

# ‘You’ll Never Get Cultural Competence in Science’: An Australian Perspective on Integrating Cultural Competence into Science Teaching Via Cultural Accountability

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## Abstract

In the last decade, the Australian higher education sector has championed the inclusion of cultural competence (CC) as a key graduate quality. Diverse disciplinary learning and teaching approaches require careful consideration about how best to achieve the end goal of supporting graduates on their individual, life-long pathways to engage with CC. Science can be viewed as an inflexible and immovable discipline. This perception seems particularly prevalent with respect to scientists acknowledging epistemes outside of a western cultural frame. It follows that eliciting curriculum reform with respect to CC broadly, and Aboriginal and Torres Strait Islander perspectives more specifically, was perceived to be a significant challenge. Through interviews with eleven non-Indigenous academics across the Faculty of Science at the University of Sydney, we uncovered several strategies for including multiple knowledges in science, with academics traversing these new horizons by building on the work of and collaborating with Indigenous Elders and academics to create enriched learning spaces. Alongside these strategies are staff reflections on their CC journey, which indicate that this endeavour entails necessary and vital discomforts that ultimately enable transformation. This process while guided by CC, led to experiences of cultural humility and a conviction in the role of cultural accountability.

## Acknowledgement of Country

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## Introduction

‘You’ll never get cultural competence in science’<sup>1</sup> was a message delivered to some of our academics when the revised graduate attributes at the University of Sydney, NSW, were being introduced. This paper is a reflection on how, as a non-Indigenous community of practice in the Science Faculty attempting to develop CC, have tried to build on the works of Aboriginal and Torres Strait Islander academics (for example: Nakata 1997, 2004, 2007, 2010; Bodkin-Andrews & Carlson 2016; Sinclair 2019; Fredericks & Bargallie 2020; Sherwood & Mohamed 2020) to challenge this assumption and undertake professional and personal journeys to achieve a step towards integration of CC across the sciences. Contending with disciplinary, curriculum and governance constraints shaped our efforts in this particular academic space. Dealing with ignorance, naivety, unconscious bias and ‘push-back’ underlie both our personal and professional experiences on this journey.

Incorporating cultural competence (CC) into the Faculty of Science via teaching and research at the University of Sydney has been a key aim of the University’s Deputy Vice Chancellor for Indigenous Strategy and Services (DVC ISS). This has been incentivised in faculties and schools via the availability of funding from the Wingara Mura-Bunga Barrabugu ‘thinking path to make tomorrow’ strategy (2012-2019)<sup>2</sup>. This funding was made available to staff to embark on initiatives to embed Indigenous perspectives and knowledges into teaching, learning and research to improve Indigenous participation in the tertiary sector and generate clear pathways for success (Sherwood & Russell-Mundine 2017).

The roll-out of these initiatives was accompanied by a dedicated leadership in CC program, the establishment of Associate Deans for Indigenous engagement, and the formation of the National Centre for Cultural Competence<sup>3</sup> (NCCC) which provided CC training and awareness modules available to all staff (Sherwood & Russell-Mundine 2017). In addition, key events such as the Connecting Cultural Competence to Curriculum Event in November 2016 and the Transforming Lives: Cultural Competence at the Interface Symposium in November 2019 provided forums for professional development. However, in most cases, the implementation of initiatives at the teaching interface, especially with students, was left up to the dedicated and enthusiastic academic staff who took on this work as an additional task. This meant that most staff went on a journey, often operating in relative isolation, both professionally and personally via their efforts to understand, embody and inspire CC.

### Cultural competence

Cultural competence is a term and concept that emerged in the 1980s (Cross, 1989), that has historically been applied to social and health work for improved communication and positive outcomes for patients from diverse backgrounds with different identities. Ultimately, CC rests on the practice of critical self-reflection and ‘is a psycho-socio-cultural journey, influencing our ways of being in the world’ (Hill, Tulloch, Mlcek & Lewis, 2018, p.15). Since its inception, the term has been scrutinised heavily, and exactly what it takes for a person to be ‘culturally competent’ is widely contested (Tervalon & Murray-Garcia, 1998; Nakata, 2007; Greene-Moton & Minkler, 2020). Other terminology, such as cross-cultural competence, intercultural competence or cultural intelligence have emerged in attempts to better articulate the requisite knowledge and skills developed via CC (Bartel-Radic & Giannelloni, 2017).

