

Crediting and citing Indigenous Knowledges within research

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Position statement: The co-authors are a collective of Traditional Owners, non-Indigenous and Indigenous researchers: ecologists, experts in Indigenous relations, archaeologists, anthropologists, historians, librarians, and lawyers based in Australia who have provided their collective perspective on the themes discussed in this article.

Abstract

Knowledge exchanges between Indigenous and scientific communities occur regularly, with researchers frequently seeking and benefiting from Indigenous Knowledge holders. These exchanges inherently demonstrate the value and authority of Indigenous Knowledges within academia; however, the traditional academic system lacks formal processes for crediting and citing such Knowledges. Given the complexity, diversity, and uniqueness of Indigenous cultures around the world, different approaches to assigning appropriate credit are required for different cultural groups—there is no “one size fits all” approach. In Australia, Aboriginal and Torres Strait Islander (First Nations) communities have knowledge traditions reaching back millennia, with high diversity in knowledge reproduction, partitioning, access, and governance among nations. We demonstrate the complexity of crediting and citing Indigenous Knowledges across Australia, so that other regions of the world can adapt to their own contexts; the structural complexity of First Nations groups requires careful, considered, and context-specific approaches. In this *Perspective*, we highlight important components that should be considered and implemented when citing Indigenous Knowledges, with the aim of supporting discussion within relevant communities. Prior to citing Indigenous Knowledges, certain prerequisites must be established and met: (i) clear definitions of “Knowledges” and free, prior, and informed consent that is neither constrained nor coerced, (ii) an established relationship between the relevant First Nations group and the researchers (the latter being either non-Indigenous or Indigenous), (iii) a clear understanding of the two-way benefits of the Knowledge transfer, (iv) an acknowledgement that citation does not replace co-authorship and the legal rights the latter confers, (v) acknowledgement that Indigenous Knowledges are dynamic, including the ways that Knowledge holders want to exercise sovereignty over their data and resources, and (vi) institutional infrastructure to support the citation process. Crediting approaches must also be available to account for heterogeneity within and across First Nations groups, such as different authorities of Knowledges, “Country” itself as an authority, as well as gendered, initiated, sensitive, or sacred Knowledges. Maintaining autonomy is essential—First Nations groups must retain the ability to retract shared information if they so desire. As such, the accompanying digital object identifier (DOI) or data repository holding the cited information must be managed within the relevant country (here, Australia) or by an organization that can meet these requirements. A homogeneous citation solution within Australia, or elsewhere, seems unlikely and potentially undermines the celebrated diversity among First Nations. We therefore suggest the development of a dynamic citation protocol, where a decision tree can assist researchers in partnering with First Nations communities to cite information in ways that support the data sovereignty aspirations of First Nations peoples, rather than a static citation protocol. Although elevating the status of Indigenous Knowledges within academia, the citation process also provides the opportunity to enhance transparency and deepen relationships between researchers and First Nations Knowledge holders in Australia and globally.

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Glossary

We intend for this glossary to provide the necessary context for our international readership to engage fully with our *Perspective* article. Most of these terms are in common use in Australia and therefore cannot be easily attributed to pioneering scholars in many cases. However, readers should note that the definitions we provide here are summaries that might not be true of all Aboriginal and Torres Strait Islander peoples. We acknowledge that the use of glossaries can be detrimental because they can limit Knowledge continuity rather than promote novel applications of Knowledge. As such, we recommend further learning of these concepts be explored within the relevant cultural setting or context, with emphasis on collaborative and respectful relationships. We also recommend referring to the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) *Code of Ethics for Aboriginal and Torres Strait Islander Research* (aiatsis.gov.au) for more information.

Aboriginal: Proper noun. First Nations people of Australia that come from all areas of mainland Australia, including Tasmania and other islands. *Aboriginal* (cf. *Torres Strait Islander*) people often choose to identify with a language group, traditional *Country*, or region.

clan: See tribe.

Country: Proper noun (cf. “country,” a recognized, independent political unit). The term is an ontological transposition that is only partially communicable in English (Whitehouse 2011). The designation is given to the ancestral lands, waterways, seas, and skies to which a particular *Indigenous* group (language group; *clan*; *tribal group*, *tribe*) is connected and belongs, and of which it is custodian (Morgan et al. 2008, Weir et al. 2011). *Country* is sentient, animate, and agentic. It is the source of culture, history, life, identity, and belonging that links its people, animals, plants, lands, waterways, and skies managed through countless generations. *Country* is not just a relationship with place, but also a measure of time, and testament to enduring systems of knowledge, resilience, and care.

