**Title:** Indigenous Student Engagement in Science: A Case Study Addressing the Lack of Diversity and Equity in Biomedical Science and Pharmacy Research for Aboriginal and Torres Strait Islander People

**Running title:** Indigenous Science Student Engagement

Wukul Yabang\*, Elizabeth E. Manning1,2, Karen E. Mate, Saije K. Endacott, Guy J. M. Cameron1,2,#

1The University of Newcastle, Newcastle, NSW, Australia

2The Hunter Medical Research Institute, Newcastle, NSW, Australia

**\*Wukul Yabang:** Guy Cameron, Belinda Clarke, Loren Collyer, Dawn Conlan, Jessica Deburr, Kelly Drury, Charlie Faulkner, Cody Faulkner, Kayla Faulkner, Raylene Gordon, Jillian Green, Aunty Sandra Griffith, Daniel Groombridge, Sharron Hall, Lindsay Hardy, Jesse Hodgetts, Karen Iles, Laura Ireland, Alice Jackson, Simone Jordan, Amanda Kelly, Kumarah Kelly, Michelle Kennedy, Kelvin Kong, Jake MacDonald, Toni Manton, Markeeta Marr, Monica McKenzie, Tammy Parish, Aunty Colleen Perry, Marook Perry, Ngaja Perry-Tighe, Trumaine Rankmore, Julianne Rose, Jennifer Rumbel, Jason Smith, Rod Smith, Debra Swan, Eleanor Swan, Nathan Towney, Yeena Thompson, Shahni Wellington, Barry Williams, Aunty Gwen Wright.

**#Correspondence:** Guy Cameron

**Address:** Hunter Medical Research Institute, Lot 1 Kookaburra Circuit, New Lambton Heights NSW 2305, Australia

**Phone:** (+61) 02 4913 8070

**Email:** guy.cameron@newcastle.edu.au

**Abstract**

Indigenous representation in Australian biomedical science and pharmacy research remains limited due to systemic barriers, historical marginalisation, and culturally inappropriate educational frameworks. This article outlines a case study of initiatives at the University of Newcastle (UoN) aimed at addressing these inequities. Central to this effort is the establishment of the Indigenous Student Engagement Committee, which promotes Indigenous participation across all academic stages. Working in conjunction with key programs, including culturally embedded pathways like the Yapug and Miroma Bunbilla programs, undergraduate and postgraduate research fellowships, and culturally inclusive curricula, demonstrate UoN's commitment to fostering a robust pipeline for Indigenous researchers.

UoN's initiatives are grounded in collaboration with local Aboriginal communities, ensuring relevance and cultural safety. Early engagement programs with primary and secondary schools, supported by partnerships with the Wollotuka Institute, create pathways that demystify science and higher education. Hands-on experiences, such as laboratory work placements, enhance accessibility and interest among Indigenous students. At the tertiary level, efforts focus on indigenising curricula and providing dedicated spaces and mentorship that nurture academic success and cultural connection.

The article also highlights challenges, including the rigidity of traditional funding models, the discomfort of non-Indigenous staff in this space, and the need for flexible, inclusive recruitment practices. Recommendations for addressing these barriers include ongoing cultural capability training, mentorship programs, and tailored funding constructs that accommodate community commitments.

By outlining UoN’s comprehensive, culturally responsive strategies, this case study offers a model for increasing Indigenous engagement in biomedical sciences. It underscores the importance of systemic change, collaboration, and sustained investment in creating equitable pathways for Indigenous students and researchers, ultimately contributing to a more inclusive academic and research environment in Australia.