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<sup>1</sup> We want to acknowledge that Health Sciences were one of the first disciplines to integrate CC, and that this comment was in reference to the broader Faculty of Science at The University of Sydney.

<sup>2</sup> For more on this strategy, see <https://www.slideshare.net/sydneyuni/wingara-mura-bunga-barrabugu-strategy>

<sup>3</sup> For more on the NCCC, see <https://www.sydney.edu.au/nccc/>

However, concepts such as cultural humility have better exposed key tensions in the CC debate; these being (i) whether CC can be empirically measured, and if not, what is the ‘aim’? (Tormala, Patel, Soukup & Clarke, 2018) and (ii) CC has little relevance to, or capacity for, (radically) addressing structural problems (Danso, 2018). In contrast, cultural humility embodies anti-oppressive practice by placing less emphasis on the pursuit of knowledge and skills and more emphasis on a life-long commitment to nurturing self-evaluation and critique, fostering interpersonal sensitivity and combatting power imbalances (Fisher-Borne, Cain & Martin, 2015; Danso, 2018; Campinha-Bacote, 2018). Cultural humility has been promoted by many academics as a concept to supplant CC (Tervalon & Murray-Garcia, 1998; Fisher-Borne, Cain, & Martin, 2015; Danso, 2018). Furthering the debate, it has also been argued that CC and cultural humility are twin concepts that require integration (Ortega & Fuller, 2011; Danso, 2018; Yancu & Farmer, 2017). Campinha-Bacote (2018) goes as far as to merge the terminology into ‘cultural competemility’. As Greene-Moton and Minkler (2020, p.145) argue ‘both concepts increasingly have stressed the need to challenge the institutions and systems in which we live and work that may, wittingly or unwittingly, enable these injustices to remain’.

Across academia, CC is being implemented to address inequalities and inequities in leadership, teaching, learning and research. This means that implementation of strategies and approaches to improve CC must happen at all levels, from individuals to communities and institutions within the university realm. With inclusivity and diversity key cornerstones of the current strategy of The University of Sydney, CC operationalises culture change via critical reflective practice. Early efforts at increasing cultural capacity across the university were focused on recognising cultural bias by examining our individual cultural lenses. Unpacking our ontological and epistemological psycho-cultural settings to determine and address personal and communal biases, by focusing on ‘The Self’ as opposed to ‘The Other’, was deemed foundational for transformative action (White, Logghe, Goodenough, Barnes, Hallward, Allen, Green, Krupat & Llerena-Quinn, 2017).

For teaching, CC is a key graduate attribute, meaning this approach must be embedded in pedagogy, content and assessment. While this suggests measurability, we follow the notion that CC is a lifelong journey and not a destination with a defined outcome (Palmer & Carter, 2014; Hill et al., 2018; Sherwood & Mohamed, 2020). As Harvey and Russell-Mundine (2019) explain, while graduate attributes are embedded within non-Indigenous frameworks, they can be used to interrogate and analyse non-Indigenous disciplinary knowledge constructions, assumptions and pedagogical approaches. For more on interpreting, adopting and adapting CC graduate attributes see: Sue, 2001; Lum, 2010; Flavell, Thackrah & Hoffman, 2013; Page, Trudgett, Bodkin-Andrews, 2019. Due to the ongoing marginalisation, continued colonisation and subjugation of Indigenous peoples and their ways of knowing, being and doing within the academic space and beyond, this focus has shaped most of our initial efforts to improve CC in science at The University of Sydney (Cross, Bone, Ampt, Bell, Quinnett & Gongora, 2020). This was paired with cultural awareness modules made available through the NCCC that focused specifically on introducing Indigenous knowledge systems to academics at The University of Sydney to provide a foundation for their ensuing journeys.

