Aboriginal and Torres Strait Islander Girls STEM Mining and the Lands Camp

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Research and government reports clearly demonstrate that girls are much less likely to take up science, technology, engineering, and mathematics (STEM) subjects and careers, especially Aboriginal and Torres Strait Islander girls.

A 2021 report by the Australian Council of Educational Research (ACER) has found that while one in four university students enrol in a STEM field, only one in eight females commence a STEM degree. Furthermore, while female STEM students have a high degree completion rate, fewer than one in three are employed in a STEM-related field the year following graduation (ACER, 2021, p.1).

Even fewer are working in a STEM occupation five years after graduation. For example, the Department of Industry, Science, Energy and Resources's online 'STEM Equity Monitor' (2021a) calculates that of 25,502 university graduates in 2011, the majority (65 per cent) obtained a non-STEM qualification. The remainder obtained a health degree (19 per cent) or STEM degree (16 per cent). Of those with a STEM qualification, 62 per cent were male and 38 per cent were female. For female STEM graduates, only 26 per cent were employed in a STEM occupation by 2016. This translates to approximately 403 women out of 25,502 graduates working in STEM five years after graduation.

The figures are even more concerning for Indigenous Australians. Of the 25,502 university graduates in 2011, only one per cent identified as Aboriginal and/or Torres Strait Islander. The vast majority (90 per cent) received a non-STEM qualification. Of those with a STEM degree, 42 per cent were female and, of these, only 45 per cent

were working in STEM jobs by 2016 (STEM Equity Monitor, 2021a). Putting this into figures, there were approximately 255 Aboriginal and Torres Strait Islander graduates in 2011 of whom 26 gained a STEM degree and approximately 11 were female. By 2016, eight women were working in non-STEM fields and only three were employed in a STEM occupation.

YouthInsight was recently commissioned by the Department of Industry, Science, Energy and Resources to seek the views of educators who regularly work with Indigenous students regarding their experiences of engaging Aboriginal and Torres Strait Islander girls in STEM. Findings published on the Department's website (STEM Equity Monitor, 2021b) include:

- Aboriginal and Torres Strait Islander girls, particularly those in secondary school, were identified by teachers as having lower confidence levels than non-Indigenous students, leading to self-doubt.
- There is a need for more relatable role models in STEM, including from Aboriginal and Torres Strait Islander backgrounds, and particularly role models from these backgrounds who are female, local and/or within students' communities and schools.
- It is important to show the real-world connections and impact of STEM to make STEM learning more tangible to Indigenous students.

Educators involved in the survey identified making STEM education more relatable to female Indigenous students, along with helping them to identify educational and career pathways in STEM, as priority areas of engagement for Aboriginal and Torres Strait Islander girls (STEM Equity Monitor, 2021b).

The Indigenous Girls' STEM Academy launched by the National Indigenous Australians Agency (NIAA) is a ten-year, $25 million program to mentor high-achieving Aboriginal and Torres Strait Islander girls and women who aspire to education and careers in STEM. The Academy operates across Australia, offering a variety of opportunities, including the CSIRO Student Initiative which will support up to 1,000 Indigenous girls in Years 9 to 12, through tailored support, internships, and work experience. In addition, the Stronger Smarter Institute is offering a 'Teachers of STEM Initiative' which will support the training of up to 100 new, STEM-specialist, female Aboriginal and/or Torres Strait Islander teachers (NIAA, 2020).

Drawing inspiration from the NIAA's efforts to support Aboriginal and Torres Strait Islander women and girls to explore education and careers in STEM professions over the next ten years — and in partnership with AngloGold Ashanti and hosted by Curtin University — the Association of Independent Schools of Western Australia (AISWA) Future Footprints Program piloted an immersive five-day 'Indigenous Girls STEM Mining and the Lands Camp'. Specifically designed for students in Years 9 – 12, the camp sought to explore post-school pathways into future study and career opportunities in STEM.