**SECTION 1: INTRODUCTION AND BACKGROUND**

In the broader Australian academic and research landscape, Indigenous representation has historically been limited.1 Systemic barriers, ranging from socio-economic challenges to a lack of culturally appropriate support within educational institutions, have contributed to the underrepresentation of Aboriginal and Torres Strait Islander people in fields like biomedical science, pharmacy, and medical research.2 This disparity is not only a reflection of colonial histories and ongoing marginalisation but also the result of curricula that traditionally follow Western approaches, with little room for Indigenous knowledge systems and cultural perspectives.3–5

However, there is a growing recognition of the need to address these imbalances. Institutions like the University of Newcastle (UoN) are beginning to take important steps to rectify this through initiatives such as the school of Biomedical Sciences and Pharmacy Indigenous Student Engagement Committee.6 This committee has set out to reduce barriers for Indigenous students and build a pathway to success in higher education and research by embedding Indigenous knowledge and support structures throughout the academic pipeline.

**Historical Context**

Australia’s colonial history has long dictated the educational and research sectors, sidelining Indigenous voices and knowledge.7,8 Historically, Aboriginal and Torres Strait Islander peoples have faced significant challenges in accessing education due to systemic racism, exclusion, and a lack of culturally relevant curricula.9,10 The educational experiences of Indigenous students have often been shaped by institutions and teaching styles that did not reflect their cultural values, worldviews, or learning needs.11

In recent years, the tide has begun to turn as universities, government bodies, and communities work towards increasing Indigenous participation in education, particularly in health and medical sciences. For example, at UoN, the Aboriginal and Torres Strait Islander Education and Research Framework has placed cultural knowledge at the heart of its approach.12 This framework supports both Indigenous and non-Indigenous students in gaining the knowledge, skills, and values necessary to bring about positive change in their professional practice.

**A Community-Centred Approach**

It’s important to note that this movement is not one-size-fits-all. Australia is home to hundreds of distinct Indigenous nations, each with unique histories, languages, and cultural practices. Any attempt to increase Indigenous engagement in science and research must be done in collaboration with the local Community. Institutions seeking to replicate or expand upon this work must understand the needs and priorities of the communities they serve.

A disclaimer is essential here: the strategies and approaches outlined in this article have been tailored to UoN’s specific context, developed in consultation with the local Aboriginal Community on Awabakal and Worimi Country. Those who wish to pursue similar initiatives must commit to engaging with local Elders and community leaders, ensuring their efforts are informed by the unique circumstances and values of each region.

**The University of Newcastle Context**

At UoN, we have taken concrete steps to create pathways for Indigenous students. Through specific entry programs, like the Yapug pathway which embeds Indigenous learnings in the curriculum, we aim to support students from the moment they express an interest in higher education.13 Other programs are course specific such as the Miroma Bunbilla Program for entry to Medicine, this enables students to be mentored by "Deadly" Indigenous doctors and medical students, to experience problem based learning and other key components of the medical degree, and also to undertake cultural activities.14 Whilst this institutional support has been key to increasing Indigenous enrolments across medicine, other programs such as biomedical science and pharmacy are still lacking.

To address this, we established the Indigenous Student Engagement Committee within the school of Biomedical Sciences and Pharmacy.6 Through the introduction of programs such as paid Indigenous Research Fellowships, meaningful Acknowledgment of Country in coursework, and with ongoing support from bodies like the Wollotuka Institute and Thurru Health Unit the committee has started to address long-standing gaps.15,16 However, these efforts are just the beginning. Our goal is to ensure Indigenous students succeed at every stage of their academic and professional journeys, from undergraduate enrolment to postgraduate research.

**The Pipeline: Different Stages, Different Needs**

As we work towards building a robust pipeline for Indigenous engagement in science and research, it’s clear that support cannot be uniform. Different stages of the academic journey from primary and high school engagement to undergraduate studies, Honours, and PhD pathways require different types of support. For instance, early interventions may focus on fostering interest in science among primary school students, while university-level support might focus more on mentoring, financial support, or cultural safety. This article aims to outline our approach alongside the steps already taken by the University of Newcastle as a case study for other institutions to learn from and assist with their journey towards cultural competence.