### **The importance of integrating Indigenous knowledge into tertiary science**

Decolonisation of science is a fraught space due to cultural perceptions of what constitutes science, and a ‘western’<sup>4</sup> frame dominating notions of science at the global scale. Positivist, reductionist views of science as objective fact render invisible the cultural machinations that western science is founded on and reproduced within. Internal debates in western science that inspire discussion and dispute regarding the ‘purity’ of science, and what can be called science (including applied science) is most prevalent in interdisciplinary pursuits (Welch, 2018). With Indigenous knowledge systems transcending western disciplinary boundaries, these ways of thinking and doing have historically been undermined and devalued in non-indigenous, discipline-bound sciences. It has been argued by Holmes, Murray, Perron and Rail (2006) that science has been territorialised and is a tool of colonisation that subjugates and excludes other forms of knowledge, deeming it a fascist structure. In agreement, Bodkin-Andrews and Carlson (2016) discuss epistemic racism and the ongoing ways that our tertiary education systems perpetuate and reinforce knowledge hierarchies and therefore silence and erase Indigenous cultural practices and values. It is for these reasons that integration of CC in science means instigating a process of critically engaging with science as a cultural product. In this way, CC encourages understanding the socially constructed nature of knowledge, and the multiplicity in this space, where ceremony, story and the ‘supernatural’ can co-exist (Sepie, 2017).

### **Developing a compendium of practice**

#### **Aims**

This study aimed to collate perspectives, strategies and content from ‘first wave’ efforts to embed CC in curricula via the first iteration of the Wingara Mura-Bunga Barrabugu strategy. While we recognise that since this first iteration, there has been much development across Science with integrating CC, we aimed to capture and consolidate a compendium.

#### **Process and outcome**

Mid-2018, via the Associate Dean Indigenous in Science and nine Heads of School, we were able to identify those championing the ‘first wave’ integration of CC in curriculum. These academics were acting as interlocutors, by translating the aims of the Wingara Mura-Bunga Burrubugu strategy into actions for improving CC of students. With most acting in relative disciplinary isolation – but able to get advice and feedback from DVC ISS and NCCC staff – there was a need to identify this network and to develop a platform for sharing synergies and strategies. Through this process, we developed a CC compendium of practice, documenting the work conducted so far across the Faculty of Science. This compendium was developed and made available via a popular Learning Management System (Canvas) so that all members of the campus community (staff and students) could have access, with staff able to add content and information. In this way, we build a repository of resources and a legacy of strategies to showcase and inspire via an iterative process on a dynamic shared platform.

### **Methodology**

The study participants are all authors of this paper. Participation resulted in 9 semi-structured interviews and 6 qualitative email responses (some interviewees offered further responses to interview questions via email). A representative from eight of nine Schools within the Science Faculty was interviewed. We reached out to the School of Physics with limited response at the

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<sup>4</sup> Given the contributions to science from non-western origins, the perception that science is ‘western’ is in itself problematic.

time of this study (2018), but with an understanding that they are pursuing the integration of Indigenous astronomy in teaching and learning. Two additional academics were interviewed from the School of Life and Environmental Sciences due to the breadth of the School from agriculture to plant sciences. The eleventh participant was in Educational Innovation at the University of Sydney and was instrumental in the initial roll out of cultural competence as a graduate attribute and associated efforts to embed Indigenous perspectives in curricula.

The interviews/written responses were multipurpose; they were conducted to examine the approach and processes employed by others in the Faculty of Science who took on the initial challenge to embed CC in curriculum. Questions posed to each interviewee revolved around reasons for taking on this initiative in their respective disciplines, their personal journey with CC (for example, how competent did you feel? How did you build this competence? Was critical reflection a part of that process? What realisations did you have?), strategies for integrating CC into teaching, reception of this by students and colleagues and barriers and enablers to integrating CC. Interview notes were transcribed and, together with written responses, were analysed thematically via manual qualitative coding, which is appropriate due to the small number of interviews. We utilised both *a priori* and emergent coding, with the former shaped by the interview questions and validated by two co-authors/participants. What emerged during interviews were very emotional and personal stories of this journey – the pitfalls, the lessons learnt and reflections on navigating what Nakata (1997, 2004, 2007, 2010) terms the ‘cultural interface’. The themes that emerged were utilised to produce the results section of this paper, which was further edited and vetted by study participants, aka authors. Interviews and written responses were used as gateways to gather resources and other material from across the Science Faculty to include in a CC compendium of practice.

### **Content and connections**

The following offers a brief overview of the catalogue of content and teaching strategies used by Schools across the Faculty of Science to embed CC in teaching, and to some degree, research. This is a summary of the ‘first wave’ attempts to build CC in curriculum – from approximately 2013-2018, noting that this has expanded considerably in recent years.

