

Pūhoro STEM Academy

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Pūhoro STEM academy, based at Massey University, supports almost 1,000 Māori students around the country in Science, Technology, Engineering and Maths. NZASE Science Communicator Mikhal Stone spoke with teachers, principals and Pūhoro staff about how it works.

Beginnings

Naomi Manu works out of the office of the Assistant Vice-Chancellor (Māori and Pasifika), led by Selwyn Katene. When she looked at the stats, Naomi found Māori students were well represented in many faculties, but making up less than two percent in the sciences. Thinking about how Massey University could increase the numbers of Māori students in STEM subjects, Naomi realised she needed to bridge the gap between tertiary and secondary.

At a meeting she organised between first-year Massey science lecturers and Science HoDs from local high schools, uni staff said that externally-assessed L3 NCEA science standards best-positioned students to enter their courses. The teachers mapped the needed externals from L3 back to L1, developing a pathway to university. Naomi then challenged schools to enrol Māori

students in all three externals at L1. Schools were nervous; Māori rarely did externals; how would they cope?

And so Pūhoro was born – a support system to help Māori students achieve with external exams, get into STEM courses at university and the STEM workforce. Pūhoro signed an agreement with Massey University with public good outcomes as a measure of success rather than recruitment targets; “It’s about doing the right thing,” says Naomi.

Schools were asked to select 15 level one Māori students who were interested in science – not just those with good grades, but also those on the periphery who showed a curiosity about the world. They needed to include a mix of students. “Some may be smart Māori students, not well connected to their Māori identity; other students may be talented performers and speakers but poor at STEM,” says Leland Ruwhiu, Kaihautū lead for the program. Pūhoro wants to strengthen both identity and academic achievement.

Structure

Kaihautū are selected to be guides on this journey. These current tertiary students work with students at their school in weekly visits that involved alternating sessions:

- **Tutor-led sessions** to help students with the science learning that is current for them, for internal as well as external assessment. Students indicate the areas where they need help, and paid tutors guide them in their learning in small groups.
- **Kaihautū-led sessions** include:
 - 21st-century skills – resilience, note-taking, study skills. These are couched in the context of pūrakau; e.g., Maui slowing

The Pūhoro logo. Kaihautū Leland Ruwhiu, says “Pūhoro is the scrolling shape on the side of the waka, signalling speed and advance. Kaihautū are the big mouths who ensure everyone rows in time.”

Pūhoro students at NASA in Houston, Texas in 2019.



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the sun (time management), Maui working with his brothers (teamwork).

► Career exposure –speakers are asked to think of their 15-year-old selves, and talk about their STEM work and how they got there.

► Tuakiri / identity – when these students become part of the STEM workforce they will also bring their unique identity.

One day each term all the Pūhoro students in an area meet at university for a Wānanga. These involve activities linked to science and maths, including lectures, lab practicals such as genetic variation of fruit flies, dissecting animals at the vet school, looking at All Blacks stats (and playing a game in VR).

“The wānanga are great,” says Stacey Lambert, liaison teacher for Palmerston North Boys High School. “With real labs and lectures they normalised being at university. They also connected students from different schools and this was a big deal for the students, becoming

part of a community of Māori science students.”

Wānanga for Auckland schools are held at MU’s Albany campus. Michal Denny, HoF at Auckland Girls’ Grammar School, says: “The wānanga are amazing. Speakers have included scientists, entrepreneurs and Ihumātao activist Pania Newton – out-there, go-getting inspirational young

Māori women and men. They also had a session on future directions I was impressed with – students were encouraged to think about their values and what is important to them.”

Sharon Krishna, Manurewa High School liaison, says: “We have junior wānanga too, where 18 students from each school compete in STEM challenges. It can increase interest in science and Pūhoro”. The program also offers whanau days with age-appropriate activities for siblings.

Leland says: “we have some results that show our program makes a big difference.



Dawn Hirschberg, Pūhoro kaimahi: “Last year we had overnights at Raukawa Marae, where our school has strong links. When I go down there I am in the students’ world. They are the hosts; it’s a different dynamic.”

In our first year, Pūhoro students did better in L1 externals than the national average for all students. And two-thirds of these students were not on a trajectory to sit science externals based on their Y10 results and behaviour.”

In later years the program extended to cover L2 and L3. “Pūhoro operated with very little funding at the start,” Leland says. “Massey University provided an office, and we were supported by small grants from Palmerston North City Council, Te Tumu Paeroa and Te Puni Kōkori.” However, with Provincial Growth Funding until the end of 2022 Pūhoro can now expand into Hawke’s Bay.

Pūhoro kaimahi

The liaison teachers or Pūhoro kaimahi are the linchpin for the program. With three levels, a liaison teacher may be dealing with organising 50 students’ attendance at weekly sessions and wānanga, and all the related communications between students, school leaders and Kaihautū.

Andy Fraser, principal at Ōtaki College, says in this role “you need a highly-committed staff member who can liaise well with people – it’s important they have some mana and are respected to deal with any kick-backs.” Leland and Naomi said that the person in the role needs to be good at building relationships, with Pūhoro and with students. All the Pūhoro kaimahi spoken to emphasised the importance of having a time allowance for their role.