**SECTION 2: PRE-UNIVERSITY ENGAGEMENT**

**Engaging Students at the Primary and Secondary Level**

To achieve equity in Biomedical Sciences and Pharmacy, we need to connect with our Community early. In our experience engagement at the primary and secondary school levels needs to focus on making science accessible, interesting, and relevant to Indigenous students. Programs that introduce students to basic scientific concepts through culturally sensitive and engaging activities can help foster a positive relationship with learning and science from an early age. Moreover, linking these educational activities to real-world applications, such as how science impacts their own Community, health, and the environment, helps students see the value and relevance of science in their daily lives.

Partnerships with local schools are essential in this regard. These collaborations can provide tailored programs that not only highlight the importance of science but also integrate Indigenous knowledge systems. Offering hands-on learning experiences, such as field trips, workshops, and activities in partnership with local Elders, allows students to see the intersection of Indigenous knowledge and Western science in practice. For example, Deadly science have created science activities and resources that highlight traditional Indigenous scientific knowledge.17

**Wollotuka – High School Student Engagement**

The UoN Wollotuka Institute has been instrumental in engaging Indigenous high school students and preparing them for higher education.15 Wollotuka runs various programs aimed at encouraging Indigenous students to consider university as a viable and welcoming option. One of the standout initiatives is the outreach programs aimed at high school students, which offer insights into university life, showcase pathways available for Indigenous students, and create a support network to guide them through the often intimidating transition from high school to higher education.

Through these programs, students are invited onto the UoN campus to participate in activities designed to build their interest in a range of disciplines, including science and research. These programs often involve mentorship opportunities, where Indigenous high school students can meet current university students and staff, hear their stories, and see firsthand the opportunities that higher education can offer.

Wollotuka’s approach also focuses on removing barriers to university, ensuring all students feel safe and valued. By introducing high school students to academic settings early on, students gain familiarity and comfort with the idea of pursuing tertiary education. These early engagements are vital in creating long-term aspirations for Indigenous students to enter science, medicine, and research fields. Similarly demystifying the different degrees and how they align with individual student interests and goals can be instrumental for entering the biomedical research pathway.

**Work Experience in Labs**

One of the most effective ways to spark interest in science among Indigenous high school students is through hands-on work experience. At UoN, work experience programs offer high school students the chance to spend time in university labs, working alongside researchers and getting practical exposure to scientific techniques. These opportunities allow students to see themselves as future scientists and researchers, breaking down the mental barriers that may have previously made science seem inaccessible.

Such work experience programs are designed to be culturally appropriate and supportive, ensuring that Indigenous students feel welcome in these spaces. This experience not only provides valuable insight into the world of scientific research but also helps students build relationships with potential mentors and role models in the academic community. By giving students these tangible experiences, we are helping to build their confidence and enthusiasm for science, making it more likely that they will pursue further studies and careers in this area.

**Building the Foundation for Future Success**

By engaging students at these early stages, we are not only increasing the likelihood of their eventual success in higher education but also creating a pipeline that can help address the underrepresentation of Indigenous people in science and research. The programs offered through Wollotuka and the hands-on work experience in labs serve as a critical foundation for building interest, knowledge, and confidence in science among Indigenous students. These engagements lay the groundwork for the more structured pathways and support systems that exist at the university level, ensuring that students can continue their educational journey with a strong sense of purpose and belonging.

**SECTION 3: UNIVERSITY INITIATIVES**

**Teaching-Focused Initiatives in Tertiary Education**

Tertiary education is an essential component of the journey towards a professional career in healthcare and medical research. Every student brings their own cultural capital that can be an enabler or barrier to academic progress depending on how well the institution recognises and values diverse cultural knowledges and supports. The UoN Aboriginal and Torres Strait Islander Education and Research Framework places cultural knowledge and understanding at the centre of its approach.12 It fosters a holistic approach to support the success of Indigenous students: a culturally safe environment founded on recognition and respect, Indigenous spaces for networking and mentoring, academic support, and incorporation of Indigenous knowledges, perspectives and pedagogies within the curriculum.