In the School of Life and Environmental Sciences, the earliest iterations of CC in curriculum emerged in the disciplines of agriculture, environmental land management and plant sciences. Here, the first initiative to include CC in coursework involved the development of an intensive and immersive unit of study. This unit, AGEN3008 Indigenous Land and Food Knowledge, was developed and delivered in collaboration with a range of Indigenous Elders, Indigenous organisations, Indigenous community members and Indigenous academics who all subsequently educated students and staff in the field and on Country. This unit involved a 13-day field trip to meet with Indigenous Elders, academics, rangers and land managers from Darwin and Katherine in the Northern Territory and Kununurra in Western Australia. Students developed projects entailing small grant applications as feasibility reports on new enterprise options for Indigenous communities. Critical reflections were key throughout this course – from engaging in activities to expose cultural lenses to daily debriefs while in the field, to a formal critical reflection assessment task that included keeping a personal diary throughout the field trip.

To develop teaching materials that integrated Indigenous perspectives, inspiration was drawn from seminal works by Gerritson (2008), Gammage (2011) and Pascoe (2014) that outline evidence of Indigenous agriculture. This content opened up discussions on decolonisation of agriculture and food systems, especially with regards to the native foods industry and

Indigenous enterprise based on sustainable use of natural resources, instigating the Indigenous Grasslands for Grains project (Pattison, Bell, Keitel, Leung, Phillips, Roth, Khoddami, Cross, Craigie, Drake, Lee, Badaoui, 2020). Additionally, cultural practice such as Caring for Country and associated cool or cultural burning (Steffenson, 2020) offered alternative perspectives on resource and environmental management sparking discussions on environmental justice and protection and maintenance of sacred sites or sites with high cultural significance.

Plants offer a key focus for understanding Indigenous relationships with Country via their indication of environmental and seasonal change and as totemic species with embedded kinship. In plant science teaching, the integration of Indigenous knowledges first occurred through language. Indigenous leader, Professor Jaky Troy, explains the power of speaking language: ‘the first time I spoke my own language I broke down and wept’ (Troy, 2015). These words consolidated the focus to offer the Sydney language in curricula and the vernacular of plant science courses (Quinnell, Troy, Poll, 2020) and to the campus community at large via the CampusFlora app. Responses from students and staff to being able to learn some of the Sydney language as it relates to plants has been overwhelmingly positive.

In the School of Psychology, CC was explored via a more traditional route with a focus on practitioner-patient relationships. At the time of this study, virtual reality software was being discussed as a way to breakdown bias and overcome cultural barriers during consultations, with clients and practitioners developing avatars to facilitate openness. New pedagogical techniques were developed by academics to encourage budding psychologists into an ongoing professional habit of critique and reflection on self and personal assumption-making via a group support model. Beyond this, the role of spiritual taboos and Indigenous views on mental distress and health were discussed as future spaces for exploration.

In the Sydney School of Veterinary Science, since 2012 CC as a reflective practice was embedded in all stages of the degrees on offer. These efforts focused on practitioner-client relationships by expanding understanding of animal-human relationships and how these differ across cultural contexts, including Indigenous contexts. The themes have included: perceptions of animals; use of animals across cultures; non-human kin relationships in Indigenous cultures; traditional practices to conserve and manage animal diversity; weather knowledge related to animals; and conflicts and bridges with western science. Various species were used to showcase the teaching, including crocodiles, emus, platypuses and snakes amongst others, and used a learning structure based on ‘two ways of knowing’ where themes were co-taught with Indigenous knowledge holders (and development of or use of publicly available resources under the guidance of these knowledge holders) to offer both Indigenous and western science perspectives (Gongora, Vost, Zaki, Sutherland, Taylor, 2020). Students have expressed that they see the relevance of Indigenous knowledge systems in the curriculum and to their future careers. In addition to the inclusion of Indigenous cultural competence in the curriculum, an Indigenous Science seminar series was hosted by this school (2013 – 2018) and featured Elders and other Indigenous scientists. This seminar series exposes students and staff across the University to different ways of thinking about science and the impact of science. Furthermore, students were encouraged to participate in internship programs based in remote Indigenous communities to deepen their understanding and to gain experiential learning.