Dreaming: Proper noun. Originally coined by Spencer and Gillen (1899) as a translation of the Arrernte word *alcheringa* (also spelled: *altjirerinja* or *altjiranga*) (Wolfe 1991). Represents a past, present, and future, or everywhen, where ancestral spirits are active across the land, seas, and skies, creating and sustaining life and important physical and geographical formations. *Dreaming Knowledges* are passed to subsequent generations through lore, art, ceremony, and song. Also see *songlines*. The *Dreaming* is unique to each *Country*.

Elder: Proper noun. A revered custodian of *Indigenous Knowledges* who emerges as a leader and guide within a First Nations community, and who has essential roles in preserving, promoting, and transferring *Knowledges*, beliefs, and practices.

First Nations: Proper noun. A Canadian-origin term created by the Assembly of First Nations (afn.ca) established in 1980 (Calliou 1998). It is often synonymous with *First Peoples*. In Australia, this is generally now the preferred term instead of *Indigenous*; it can encompass both *Aboriginal* and *Torres Strait Islander* peoples. People often prefer to identify with a language group, traditional *Country*, or region instead.

First Peoples: Proper noun. The first people to settle an area, most often thousands or tens of thousands of years prior to European invasion and establishment.

Indigenous: Proper noun. A general, umbrella term describing the sum of all First Nations within a particular region. In Australia. The term encompasses two broad and distinct cultural categories: *Aboriginal* and *Torres Strait Islander* peoples. People often prefer to identify with a language group, traditional *Country*, or region instead (that are not necessarily defined by blood relationships).

Indigenous Knowledges: Proper noun; plural (cf. the general definition of “knowledge” as the understanding of, or information about, a subject acquired through experience or study). The sum of the understandings, skills, and philosophies developed by *Indigenous* societies with long histories of interaction with and custodianship of their natural surroundings (Warren et al. 1995, Purcell 1998). These understandings include ecological, environmental, medicinal, historical, cultural, and social knowledge retained, nurtured, and promulgated particularly by *Elders* to the rest of the community. *Indigenous Knowledges* are *inter alia* cumulative, dynamic, holistic, intergenerational, non-linear, and spiritual.

men’s business: Certain *Knowledges* held, and customs and practices performed, by men only, with strict rules for application and penalties for infringement (cf. *women’s business*; “gendered business”).

native title: A collection of legal rights (e.g., to camp, hunt, use water, hold meetings, do ceremony, protect cultural sites) guaranteed to relevant First Nations people under the Australian Native Title Act 1993 (Commonwealth of Australia 2024).

researcher: A person who studies a subject, especially with the aim of discovering new information or reaching a new understanding. A researcher can be non-*Indigenous* (“outside”), or *Indigenous* (“inside”). *Indigenous* researchers from the relevant community might have additional restrictions or protocols. *Indigenous* researchers not from the specific community might still be categorized as an “outside” researcher.

songlines: A term popularized by Chatwin (1987) to mean “... the labyrinth of invisible pathways which meander all over Australia” (Lilienthal and Ahmad 2017). Encoded Knowledge about *Country* in song and story. *Songlines* contain information about ancestral travels, the creation of *Country*, and the rules that govern behavior. Some songlines incorporate *Dreaming* pathways forged by creator spirits during the *Dreaming*.

sorry business: A period of mourning after an *Indigenous* person has passed away (Glaskin et al. 2008). An important time of mourning, involving responsibilities and obligations to participate in cultural practices, protocols, ceremonies, and rituals associated with bereavement for an ill, incarcerated, or deceased individual, or loss of cultural connection to *Country*. There are no set times for *sorry business* because they depend on the status of the person being mourned, and the connection different individuals have with that person. *Sorry business* often includes restrictions of naming, word use, and images for both community members and outsiders.

Torres Strait Islander: Proper noun. First Nations people from the region of the approximately 200 islands of the Torres Strait (sometimes known as *Zenadth Kes*) between Papua New Guinea and north-eastern Australia (Cape York). *Torres Strait Islanders* (cf. *Aboriginal* people) generally define themselves as being from specific islands, tribes, family groups, and/or sea *Country*.

totem: A natural object, plant, or animal that is inherited, assigned, or adopted by members of a *clan*, *tribe*, or family. *Totems* designate roles and responsibilities of people, as well as their inter-relationships and connections to the *Dreaming*.