The creation of a safe and inclusive environment where Indigenous students feel welcomed and valued is an important and multilayered first step that requires consideration of cultural and physical aspects. A safe cultural environment is built on the values, attitudes and practice of all staff and students, and requires an institution-wide focus on education and training to develop cultural awareness and responsiveness. It's a journey towards achieving a culturally responsive environment, yet it is possible through the introduction of mandatory training for staff and students, in addition to the introduction of graduate attributes in for every degree.18–20

Academic teaching staff are well placed to practice and demonstrate inclusive practices to students; simply sharing some aspects of their personal background and identity as an educator can foster a more open inclusive environment and encourage students to contribute to class discussions. Practices such as Acknowledgement of Country also help to establish and model inclusivity. A dedicated physical space for Indigenous students, such as the Birabahn building, home to the Wollotuka Institute at UoN, can act as a home away from home and provide informal and organised opportunities to connect with other students and community, and academic support in the form of tutoring and mentoring. Other learning environments such as lab spaces can be made more welcoming and inclusive with Indigenous language names and artworks. It is important for Indigenous students to see themselves and traditional knowledges reflected and valued in their studies.

“Indigenisation involves recognising and embedding Indigenous knowledges across the curriculum, developing a greater understanding of Indigenous peoples and cultures, and prepares graduates to work with a wide range of peoples, including Indigenous peoples”.21 There is no single way to achieve Indigenisation of curricula; it will be an ongoing process with changes implemented over time in collaboration with local Indigenous community and scholars and will require continuing evaluation and revision to be inclusive of First Nation peoples, perspectives and place.

Our initial work in this area in School of Biomedical Science and Pharmacy has determined scaffolded programmatic approach to Indigenisation of the curriculum building from foundational cultural knowledge and understanding including the actions and consequences of colonisation; followed by Indigenous perspectives on historical and current health and health-related research and discipline specific topics; and providing opportunities to apply knowledge to practice. Each of these stages of knowledge and understanding will be built within the framework of appropriate learning outcomes, environment, assessments and pedagogies, and will be developed collaboratively in the context of the values of equity, respect, self-determination, trust, community, reciprocity, reflection and country.

**Research-Focused Initiatives in Tertiary Education**

Introducing Indigenous students to research early in their academic journey is crucial for developing the next generation of Indigenous researchers. Such experiences should be built upon at the undergraduate and postgraduate levels. Offering research opportunities, fellowships/scholarships, and mentorships helps students gain exposure to the world of academic research, fostering a sense of belonging and capability in these spaces.

**Undergraduate Fellowships**

UoN has established several initiatives to encourage Indigenous students to pursue research careers. One key program developed by the School of Biomedical Science and Pharmacy Indigenous Student Engagement Committee is the Indigenous Student Research Fellowship.6 These fellowships provide paid opportunities for undergraduate students to work in labs or research settings alongside experienced academics, without the need for prior research experience. These fellowships not only offer practical experience but also help students develop critical research skills and networks that will support their future career, whether that is in academia or other research adjacent roles. Importantly, these fellowships provide funding, mentorship, and professional development opportunities that help students transition into postgraduate research roles, such as Honours and PhD programs therefore supporting the pipeline and building capacity in our future Indigenous researchers. Providing fellowships or scholarships reduces the financial burden on students, by allowing students to focus on their studies and engage more fully in research opportunities. Coupling scholarships with mentoring programs ensures that students have both financial support and academic guidance, which increases their likelihood of success and retention. Feedback from past Indigenous Student Research Scholarship students demonstrates the success of this program so far.