In the School of Mathematics, CC was integrated by focusing firstly on promotion of groupwork in learning and teaching. While this may seem a small step, in the disciplinary context of the School, where maths is often an individual pursuit, this was providing an avenue for breaking down cultural barriers among students. Furthermore, certain teaching aids (for

example those developed by Nicky Case: <https://ncase.me/>) were used to show how maths could be used to quantify and predict bias as well as breakdowns in trust. Discussions within the School facilitated ideas for mathematically mapping Indigenous kinship systems in partnership with Indigenous mathematicians – a pursuit that is ongoing.

In the School of Geosciences, academics in the discipline of geology initially engaged with the roll-out of CC at The University of Sydney in 2017 (Bell, Hartman, Uptin, Barahona, Beg, Couslon, Ni, Eymont, Hubble, Leung, McDonnell, Peseta, Sakhaee, 2020). Maps and images are fundamental to geology and geography and this topic provides a robust basis for including well-contextualised Indigenous content into the curriculum. Comparisons of topographic and geological maps to traditional and contemporary Indigenous Australian depictions of landscape were used to demonstrate alternate ways of communicating landscape knowledge. In particular, the striking similarities between the visual devices used by both geoscientists and Indigenous Australians to identify several topographic and landscape features, was used as a starting point for discussion of the two approaches. Consideration of the similarity in the ways that knowledge is communicated between elders/teachers/experts and youngsters/students/novices also formed part of these discussions. Reading landscapes from multiple viewpoints enhanced student and staff understandings of environments, landforms and different cultures.

In the School of History and Philosophy of Science, CC has long been integrated in questions around the origins of science and the Middle Eastern and Asian birthplaces of many aspects of modern science. Discussions with academics in this school revealed efforts to build an online learning environment for a unit of study specifically about Indigenous science and its history of subjugation within mainstream or colonial science.

Finally, in the School of Chemistry, the focus began in a laboratory setting. Instructors introduced and discussed the cultural context of native plants (for example, *Eucalyptus*) and specific bushfood species (for example, Kakadu plum or Gubinge) with students, as part of laboratory classes that focused on the extraction of eucalyptol. Students analysed the chemical properties of their extract and related these to its production and use with consideration given to related ethical issues.

Since starting out, most of these disciplinary initiatives have now grown and since the ‘first wave’, subsequent funding opportunities via DVC ISS have been harnessed to enable deeper collaboration with Indigenous Elders, leaders and academics to develop CC in these schools across the Science Faculty.

## **Personal and professional journeys**

In most cases the journey of embedding CC into teaching and research for each academic (all of whom are non-Indigenous) began with both conviction and discomfort. Conviction that CC and embedding Indigenous knowledge into curricula was a vital first step to addressing epistemological and systemic racism prevalent across tertiary institutions. This conviction resulted in the forging of new pathways, new journeys and new connections with Indigenous Elders, academics, leaders and communities. It also resulted in sometimes dramatic personal transformations which were laced with discomfort which, as one Indigenous Elder gently reminded one of the authors, ‘is necessary for culture change’.

When asked, why did you put up your hand to take on the CC initiative for your School, most responses entailed a lifelong discomfort with the continued colonisation and marginalisation

of Indigenous peoples and knowledge systems in mainstream Australia. Reasons for taking on this initiative were both personal and professional, with starting points involving some mix of trepidation (What is the right way to do this? How can I improve my capacity for CC? Who do I ask for help? How can we start addressing this without being tokenistic?) and exasperation (Why are there no Indigenous teaching academics in the faculty of Science? Is it fair for me to lean on Indigenous academics in the University? Who has the cultural authority and right to do this? How can I get my colleagues on board?). There were also practical and institutional limitations, including perceived lack of relevancy in core sciences - as the title of our paper indicates, from both outside and within the Faculty of Science - perceived lack of 'space' within mainstream offerings, lack of expertise and experience with including and examining CC and questions about cost and ongoing funding to pay for Indigenous expertise.

Engaging with professional development relating to CC was an emotional experience for many of us. Realising unconscious bias, and therefore complicity, was a painful, isolating, anxiety-inducing and depressing experience for some. Recognising the historical complicity of family led to strong feelings of guilt and shame. As one academic reflected:

*"it was really really hard, this wasn't just a professional thing, it went deep...I had to face that my forebears, my family and myself were and are complicit in [ongoing colonisation] ...that's a hard pill to swallow"* (Interviewee 6).

However, we recognise that this discomfort is inconsequential in the context of the continued marginalisation and racism experienced by Aboriginal and Torres Strait Islander peoples since colonisation.