Dawn Hirschberg is the Pūhoro kaimahi for Ōtaki College. She helps at weekly sessions (they were short a chemistry tutor) and also attends wānanga. She appreciates their support – “Pūhoro provides transport for the 70km to the uni, so students can easily get there - all they have to do is turn up to the



Luke Orbell of Manurewa High school gives his pepeha in the competition



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school to get a lift.”

Stacey says, “At our school Māori have been underrepresented in senior sciences, largely due to streaming, which has limited their choices. Pūhoro has provided extra support for our Māori students in both their science learning and their Māori identity.” Stacey acknowledges the drive of the science HoF, Geedha Reid and the support of the school’s senior management.

“Our school is organised into year-level form classes but approval was attained from senior management to introduce a multilevel form class consisting of the Pūhoro students,” says Stacey. “This allows more effective monitoring of students and for tuakana-teina relationships to develop.”

Joseph Houghton, the Director of Māori and Pasifika achievement at Shirley Boys’ High School, says that “numbers of Māori and Pasifika drop in the senior sciences, with some teachers saying it is too academically challenging. We want to disrupt that narrative and show young Māori can be passionate about science and can achieve.”

Michal Denny says “This is a fantastic program for our Māori girls. We have one kaihautū who has been with us for three years and who has built a strong relationship with the girls. This year all our tutors are Pūhoro graduates. I don’t currently teach any of our level two or three Māori students in Pūhoro but attend all the weekly sessions and the wānanga, so I can form relationships with all of them. I am in regular contact with the girls and many of them came to chat with me at course selection time, about their future career plans and the subjects they should take next year.”

It’s not easy finding a weekly time that works. Principal Andy Fraser says “it was challenging to fit it in our timetable but if it’s good for kids we make it fit.” Some schools meet at lunchtime or in the morning during the time for roll call and assembly. Sharon



AGGS student Leilani Hayes in a lab at the wānanga on Massey’s Albany campus.

says “at Manurewa High school we meet at 2.30 when the school finishes early, but attendance can be an issue as students are tired and have competing commitments. I follow up on absences because it’s noticeable that those whose achievement improve are those who attend regularly. Next year we’re

trying a new time.”

Dawn finds it difficult when students go into subjects other than science but still want to be part of Pūhoro. “It’s hard for me to see some students drop out, as an adult I can see the value. But teenagers, especially boys, don’t think the same way,” she says.

Challenges and benefits

There have been some unique challenges for the Pūhoro program this year. They have had to cancel their overseas trip, which connects selected year 13 students with indigenous science in other countries. Joseph says that “during lockdown, our Kaihautū, Chante, went the extra mile, delivering care packages, phoning and zooming regularly to keep the students connected and the relationships strong.”

Pūhoro now has more than 800 students across 29 schools in four regions, and also at universities across the country. Leland Ruwhiu says that “85 percent of students from 2016 are now in their second year at uni, and many are still in touch with us and with each other as a community of Māori learners around the



AGGS students at Auckland’s Year 10 STEM challenge.



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country.” Naomi says: “three of our founding students have established a Māori Science tutoring company which co-ordinates the tutoring program for Pūhoro at levels 1 and 2.”

There are numerous benefits to the Pūhoro program. As well as a lift in their achievement in external exams, many schools report improved retention of Māori students in the senior sciences. Stacey also found that “the Māori students gained a greater sense of connection and pride in their school.”

All teachers reported greater student confidence. Dawn says, “There is more confidence and a greater willingness to give it a go. Students will stick with things if they have support, if they have confidence. We are seeing really positive effects.” Stacey says that “other teachers noticed these students gaining confidence, asking more questions, contributing more to class discussions.”

Andy Fraser says: “It’s a good story; Māori students are engaged in Pūhoro, they love being part of it, the wānanga approach works. The program also provides ongoing PD for teachers – they are inside the tent, seeing how it works.”

Jordan Housiaux-Dustin, ex-pupil, tutor and Kaihautū for Ōtaki College, says “the results go beyond the quantifiable. Many of these students never saw themselves on a science pathway but now do. Exposed to science jobs they can see themselves at uni, that they are supposed to be there. They say, ‘I used to think science was not for me, too hard but now I am thinking about science as a career’”

Sharon Krishna says: “Our students have also increased in confidence with their own pepeha and making links to iwi. One year 13 student has applied for a Ngārimu VC and 28th (Māori) Battalion Memorial Scholarship with Pūhoro support.”

Ngā Kupu

Kaimahi – Worker

Kaihautū – Person who calls the time for paddlers in a waka; producer

Mātakitaki – Watch, observe

Pūrakau – Ancient stories

Rakahinonga – Entrepreneur, entrepreneurial

Tuakana-teina – Mentoring or buddy relationship between older & younger student

Wānanga – Hands-on learning, field trips

From Te Aka Maori Dictionary

Some of the Puhoro staff at a celebration in 2019.



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