Students were asked what they enjoyed most about the program:

*“Ability to learn from professionals and leaders in the field. And the ability to work it around my schedule made the experience more enjoyable”.*

Students were asked if this program increased their interest in a research career:

*“I had never previously had very much experience to do with research, this program allowed me to understand the vast opportunity in the field of research. Mentors within the program showed how research is involved in many different careers, and how I can be involved in research in the future”.*

Students were asked to describe the impact of this program on their career goals:

*“It gave me options I had not considered before”.*

**Postgraduate fellowships**

Beyond the undergraduate level, fellowships offer pathways for Indigenous students to continue their research careers in a supportive and structured manner. At UoN, fellowships are designed to address the specific needs of Indigenous students, ensuring that they not only have access to research opportunities but also feel supported in culturally appropriate ways. The Thurru Indigenous Health Unit, for instance, plays a pivotal role in providing both academic and cultural support to students involved in postgraduate research fellowships, ensuring that their experiences are positive and empowering.16 Fellowships also foster long-term engagement with the academic community. By providing these opportunities, we are not only building the skills of individual students but also contributing to a broader shift in academia, where Indigenous voices and perspectives are increasingly present in research that impacts their communities.

**Wukul Yabang and Research Our Way strategy**

The Wukul Yabang (meaning "One Path") community research panel is a groundbreaking approach that centres Indigenous ways of knowing, doing, and being in research.22,23 The Indigenous led panel comprises of Community members including Elders, researchers, doctors, allied health professionals and people with lived experience. This initiative advocates for Indigenous-led research, where Indigenous people take control of the research process, from the formulation of research questions to the dissemination of results. The goal is to ensure that research conducted in the Hunter and New England regions is conducted in ways that are culturally safe, respectful, and relevant to Indigenous communities.

Wukul Yabang challenges traditional Western research methodologies, which have often excluded Indigenous perspectives or have been conducted on Indigenous people rather than with them. By adopting a research "our way" approach, Indigenous researchers are empowered to lead research that aligns with their community's values, knowledge systems, and priorities. Wukul Yabang reflects a shift towards more ethical and inclusive research practices that prioritise community engagement and the co-creation of knowledge.

**Supporting Indigenous Researchers Through Every Stage**

Creating a sustainable and supportive pipeline for Indigenous researchers requires targeted initiatives at every stage of their academic journey. From undergraduate research opportunities and fellowships to participation in conferences and Indigenous-led research initiatives like Wukul Yabang, it is essential to ensure that Indigenous students and researchers have access to the tools, networks, and resources they need to succeed.

These initiatives not only provide tangible support but also help change the academic culture by normalising Indigenous leadership in research and creating a more inclusive and culturally responsive research environment.

**Wollotuka - Current Student support**

At UoN, the Wollotuka Institute serves as the cultural and academic hub for Indigenous students, providing them with a range of support services that cater to their unique needs.15 Wollotuka plays a critical role in ensuring that Indigenous students feel welcomed, culturally safe, and supported throughout their academic journey. This holistic support model includes academic assistance, cultural mentoring, pastoral care, and social opportunities to connect with other Indigenous students and staff.

Wollotuka’s work with current students is central to student retention and success. The institute fosters a strong sense of belonging and pride in Indigenous identity, which is crucial in a university setting that can often feel alienating for students who come from marginalised communities. Through regular events like welcome lunches, cultural workshops, and leadership opportunities, Wollotuka helps students maintain a connection to their culture while navigating the demands of higher education.

In linking with Indigenous student support programs across other Australian universities, Wollotuka’s approach is part of a larger national movement to improve the academic experience for Indigenous students.24–27 Many universities now recognise the importance of providing dedicated support services for Indigenous students and have implemented similar cultural and academic support models. By working together, these programs create a network that allows students to feel connected across institutions and ensures that Indigenous students have the support they need to succeed, regardless of where they study.

**Student Leadership**

Within the Indigenous Student Engagement Committee at UoN, having a dedicated student representative is an important way to ensure that the voices of Indigenous students are heard in decision-making processes.6 This student member acts as a direct link between the committee and the broader Indigenous student body, bringing forward student concerns, feedback, and suggestions to improve the university's engagement with Indigenous students.

