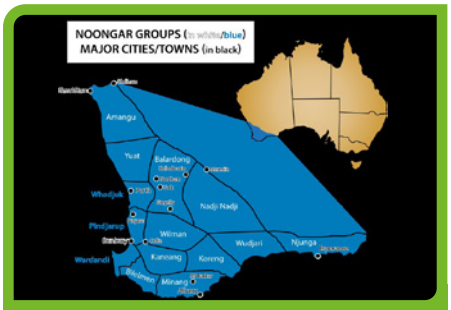
Jason Barrow and Caroline Bishop describe an approach that was designed to bring together traditional and contemporary science expertise and approaches in Western Australia

Keywords Contemporary, International, Aboriginal

Old ways, New Ways is an outreach initiative based at Edith Cowan University (ECU) in Perth, Western Australia.

The programme looks to bring together Traditional Australian Aboriginal knowledge and contemporary science expertise and perspectives. It has been developed to encourage, support and engage Australian Aboriginal and/or Torres Strait Islander children from Western Australia's low socio-economic communities.

ECU has three main campuses, all of which are situated on Noongar boodjar (country); two are situated on Whadjuk boodjar and the third on Wardandi boodjar. Noongar boodjar is situated in the southwest corner of Western Australia and comprises 14 groups.



The campuses and location
(Image taken from noongarculture.org.au)

How? Old Ways, New Ways: a unique approach

The premise of this approach is that we link Aboriginal cultural competency and the Traditional 'Old Ways' of Aboriginal science with contemporary or 'New Ways' of scientific knowledge. Participants learn through hands-on activities and peer-supported learning.

Old Ways, New Ways' primary objective is to improve the participation of Australian Aboriginal and Torres Strait children in science subjects, with a view to increasing educational and employment outcomes in science and technology. Currently, Aboriginal and Torres Strait Islander people are hugely under-represented in science fields. Old Ways, New Ways seeks to address this imbalance and educational disparity.

The programme enhances confidence in science-based learning, cultural identity and builds leadership and communication skills through peer-supported learning. This is achieved through intergenerational knowledge exchange and demonstrator training, while promoting positive role models who inspire the children to improved education pathways and science career opportunities.

Old Ways, New Ways' interactive workshops look to embed Traditional Aboriginal knowledge systems into contemporary sciences, thus increasing the relevance and depth of understanding for participants, while increasing a deeper connection with their cultural background. We act as a vehicle for children to connect with the programme to see their own cultural backgrounds reflected in what they are doing.

We work with a number of focus schools each year across metropolitan, rural, regional and remote areas of Australia. The same cohort of children attend the programme twice a term for the duration of the school year. Each term, the children participate in an 'Old Ways' session held at their school and a 'New Ways' session held at one of our three ECU campuses. Through this approach, we are able to build a rapport with the children and take them on a journey of ongoing narrative, while breaking down some of the barriers and preconceptions they may have around higher education institutions.

What? Our workshops

Creative, non-literacy-based, hands-on science activities create the foundation of the programme. Children are taken on a journey of scientific exploration, where Traditional methods of Australian Aboriginal bushland survival and environmental sustainability methodologies are celebrated, shared and linked to contemporary scientific practice. These workshops are complemented by and connected to practical contemporary science workshops that include: plant and human biology, chemistry, engineering, and computer and security science – all within the context of rigorous scientific knowledge and inquiry. The workshops are adapted based on the literacy, cognition and experience of each participatory group. Older children are trained as demonstrators and provide technical and theoretical expertise in running workshops for younger children. This approach aims to build confidence, communication skills and a greater depth of understanding of the presented subject areas.

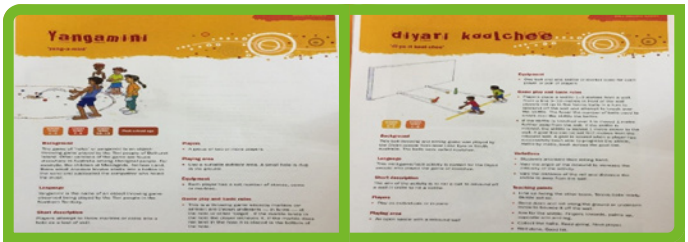
We reflect these strong cross-cultural partnerships within the outreach delivery team, which comprises both Australian Aboriginal and non-Aboriginal staff from Traditional and academic learning backgrounds.

Additionally, the initiative provides training and teacher resources that promote cultural competence and facilitate the integration of locally relevant and specific Australian Indigenous knowledge systems into the science curriculum. Both cultural relevance and alignment with the current school science curriculum are exemplified in the content and delivery of each of the workshops. Close consideration is given to historical, social and language perspectives. Through professional development for teaching staff, we aim to normalise the integration of Aboriginal culture into the curriculum and discuss practical approaches to undertaking activities outside of the standard classroom setting.

Some examples of programme delivery

Ages 4–5

Adaptation of Traditional Aboriginal games modified to incorporate fine motor play while exploring concepts of aim, flight trajectories, arcs, ricochet and angles.



Download full resource at : www.sportingschools.gov.au/resources-and-pd/schools/yulunga

Yangamini is an object-throwing game. In this case, we started with hacky sacks being thrown into a small bucket. Participants experiment with different throwing styles (underarm, overarm) and predict outcomes and trajectories of the thrown item. Observations are encouraged around outcomes, and discussions are facilitated regarding where and how these acquired skill sets and outcomes may benefit them. The game is upskilled by using different parameters and materials: changing throwing distance, size of throwing object (changing to tennis ball), size, angle and shape of target. Participants further predict difficulty and alter their throwing style to accommodate these shifting parameters.