Traditional Custodian: A First Nations person with cultural obligations to care for Country. Traditional Custodians are not necessarily legal owners in the way that *Traditional Owners* are. *Traditional Custodians* are sometimes given or assume responsibilities to look after Country where no one else is able to do so.

Traditional Knowledges: Proper noun. See *Indigenous Knowledges*.

Traditional Owner: Often used interchangeably with *Traditional Custodian*. Aboriginal and Torres Strait Islander peoples who have a historical and continuing spiritual, cultural, political, and physical connection to a specific area of land, and/or individuals recognized as persons who authorize certain Indigenous Land Use Agreements under the Native Title Act 1993 (Commonwealth of Australia 2024), or native title holders.

tribe: Also known as a *tribal group*. A disputed term generally referring to a group of First Nations people who share a common language, ancestry, or other characteristics that define a specific group of people with a common heritage and/or set of relationships with each other.

tribal group: see *tribe*.

Western: Proper noun. Refers mainly to the traditions, politics, economics, culture, and methodology commonly associated with the various nations and states in Western Europe, North America, and Australasia. Western approaches in Australia are associated with the invasion and settlement of European colonists from the late 18th century onward.

women's business: Certain *Knowledges* held, and customs and practices performed, by women only, with strict rules for application and penalties for infringement (cf. *men's business*; "gendered business").

Zenadth Kes: Proper noun. An acronym created by Torres Strait Islanders to refer to the Torres Strait as a region (Fuery 2010): *ze* is an abbreviation of *zey* meaning "south," and *na* is an abbreviation of *naygay* meaning "north" to refer to southerly and northerly seasonal winds, respectively; *d* is an abbreviation of *dagam* meaning "place"; *th* is an abbreviation of *thawathaw*, a Kala Lagaw Ya term meaning "coastline"; *kes* means "passage" (Liu 2022) (see also *Torres Strait Islander*).

Introduction

Epistemology (from Ancient Greek *ἐπιστήμη* for "science" or "knowledge" + *λογία* for "study" or "logic of") is a branch of philosophy that considers the origin and scope of knowledge, essentially asking, "What do we know?" and "How do we know it?" (Rescher 2003). Although approached from different angles, both non-Indigenous (most often, Western) and Indigenous epistemologies develop through parallel processes of observation, theorization, experimentation, deduction, and communication. The time scale of Indigenous Knowledges spans months to millennia (Snively and Corsiglia 2001), their production and reproduction are often interwoven with connections to land, sea, and sky, and relationally viewed as something that is received, rather than extracted (Nakata 2007, Martin 2017, Elicor 2023). Non-Indigenous research follows an analogous path; however, it tends to emphasize quantitative (mathematical) analyses to test hypotheses and overcome uncertainties through experimentation and inference, such as sampling subsets of a total population, comparing manipulated and "control" entities, randomization, replication, and extrapolation (Diggle and Chetwynd 2011). These knowledges are typically considered from a detached perspective of abstract reasoning, highlighting the cultural differences and assumptions that underpin these epistemologies (Martin 2017, Elicor 2023). Although structurally distinct, we argue that Indigenous Knowl-

edge and non-Indigenous knowledge systems provide different, yet complementary forms of information (Mazzocchi 2006, Mistry and Berardi 2016, Diamond 2019, Venkatesan et al. 2019, Fletcher et al. 2021, Molnár and Babai 2021, Lindstrom 2022, Macdonald et al. 2023, Molnár et al. 2024).

Knowledge exchanges between Indigenous and non-Indigenous research communities occur regularly, with non-Indigenous researchers frequently seeking and benefiting from Indigenous Knowledges shared by their knowledge keepers. Indigenous Knowledges are often directly integrated into formalized research designs, interpretation, and reporting (Prober et al. 2011, Hoagland 2016, Ens and Turpin 2022, Jessen et al. 2022, Stern and Humphries 2022), forming integral contributions to research outputs. For example, the Banbai rangers of the Banbai Aboriginal Nation (New South Wales, Australia; figure 1) shared Knowledge surrounding their cultural landscape-burning practices to co-develop a seasonal calendar that guides fire management and reduces the impact of uncontrolled seasonal bushfires (McKemey et al. 2021). In another example, researchers united with the Bardi Jawi Rangers and developed a partnership to monitor coral reefs and fish populations within the Bardi Jawi Indigenous Protected Area, located in remote north-western Australia (figure 1) (Cure et al. 2024). Likewise, non-Indigenous researchers partnered with the Malgana Aboriginal Corporation Rangers to learn about the ecology, flora, and fauna of Gathaagudu (Shark Bay, Western Australia; figure 1) for a seagrass restoration project (Sinclair et al. 2024). These exchanges demonstrate the value and authority of Indigenous Knowledges within non-Indigenous (mainly, academic) research.