The role of the student committee member is not only to represent their peers but also to act as a bridge between academic staff and the student body. This position helps ensure that the university’s initiatives, such as indigenisation of the curriculum and student support services, are informed by the lived experiences of Indigenous students. Their input has been invaluable in shaping the direction of our committee’s work, ensuring that it remains relevant and effective in addressing the challenges Indigenous students face.

The inclusion of a student voice also fosters greater transparency and accountability within the committee. Students can see that their concerns are being taken seriously and that they have an active role in shaping their educational experience. This collaborative approach empowers students to advocate for their needs while also encouraging a greater sense of ownership over their academic journey.

**Section 4: CONCLUSION/DISCUSSION POINTS**

**Staff Comfort and Level of Understanding**

One significant barrier in increasing Indigenous engagement and inclusion in research is the discomfort or lack of understanding among non-Indigenous staff. There is often a misconception that Aboriginal and Torres Strait Islander students and researchers must work on Aboriginal-specific research. In reality, Indigenous researchers, like any others, have diverse interests and should be encouraged to pursue whatever field they are passionate about, whether it is Indigenous health or any other area of study.

Mentorship is crucial here; mentors do not need to be working on Aboriginal-specific projects to provide valuable guidance. Academic mentorship is about developing skills, networks, and career progression, regardless of the research focus. It is essential to dispel the fear among potential mentors that they need specific knowledge of Indigenous issues to effectively support Indigenous students. Non-Indigenous staff and mentors can still contribute significantly to the career development of Indigenous researchers by providing advice on academic processes, research methodologies, and career navigation.

**Moving Past Fear: Starting the Conversation**

A well-meaning desire to engage with Indigenous issues or support Indigenous students often comes with a fear of doing or saying something wrong, which can lead to inaction. This fear can paralyse staff, particularly those with limited exposure to Indigenous cultures, preventing them from engaging with Indigenous students and researchers. Overcoming this fear starts with fostering open, culturally safe dialogues within academic departments.

Staff need to understand that the fear of making mistakes is natural, but it should not prevent them from taking the first step. Institutions should provide ongoing cultural capability training to help staff feel more comfortable in navigating Indigenous issues. At UoN we are fortunate that this training is mandatory for all staff and has also recently been introduced for students. The emphasis should be on building relationships and undertaking significant engagement before implementing a strategy and also being open to learning, adapting and improving.

**Lessons Learnt and Barriers: Funding Constructs and Fellowships**

One barrier that often arises is navigating the rigid structures of scholarship and fellowship contracts. Traditional funding models may not always align with the unique needs of Indigenous researchers. For example, many Indigenous students may have commitments to their communities or need more flexible study arrangements, which can be at odds with funding timelines or contractual obligations.

Institutions need to reflect on these barriers and consider alternative models of funding that provide flexibility for Indigenous researchers. This could involve adjusting the length of contracts, allowing part-time study or research positions, or offering extended time frames for projects to accommodate community commitments. By acknowledging the diverse needs of Indigenous researchers, we can create funding models that are more inclusive and supportive.

**Building Up Indigenous Researchers: Creating Supportive Pipelines**

While advertising scholarships and positions is important, simply making these opportunities available is not enough to build a strong pipeline for Indigenous researchers. Many Indigenous students and early-career researchers may lack the support or guidance to confidently apply for these roles. Institutions must take a proactive approach by building up Indigenous researchers well before they reach the stage of applying for PhD or early career researcher (ECR) positions.

This involves targeted programs that develop research skills, networking opportunities, and mentorship well in advance of formal job applications (for example the Indigenous Student Research Fellowship, described in section 3). It also includes providing opportunities for Indigenous students to gain teaching or research experience as part of their roles, ensuring that they have a broad set of skills that will make them competitive when applying for positions. Mentorship, research training, and career development support must be integrated throughout the academic pipeline, from undergraduate programs through to postgraduate research and beyond.