A total of 25 young women from Australian Independent Schools Western Australia (AISWA), Catholic Education Western Australia and Department of Education schools applied to attend the camp held during the second week of Term 1 holidays. Eleven girls, from Years 9 – 12 and drawn from 10 schools located across Perth, were successful. The 11 girls undertook an extensive schedule of immersive activities, that included visiting several mine sites (with all safety equipment supplied), participating in robotics and geology workshops, and networking with representatives from AngloGold Ashanti and BHP. The girls spent time with mine-site rehabilitation expert and botanist Professor Kingsley Dixon and met with Curtin University Indigenous Chair of Biodiversity and Environmental Science Professor Steven van Leeuwen. They also attended the Western Australian Museum Boola Bardip, the South Metropolitan TAFE underground mine simulation centre, and toured St Catherine's College student accommodation at the University of Western Australia (UWA).

The camp concept was originally championed by legendary WA mining educator Odwyn Jones, former principal of the WA School of Mines in Kalgoorlie for fifteen years, and a long-time advocate of increased Aboriginal involvement in the state's mining and resources sectors. AISWA Aboriginal Education Consultant and Future Footprints Lead, Lisa Fieldhouse, said that the camp provided, "a fantastic opportunity for the girls to gain insight into the full breadth of possibilities that STEM can offer and the importance of conservation". She acknowledged the significant efforts Andrew Hannah and Tim Keely at Curtin University, and especially those of Josie McCafferty of AngloGold Ashanti, Keith Ross of TPG, and Odwyn Jones for making this opportunity possible. AISWA Future Footprints is now excitedly looking forward to planning the next Indigenous Girls STEM Mining and the Lands Camp in 2022.

Selected student reflections from the post-camp student survey

"My favourite part was going to the Talison mine, specifically the plant because I thought it was really cool and informative."

"My favourite part about the camp was going to see the open pit mine and going to the Perth Museum. This was my favourite because I hadn't seen an open pit mine before neither have I gone to a museum."

"I want to be able to look after the land and explore more plants and animals."

"It has made me more passionate about why I want to do what I want within the industry."

> "I think we really need more indigenous women in STEM to make a change to the way companies mine places without consulting the Indigenous people the land belongs [to]. [We need] to help form a bridge between the two and listen to what the Aboriginal elders of each mining area want to do."

It with great pleasure, and much appreciation, that AISWA Future Footprints offers these concluding reflections on the camp by Hayleigh Duck, a Year 11 boarding student at Penhros College.

Student camp reflection

Hi, I'm Hayleigh. I recently attended the first Girls STEM Mining and the Lands camp hosted by Curtin University and Future Footprints. The camp was held during the second week of Term 2 school holidays. Participants got the opportunity to tour Curtin's facilities and gain information on mining offers. It was an amazing opportunity which I was glad that I was able to be part of. It gave me a better insight into mining life and the massive range of jobs available in the mining industry. I went into the camp not knowing anyone and being the only Penrhos girl attending, but soon after arriving I made some amazing friends.

Throughout the five days we completed a few activities and made it to two mine sites. Some of the activities we did were robot programming, a tour around the campus, and many talks from those in the mining areas. We also had a networking night where we could discuss our life after high school and meet the sponsors of the camp. On the Friday we took a trip down to the ALCOA mine in Pinjarra and Talison mine. Talison Mine in Greenbushes was one of my favourites, as we got to see the super pit and tour the processing plant, seeing the way they process materials in every detail. The trips to each mine site were especially fun as we got to chat and get to know one another even more. We met biologists and environmental scientists, but a real stand out for me was meeting Professor Kingsley Dixon who is a profound biologist. He visited us when we stayed in Waroona campgrounds for a night. He spoke about his studies, and his aspirations and goals for the environment, especially the restoration of the jarrah forests. Waroona had a beautiful view of the lake and on our way back to Perth we stopped in Mandurah for a delicious meal on our last night.

Overall, the camp was one of the best opportunities I could have been given. At first, I was unsure about whether I really wanted to go but I am extremely glad I went. I made some amazing friends and got to tour some impressive mine sites. If anybody ever has this opportunity, you will not regret it. I now know my opportunities if working on a mine is something I want to do in the future. Future Footprints is amazing for their promotion of camps run by universities and I strongly suggest attending them, not just to learn, but make friendships. ▲

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