However, the academy of non-Indigenous research lacks formal processes for crediting and citing such Knowledges, aside from a recently suggested method for citing oral teachings from First Nations people in Canada (MacLeod 2021) and a non-peer-reviewed guide for undergraduate students in Australia (Indigenous Archives Collective et al. 2023). For example, MacLeod (2021) proposed a simple citation template following the American Psychological Association (APA) or Modern Language Association styles, including name of Knowledge holder, Nation, territory, community, title, Knowledge detail as a "personal communication," and date. Likewise, the *Indigenous Referencing Guidance for Indigenous Knowledges* (Indigenous Archives Collective et al. 2023) described an "Indigenous Knowledges attribution toolkit" that includes a decision tree to determine whether a resource can be appropriately cited, and a "citation style guide" that includes a broader suite of suggested styles compared to MacLeod (2021). Although these are useful suggestions toward standardizing Indigenous Knowledge citations in the academic literature, they do not cover the complexity and diversity of the subject. But the lack of a formal process does not stop Indigenous Knowledges from being integrated within the scientific literature; instead, the absence of formal citation can amount to unacknowledged and unattributed appropriation of Knowledges, even with unstructured yet well-intentioned methods of informal attribution. Existing *ad hoc* methods of informal attribution include personal communications, personal observations, acknowledgements, and field notes, providing partial solutions to a systematic oversight (Sarna-Wojcicki et al. 2017, Bennett 2019, MacLeod 2021).

The structural and cultural complexity of Australian First Nations people justifies the need for Australian-specific considerations for citing Indigenous Knowledges. We argue that Country-, region-, or nation-specific approaches are required in Australia as they are elsewhere. Within Australia, First Nations groups have a lineage of approximately 65,000 years (Clarkson et al. 2017), with



Figure 1. Map of Australia showing place and group names mentioned in the text, affiliations, and Acknowledgements. Also shown are state and territory boundaries, and background elevation/bathymetry (darker = deeper; General Bathymetric Chart of the Oceans 2022; gebco.net). The non-conventional orientation is meant to provoke the reader into questioning the colonial imposition of a Northern Hemisphere bias.

high diversity among nations evidenced by the over 250 language groups that existed at the time of European invasion from 1788 onwards (McNiven and Russell 2023). Across these nations, expertise and Knowledges are organized through a variety of structures (Whap 2001), including repository Elders (Warburton and Chambers 2007), songlines (Kearney et al. 2023), totem animal allocation (Clarke 2016), stories (Walsh et al. 2023), gendered (women's and men's) business (Walsh et al. 2023), traditional lore (Ridges et al. 2020), dance (Day et al. 2024), initiations (Curran 2011), and held within restricted languages (Fleming 2017). To navigate the various authorities of knowledge and maintain heterogeneity, we canvas a range of considerations for citing Indigenous Knowledges within the Australian context, with relevance for First Nations groups elsewhere. Our aim is to discuss components that should be considered when citing Indigenous Knowledges, provoke discussion, and reflect on the implications of recommended approaches.

Points for consideration

Clear definitions and prerequisites

When Indigenous Knowledges are cited in the peer-reviewed literature, clear definitions of terminology and expectations must be met to ensure the upholding of Indigenous rights (Ignace et al. 2023). Well-considered and consensus definitions ensure clarity, unite understanding of topics, and support agreements, policies, or documents used by non-Indigenous researchers. For these protections, we reference the United Nations Declaration of the Rights of Indigenous People (Article 31) (United Nations 2007):

- a. "Indigenous peoples have the right to maintain, control, protect, and develop their cultural heritage, traditional knowledge, and traditional cultural expressions, as well as the

manifestations of their sciences, technologies, and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect, and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.

- b. In conjunction with indigenous [sic] peoples, States shall take effective measures to recognize and protect the exercise of these rights."