**Flexibility in Recruitment: Pathways to PhD and Teaching Experience**

Recruitment processes for Indigenous researchers need to be flexible. For example, there may be cases where a candidate requires additional time or support to complete a PhD as part of their role. Recruitment criteria should recognise these pathways and allow for flexibility in gaining further qualifications or experience while in the role, while also recognising other valuable cultural knowledge they may bring to their role.

Moreover, positions should offer the opportunity for Indigenous researchers to gain experience in areas like teaching if that is required for career progression. Building in flexibility allows for a more supportive and realistic career trajectory for Indigenous researchers, particularly in institutions where there may not yet be a critical mass of Indigenous academic staff.

**Realistic Expectations: Recognising the Diversity of Indigenous Knowledge**

It’s important to recognise that not all Aboriginal or Torres Strait Islander researchers will have comprehensive knowledge of all aspects of Indigenous culture. Each individual’s cultural knowledge and life experience will differ, and it is unrealistic to expect every Indigenous researcher to have deep knowledge of all Indigenous matters. This assumption can create additional pressure and unrealistic expectations for Indigenous staff.

Recruiters and institutions need to be clear about their expectations for roles involving Indigenous researchers. A Certificate of Aboriginality (COA) is not sufficient on its own to fulfil a complex academic or research role. Transparency is key, institutions must clearly outline the skills and experiences required for the role and should not place additional cultural expectations on Indigenous candidates unless they are explicitly part of the job description. Indigenous researchers should be able to bring their authentic selves to their work without feeling the need to represent all aspects of Indigenous knowledge.

**References**

1. Wilks, J. & Wilson, K. A profile of the Aboriginal and Torres Strait Islander higher education student population. **57**, (2015).

2. Harfield, S. *et al.* Enablers and barriers to primary health care access for Indigenous adolescents: a systematic review and meta-aggregation of studies across Australia, Canada, New Zealand, and USA. *BMC Health Serv. Res.* **24**, 553 (2024).

3. Tuhiwai-Smith, L. *Decolonizing Methodologies*. (Zed Books, 2021).

4. Harrison, N. & Clarke, I. Decolonising curriculum practice: developing the indigenous cultural capability of university graduates. *High. Educ.* **83**, 183–197 (2022).

5. Behrendt, P. L., Larkin, P. S., Griew, M. R. & Kelly, P. Review of Higher Education Access and Outcomes for Aboriginal and Torres Strait Islander People: Final Report. (2012).

6. The University of Newcastle. Indigenous Student Engagement Committee. *School of Biomedical Sciences and Pharmacy* https://www.newcastle.edu.au/school/biomedical-sciences-and-pharmacy/indigenous-student-engagement-committee (2024).

7. Properjohn, C., Grace, R. & Sullivan, C. T. Colonial dominance and Indigenous resistance in Australian national education declarations. *J. Educ. Adm. Hist.* **56**, 293–311 (2024).

8. Burridge, N. & Chodkiewicz, A. An Historical Overview of Aboriginal Education Policies in the Australian Context. in *Indigenous Education: A Learning Journey for Teachers, Schools and Communities* (eds. Burridge, N., Whalan, F. & Vaughan, K.) 11–21 (SensePublishers, Rotterdam, 2012). doi:10.1007/978-94-6091-888-9\_2.

9. Moodie, N., Maxwell, J. & Rudolph, S. The impact of racism on the schooling experiences of Aboriginal and Torres Strait Islander students: A systematic review. *Aust. Educ. Res.* **46**, 273–295 (2019).

10. Bodkin-Andrews, G. & Carlson, B. Racism, Aboriginal and Torres Strait Islander identities, and higher education: Reviewing the burden of epistemological and other racisms. *Divers. High. Educ.* **14**, 29–54 (2013).