We also recognise that discomfort is part of an ongoing struggle to "catch our biases" (Interviewee 11), that is, to overcome and conquer unconscious biases, and accept that further biases will be revealed along each CC journey (Lewis & Stenlake, 2020). Our efforts to culturally 'deprogram' naturally hit multiple unforeseen or invisible impediments along the way. A key pitfall felt by many in this study was trying to forge forward with embedding CC in curricula without input from and collaboration with Indigenous Elders, community members or academics. As the following academic explained:

*"A colleague and I wrote a module for an OLE<sup>5</sup> and it turned out that the resource we based our work on (an anthropology book from the 70s) was sourced in a way that was not culturally sensitive and probably didn't include informed consent from the community...eventually we contacted the Aboriginal and Torres Strait Islander Mathematics Alliance (ATSIMA), where [we met] an Indigenous mathematician and teacher...currently we're working with him on putting it in a more culturally sensitive context"* (Interviewee 8)

Collaborations with Indigenous Elders and academics were key to overcoming these pitfalls, however in this first wave, these were predominantly with First Nations actors external to the University. This raised issues associated with needing adequate time in academic workloads to generate trust and relationships, as well as the short-term funding relied on to pay people for their time. Ensuring these collaborations were of mutual benefit was also a key learning.

Recognising entrenched racism in students, colleagues, contemporaries and leaders, and moving to challenge this, generates necessary and vital feelings of discomfort. A handful of us have experienced push-back from colleagues and students, especially when using the term 'Indigenous science', and have found it hard to articulate our respect for Indigenous knowledges and demonstrate the relevance, accuracy and depth of these knowledge systems.

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<sup>5</sup> Open Learning Environment unit of study



As one academic explained when defending the use of the term ‘decolonising’: “*I have made very assertive complaints under the term epistemological discrimination and been able to appeal rejections in conservative journals*” (Interviewee 4).

This discomfort extended to use of colonial language, including terms we have used throughout this paper including ‘embedding’, ‘integrating’, ‘Indigenous knowledge’ and ‘decolonisation’ – what does it mean to Indigenous peoples to have their ‘knowledge’ ‘embedded’ in a colonial institution by non-Indigenous academics? As one academic reflected:

*“I use Indigenous ways of knowing and being instead of knowledge...knowledge denotes Indigenous IP and I have no right to that, information can perhaps be shared, but not knowledge”* (Interviewee 1).

Furthermore, how do we, the authors of this paper, challenge the very cultural and structural foundations of a system we are very much complicit in benefitting from and reinforcing via conformance? As the old adage says, “the masters tools will never dismantle the master’s house” – but is a dismantling required? There is some contention here regarding decolonisation of universities and decolonisation of science, from the surface-level and more passive ‘integrations’ of content and ‘exposure’ to Indigenous perspectives, and ways of knowing, being and doing, to the deep and radical ‘dismantling’ for transformation of pedagogy and institutional culture. In looking for answers we have relied on a body of Indigenous-led literature on decolonising the academy, for example, Tuck & Yang, 2012; Gaudry & Lorenz, 2018. This has led some science academics to reflect on the transformation needed to actually realise a collective CC journey within the academy:

*“the key is to focus on culture change, not just curriculum content... there are deep issues of structural inequalities and epistemic discrimination in academia. The more you see the more obvious it is”* (Interviewee 4).

To overcome these discomforts as actors in a colonial machine, we are in the process of trying to transform into facilitators and allies. Facilitating personal connection with, providing a platform for, and reciprocating with Indigenous knowledge holders and community – including Indigenous students and staff – has been the only path that felt ‘right’ in this context. Furthermore, going on these journeys as novices alongside our non-Indigenous students to learn from Indigenous experts has fostered cultural humility and sparked understanding of the depth of destruction colonisation has inflicted, as well as the cultural adaptation and resilience sustained by Indigenous Nations. Delving into this space requires cultural humility, but often this is most acutely developed by making mistakes and accepting criticism humbly.

Repositioning ourselves as facilitators rather than teachers is only a first step along a continuum. Creating and holding spaces for the expansion of Indigenous expertise and facilitating institutional change must follow on from this to change decision-making at all levels, including at the teaching and research interfaces. On reflection, there is a strong need for fully-funded cultural oversight on efforts to improve CC in curriculum that we think was missing from the first iteration, especially where academic leaders were lacking in their own understanding of CC and First Nations epistemologies and pedagogies.

