

Professor Sara Tolbert

Ako | Education

Science Curriculum

Sara's research focusses on supporting young people's critical engagement with science through locally and globally contextualised science curriculum. This is an important goal in Aotearoa New Zealand as enrolment numbers in traditional science programmes at universities are declining, and fewer 15-year-olds see the value of science compared to their international peers. At the same time, climate change adaptation is identified as a key area for future job growth and a major disruptive force throughout society in the years to come. Therefore, providing young people the skills to respond to future challenges with science-informed knowledge and critical thinking is vitally important.

About Sara

- PhD Science Education
- Teaching Credential with ESOL endorsement
- Co-lead, Ōtautahi Food Justice Research Collaborative, UC Community and Urban Resilience (CURE)
- Co-director, UC Learning for Earth Futures (LEAF) research cluster



Sara has been involved as a Subject Matter Expert to the science learning area for the NZ Curriculum Refresh, proposed to take effect in the 2027 school year. This process has included an ongoing national conversation around what the science curriculum has looked like historically and what changes are required given the current challenges we face. Importantly, this conversation carefully considers what strategies and resources are needed to bring that plan to life. In today's context some of the key issues include students' ability to:

- Understand and draw from multiple knowledge systems (e.g., classical science, Indigenous knowledge systems),
- Understand transdisciplinary approaches to current scientific challenges,
- Have the analytical skills needed to differentiate low quality from high quality information, and
- Use their analytical skills to guide future action.

“Research shows that students learn basic science concepts better when they are set within real-world problems and issues. In our current context, curricula also need to create space for other valid knowledge systems such as mātauranga Māori and Indigenous knowledge. Science curricula focused on current issues can help all students better engage with science and can inspire more students to be engaged citizens and see themselves as change-makers for creating a more sustainable and just world.”



Amelia Threadgould and Sara Tolbert (left) have organized gardening workshops for local primary students and UC pre-service teachers at the UC community garden.

Research Impact

The Issue: Sara’s research and practice ethos is *“Reimagining science and education for a just, caring, & sustainable world”*. Young people today have contributed the least to climate change yet will experience the greatest impacts from it. In increasingly volatile and extreme climates, science provides vitally important information for mitigating and adapting to climate change. Sara’s research focuses on practical applied interventions that revise curriculum and increase knowledge, skills, and long-term engagement with science and sustainability.

Research Example: A good example of how this gets put into action is a current project on school gardening. This research is funded by the UC Community and Urban Resilience initiative (UC CURE) and the UC Child Wellbeing Institute and is co-led by postgraduate student Amelia Threadgould and her supervisors Sara and Professor Diane Mollenkopf, in collaboration with the UC Community Garden (Waiutuutu), the UC Sustainability Office, and Merrin School, a local full primary school. This work has multiple targets of change, including developing face to face and virtual curricular materials, upskilling local kaiako (teachers) and ākonga (students), and following up to determine how the food growing focus of their teacher education experience has carried through into their teaching practice. Through a revised curriculum kaiako and ākonga have improved skills to grow their own food. In turn, changes in behaviour will support more local and sustainable food sources in addition to the nutritional and health gains from eating fresh fruit and vegetables. The programme aims to spread the seeds of more people identifying as capable and confident to grow their own food.

The Impact:

- Direct engagement in curriculum reform will affect the way science is taught in Aotearoa New Zealand schools for more than 800,000 ākonga in primary and secondary schools.
- Capacity-building approach means that kaiako upskilling through preservice teacher education supports local schools to deliver the revised curriculum. Changes in teaching practices will be evaluated after 1 year.
- Engaging multiple key partners and groups (e.g., local community groups, local schools, and university students and staff) generates opportunities for shared knowledge and overall community capacity building.