11. Llewellyn, L. & Boon, H. J. Culturally Appropriate Behaviour Support For Australian Indigenous Students: What Does The Literature Show? (2015).

12. The University of Newcastle. Aboriginal and Torres Strait Islander Education and Research Framework. *Office of Indigenous Strategy and Leadership* https://www.newcastle.edu.au/our-uni/strategic-plan/indigenous-commitment/tabs/indigenous-education-strategy (2021).

13. The University of Newcastle. Yapug. *Pathways* https://www.newcastle.edu.au/study/pathways/yapug (2019).

14. The University of Newcastle. Miroma Bunbilla Program. *Joint Medical Program* https://www.newcastle.edu.au/joint-medical-program/aboriginal-and-torres-strait-islander-students/miroma-bunbilla-program (2015).

15. The University of Newcastle. The Wollotuka Institute. *Indigenous Commitment* https://www.newcastle.edu.au/our-uni/indigenous-commitment/the-wollotuka-institute (2013).

16. The University of Newcastle. Thurru Indigenous Health Unit. *School of Medicine and Public Health* https://www.newcastle.edu.au/school/medicine-and-public-health/thurru-indigenous-health-unit (2023).

17. DeadlyScience. Deadly STEM in Schools. https://deadlyscience.org.au/programs/deadlystem-in-schools/.

18. The University of Newcastle. Cultural Capability. *Introduction to Equity and Cultural Capability* https://www.newcastle.edu.au/study/pathways/nuprep/cultural-capability (2023).

19. The University of Newcastle. Cultural Capability Framework. *Cultural knowledge and understanding*.

20. The University of Newcastle. Graduate attributes. *Looking Ahead - Strategic Plan 2020-2025* https://www.newcastle.edu.au/our-uni/strategic-plan/life-ready-graduates/graduate-attributes (2024).

21. Al-Natour, R., Fredericks, B., Bargallie, D., Marrie, H. & Bond, C. *Great Guide to Indigenisation of the Curriculum*. https://acquire.cqu.edu.au/articles/report/Great\_guide\_to\_Indigenisation\_of\_the\_curriculum/13393868/1 (2016).

22. The University of Newcastle. Aboriginal Health Research Strategy. *Research to influence change* https://www.newcastle.edu.au/our-uni/indigenous-commitment/research-to-influence-change/aboriginal-health-research-strategy (2023).

23. The University of Newcastle. Sector-first approach to Indigenous health research. https://www.newcastle.edu.au/newsroom/featured/sector-first-approach-to-indigenous-health-research (2024).

24. The National Indigenous Australians Agency. Indigenous Higher Education Units. https://www.niaa.gov.au/our-work/early-childhood-development-and-education/indigenous-higher-education-units.

25. Charles Sturt University. First Nations Students. https://www.csu.edu.au/current-students/support/first-nations-students.

26. Macquarie University. Aboriginal & Torres Strait Islander student engagement. https://www.mq.edu.au/about/about-the-university/commitment-indigenous-australians/student-engagement/programs-services.

27. The University of Sydney. Support for Aboriginal and Torres Strait Islander students. https://www.sydney.edu.au/study/student-life/student-support/aboriginal-and-torres-strait-islander-support.html.

**Contributions**

Wukul Yabang provided intellectual input into the manuscript; Manning EE, Mate KE and Endacott SK provided intellectual input, and contributed to writing and editing the manuscript; Cameron GJM conceptualised and wrote the manuscript.

**Acknowledgements**

The authors would like to acknowledge the following people for conversations, yarning and support for this paper and our broader work: Kathleen Butler, Felicity Collis, Sarah Corr, Christopher Dayas, Dane Hansen, Jay Horvat, Tameka McFadyen, Codie Neal, David Newby, Hannah Pipe, Sharleen Slater, Bekki Spratford, Denzel Tighe, Nikki Verrills, Amy Whiteman, Lisa Wood.

**Funding**

Funding sources are not applicable to this article.