Charles Sturt University

Foundation Trust

Stream Weavers: The Living Legacy of First Nations' Aquatic Wisdom

Research Project – **Developing Cross-cultural Capabilities in Environmental Education**

Underpinning all that we do is a commitment to engage with, learn from and champion First Nations peoples. With support, we will invest in increasing First Nations peoples' success in higher education as students, graduates, researchers and staff. This doesn't just sit with our First Nations colleagues; it's everybody's purpose and everybody's opportunity.

Charles Sturt University - Case for Support

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Introduction

We are excited to present a unique opportunity to support First Nations led knowledge sharing whilst contributing to future environmental sustainability.

Our project, led by **Dr. Nick Ruddell** (*left*) and **Dr. Holly Randell-Moon** (*right*), focuses on developing cross-cultural capabilities in environmental education in the Riverina region, situated on Wiradyuri Country in south-west New South Wales.

The Riverina, which includes the Murrumbidgee River, part of the Murray-Darling basin, has experienced environmental degradation due to intensive agriculture, grazing, and previous water management practices. This degradation, along with drought and climate change, impacts water health and fish habitat biodiversity.

Our project aims to address these challenges by designing and delivering education packages that integrate place-based, cross-cultural concepts of river habitat sustainability into the NSW middle-school (Years 5-8) curriculum at four to six over three years.

These packages will develop teacher and student capabilities to co-design sustainable and adaptive fish engineering practices and promote Indigenous/non-Indigenous collaboration for climate change mitigation.

Stream Weavers The Living Legacy of First Nations' Aquatic Wisdom Overview

First Nations led: We are proud to have the support of local Indigenous stakeholders for this project. Last year in Wagga Wagga, in the company of Professor Sue Green, Aunty Lorraine Tye and Uncle James Ingram asked us to develop resources to enable the project to be delivered into schools. A pilot school outside of Wagga Wagga was proposed. Aunty Maria Williams, who is the leader of the Wiradyuri Elders Council, was briefed and was also supportive of the project. This local Indigenous support underscores the importance and relevance of our project in promoting Indigenous engagement and environmental sustainability.

Project Outcomes

Our project is designed to achieve the following outcomes:

Transformative Education Programs: Enable First Nations knowledge holders and schools to collaborate and co-design environmental education; ensuring that the environmental leaders of the future have a depth of understanding in caring for country which encompasses both scientific and First Nations knowledge.

Sustainable River Management: Ensure students develop capabilities for understanding the scale and design required for sustainable river management and fish habitat.

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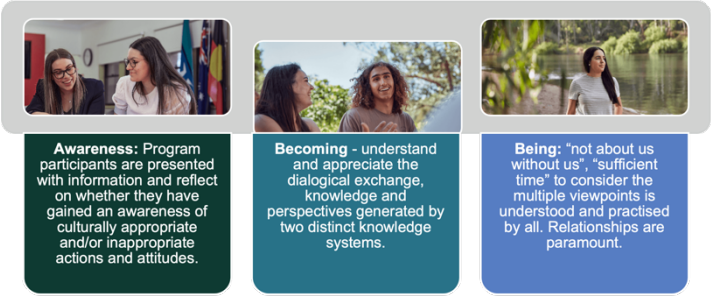
Increased Awareness: Enhance student understanding and awareness of river environment management, water health, and fish habitat biodiversity in the Riverina.

Curriculum Integration: Increase the incorporation of sustainable practices into the school curriculum and foster youth engagement in sustainable activities.

Stream of Knowledge – A Snapshot

Mutual Cultural Responsivity (Ruddell, 2019a) is defined as a pathway for communities of practitioners to produce learning experiences that satisfy a collective goal and highlights the necessity of delivering research based educational programs that are designed for, and with, an entire school community.




Week 1 school works through **"Awareness"** stage of mutual cultural responsivity framework in order to begin engagement with on country First Nations


Week 2 – students to investigate river health habitat and sustainability in the Riverina; school to work through **"Becoming"** stage

STEM

Week 3 – students learn about Indigenous Australian science and engineering, approaches to sustainability and river health habitat.


Week 4 – Students build mini fish traps using lego to model and using a stream table that models a river or stream , test water flows and percentage of fish stock required for sustainable habitat.


Week 5 – Students create a report, video or presentation of the findings from their stream table tests.


Week 6 – Schools, students and Elders exchange knowledge and stories a work toward the **"Being"** stage

Education Activity - Sample

Focusing on fish trap engineering, our proposed learning plan supports transformative education programs for schools to increase water health and prevent fish habitat loss by implementing a cross-cultural school science curriculum for Year 5 and 6 students.

Brewarrina fish traps

Middle-school (years 5-8)

Using the Brewarrina fishery as an example, students are introduced to fish stock sustainability and basic engineering principals of fish trapping. Working on collaborative learning group teams, students design and build at least two dry-stone-wall 'traps' using a lego base-board. Stones are substituted with 5cm blue metal road gravel. A stream table set up with variable water flows will allow students to test their designs in terms of strength and ability to function when confronted with fast/slow, high/low water levels.

Materials required for water experiments have been developed in collaboration with Charles Sturt Engineering.

- **A prototype desk sized stream table** will provide a science testing apparatus for fish trap models developed by collaborative student groups.
- **Charles Sturt Engineering** have also developed a viscous 'mud' for the stream table that will enable students to shape and model their local river/creek environment.
- **A 3D printer** will produce river/creek obstacles such as tree branches, small and large rocks.