We now think of ourselves as allies, however what this means and whether or not we can be called an ally is dependent on the Indigenous knowledge holders and communities we work with. This also means staying abreast of, sharing and developing dialogue on Indigenous critiques of academia and critical literature on colonisation, decolonisation and whiteness with family, friends and colleagues (for example: Morton-Robinson, 2015; DiAngelo, 2018). As

allies, we aim to relieve some of the burden placed on Indigenous leaders in CC and help others in our schools and faculty to navigate CC in respectful and meaningful ways, whilst also instilling in them an understanding of the complexities and ‘fraughtness’ of CC. As allies, and to operate meaningfully, one of the authors suggested the development of a ‘critical science alliance’ for facilitating ongoing conversations and sharing ideas and strategies for enabling decolonisation. Our first initiative was the CC compendium as a living document to which other exemplars can be added over time. This can be linked with similar initiatives outside of the Faculty of Science and our next aim is to generate opportunities to support our Indigenous and non-Indigenous colleagues across the university.

Ultimately, our CC journeys have led us to “*feeling overwhelmed, but also empowered and fulfilled*” (Interviewee 6). We want to make a meaningful difference, while respecting boundaries and generating cultural humility within the culture of our schools and our scientific disciplines. Recognising that this takes time and persistence, and constant reflexivity, is a key lesson learnt via our CC journeys.

### **From cultural humility and complicity to cultural accountability**

Through our journeys, we have reflected on what it means to embody cultural humility and the role of cultural complicity in transformation. Duntley-Matos (2014) discusses transformative complicity (Duntley-Matos, 2011) linked with cultural humility (Ortega & Faller, 2011) and argues that these values are required in the quest to reduce power imbalances. Transformative complicity entails a reckoning with past and present forms of colonisation and our role in maintaining and perpetuating structures that enable this. Fisher-Borne et al. (2015) argue that cultural accountability is at the core of complicity and humility, and that it rests with both individuals and institutions. This addresses the limitations of CC by redirecting some of the onus to transform to the institution. However, whether colonial institutes and colonial fields of study can be decolonised remains contentious (Capan, 2017; Bambra, Gebrial, Nişancıoğlu, 2018). As Duntley-Matos (2014; p.451) reminds us, ‘higher education is intrinsically intertwined in the demands of the global market regardless of its public or private institutional identity’, and therefore rests within a global colonial paradigm. However, Sherwood and Russell-Mundine (2017) argue that change can start in curriculum via a bottom-up process whereby these changes inspire ‘far reaching and systematic change’.

Just as contentious is whether or not non-Indigenous scholars can effectively participate in the decolonisation process at all. Tuck and Yang (2012, p.1) argue that settler moves to innocence thwart this process with ‘the decolonial desires of white, non-white, immigrant, postcolonial, and oppressed people’ becoming ‘entangled in resettlement, reoccupation, and reinhabitation that actually further settler colonialism.’ Furthermore, they argue that in the pursuit to reconcile with settler guilt, we rescue a settler future. This is a poignant point that helps us, as non-Indigenous academics in this space, reframe our feelings of discomfort into an understanding that (i) we cannot decolonise science curricula but instead must open up this space to make way for those that can and (ii) discomfort is more desirable than comfort because it recognises the responsibility and accountability of white privilege (Fisher-Borne et al., 2015; Beagan, 2018).

## Conclusion

This paper documents the inception of CC in the Faculty of Science at The University of Sydney from the perspective of academics who were charged with embedding CC in teaching. We found that in contrast to the sentiment voiced to one author when this journey began, ‘you’ll never get CC in science’, that CC can be embedded in science curricula in a multitude of ways. This is in terms of both pedagogical approaches as well as content and learning experiences focused on Indigenous perspectives, and ways of knowing, being and doing. However, this journey was about much more than integrating CC into science curricula, with cultural humility, complicity and accountability evolving from individual engagement. As a (currently) non-Indigenous academic community of practice, we want to continue finding and supporting avenues for transformation and decolonisation while carefully and patiently navigating the complexity this entails at the cultural interface. Growing and expanding the community of practice by sharing experiences, working in partnerships, and increasing our awareness of cultural and intellectual protocols are ways we will maintain the momentum of the CC journey in the Faculty of Science.

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