(L) Bucket and hacky sack. (R) Tennis balls with a variety of targets

Diyari Koolchee looks at rebound and ricochet. Participants changed the angle of the flat surface that they bounced the ball from, predicting how this changed the trajectory of the bounced ball.

Years 1 and 2 (ages 5 and 6)

The interactive workshops for Years 1 and 2 explore the concepts of aim, flight trajectories and arcs. These concepts are expanded to explore levers and their impact on achieving increased flight velocity and distance of the thrown item. Participants are introduced to Miros, also generically known as woomeras (spear throwers). The components of the Miro are broken down: a shaft with a cup or spur at the end that supports and propels a projectile. The Miro is a low-mass, fast-moving extension of the throwing arm, increasing the length of the lever (arm). The extra length allows the thrower to impart force over a longer distance, imparting more energy and higher speeds. Children are encouraged to think about contemporary adaptations of these concepts, i.e. dog ball throwers.

The workshop is structured to test out concepts of velocity and distance. Inflatable kangaroos are placed as targets. Participants initially try hitting the kangaroo while throwing with just their arm, then dog ball throwers are introduced and observations are made regarding the increased distance, speed and accuracy that tool utilisation can produce.

(L) Kangaroos inflated and ready for target practice
(R) Jason explains the use of spears and spear throwers

Years 3 and 4 (ages 7 and 8)

The concepts explored in the first two sessions are further expanded upon with the introduction of throwing Kylies (boomerangs). The two boomerang types are introduced: returning and non-returning; and the principles of balanced and non-balanced aerodynamics are explored. The physics of flight is broken down and gyroscopic precession is explained, while exploring and expanding upon the combination of spin, forward motion and lift.

Display of different types of boomerang designs

L-R The process of learning to throw returning boomerangs

Years 5 and 6 (ages 9 and 10)

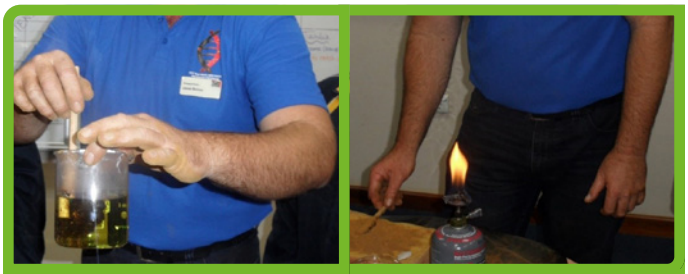
Children are introduced to the Balga (also known as a Grass tree, *Xanthorrhoea preissii*): its classification, historical naming conventions, medicinal and practical uses, the Noongar significance of the plant and the concept of 'caring for country' through Noongar environmental knowledge and links with the 6 seasons.

By analysing Traditional Noongar tools, children are able to discuss Aboriginal social and gender systems and the importance of caring for the environment in a sustainable way. Additionally, the significance of interconnected observation and connection to country is explored in order to source the natural materials required to make Noongar tools.

Children grind the raw ingredients required to make Traditional glue for tool making, and experiment with different heat sources and the results obtained from these approaches.

Display of Aboriginal artefacts and tools with Noongar labels

(L) Jason displays materials for bush glue
(R) Children grind ingredients for the preparation of bush glue



Jason compares the methods of solidifying bush glue mix: (L) Jason demonstrates the hydrophobic properties of bush glue mix when added to hot water (R) Jason demonstrates how to make a taarp using fire

Who? Importance of partnerships

The Old Ways, New Ways programme's success is attributed to the strong partnerships between our Australian Aboriginal communities and its host university, ECU. The programme is co-ordinated through ECU's centre for Aboriginal and Torres Strait Islander education and research, *Kurongkurl Katitjin*. *Kurongkurl Katitjin* is a Noongar phrase meaning 'coming together to learn'. The centre's purpose is to provide excellence in teaching, learning and research in a culturally inclusive environment that values the diversity of Indigenous Australian history and cultural heritage – the guiding principle for Old Ways, New Ways.

ECU academics and students, from a range of disciplines, provide workshops on our three campuses. This links seamlessly with the utilisation of our Australian Aboriginal Elders and knowledge keepers, who deliver their expertise in a variety of outdoor settings. We recognise equal parity between cultural knowledge held by our Elders and the knowledge of our academics.

Children's feedback

In order for us to gauge the efficacy of the programme, children are asked to complete a feedback form at their first and last sessions of the school year. We aim to capture attitudinal shifts around children's connection to science, Aboriginal culture and their cultural background, relationship with their schooling, confidence and plans for the future. We use emojis to assist children who may have challenges with literacy.

Quotes from 2018

- **Did you like science before this workshop?**

  'No I didn't really like science before but now it is amazing that you learn more about your culture' (Aboriginal girl, Year 5 – age 9)

  'No, because the resources didn't tell us about old science, Aboriginal science' (Boy, Year 5)

- **What did you most enjoy?**

  'I enjoyed the whole thing. The people talking to us were kind, clear, respectful and answered all my questions and I loved the experiments we did. They were awesome!' (Girl, Year 6 – age 10)

- **Other comments:**

  'I wish that I could enjoy that amazing experience everyday :) If I could rate it out of 10, I would definitely give it 20!!!' (Girl, Year 5)

We acknowledge the Traditional Custodians of the land on which we live, work and play: the Whadjuk Noongar people. We pay our respects to Aboriginal and Torres Strait Islander cultures and to Elders past, present and emerging.

For further information, please contact the authors at the addresses below.

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