This declaration can be further supported with the requirement to obtain free, prior, and informed consent (Ward 2011). Furthermore, defining Indigenous Knowledges as broadly as possible within documentation can maximize legal protection against data theft for the First Nations group during research projects (Stoll and Von Hahn 2004, Ward 2011, Janke 2019, 2021). It is also possible that formal agreements for Indigenous data sovereignty between non-Indigenous researchers and First Nations groups do not necessarily align with our suggested processes; we do not advocate that our suggested process replace existing agreements, but rather that our protocol be considered as a tool during the establishment of formal agreements.

There are several expectations before a non-Indigenous researcher cites Indigenous Knowledges. First, and most importantly, sufficient time must be allocated to establish a trusting relationship between the First Nations community and the non-Indigenous researchers. In action, Knowledge exchanges often occur through organic and mutually beneficial relationships that cannot be summarized in a systematic or quantifiable checklist. However, the principle of relationality can provide guidance (Ty-

nan 2021), where cross-cultural relationships rely on trust, respect, reciprocity, and benefit sharing.

Our advice to a novice researcher contemplating how to attribute Indigenous Knowledges includes the minimum requirements of establishing two-way communication (preferably in-person, but also virtually), knowing each other on first-name basis, and having shared respect and trust built to the point where knowledge can be freely exchanged without fear of exploitation or reprisal. A necessary component for developing such trust is ensuring continuity, with the same non-Indigenous researchers or staff connecting with the same First Nations individuals before, throughout, and after a project. Essentially, researchers should not cite any Indigenous Knowledges from a First Nations group or individual whom they have never met or with whom they have no relationship. The second prerequisite, beyond the information shared consensually, is that there must be consent for those same Knowledges to be shared within the context of publication arising from the research. Importantly, non-Indigenous researchers must avoid any form of coercion when negotiating permissions. For example, members of a First Nations community who retain relevant Knowledges might not have the authority to share those Knowledges with outsiders or approve their dissemination. A researcher must therefore have certainty that the Knowledge holder also has authority within the relevant community to share the Knowledge and to authorize the form of Knowledge sharing. Third, the citation process should be transparent and deepen connections through discussion with the First Nations groups and ensure citation fits within the bounds of what the community wants, as well as any other objectives they have. Fourth, no part of the citation process is mandatory, and the First Nations group can decide the scope of what they want included, or if they do not want to be included at all. Fifth, if Indigenous co-authorship is declined, researchers should make an explicit statement about whether those consulted approve or disapprove of the research's main themes (Fletcher 2025). Finally, the citation itself is to act as a reference point to specific Indigenous Knowledges at its point of incorporation within the manuscript but is not a replacement for co-authorship in instances when co-authorship is more or also appropriate (Sidik 2022a, Sarna-Wojcicki et al. 2017).

Respecting heterogeneity

Although First Nations groups in Australia share many commonalities, the diversity among Nations has developed across millennia and resulted in vast cultural differences (Whap 2001). Consequently, the authority of Knowledge among First Nations groups is not uniform, with rights to Knowledges held by Elders and designated Knowledge keepers. In contemporary communities there can also be communal decision-making structures to determine if and how Knowledges are shared with outsiders. As such, designating a homogenous source of authority for citation will likely prove impossible at the stage of implementation. To respect and maintain heterogeneity, First Nations groups should be able to delegate their own authority sources, and researchers can follow the systems of the specific group with whom they are working. This self-determination can be helpful under unique circumstances, for example, when a First Nations person is now working as a ranger on the Country of a different First Nations group, but who has been accepted by the host community as a Knowledge keeper.

The maintenance of heterogeneity can also provide an opportunity to consider how a First Nations community relates to its Knowledges (Martin 2017, Elicor 2023), especially in relation to

“Country”—the term applied in Australia to describe the lands, waterways, seas, and skies to which a people are connected (see Glossary) (Kohen 2003, Bawaka Country et al. 2014). Beyond a physical location or region, Country itself can also be considered an all-encompassing entity, and some First Nations groups view Country as the original provider of Knowledges, and therefore wish to allocate the authority of their Knowledges to their Country, rather than to custodian individuals (Bawaka Country et al. 2023, Bawaka Country et al. 2014). For example, the Yolŋu people of Bawaka Country (north-eastern Arnhem Land in the Northern Territory; figure 1) have published many articles with “Bawaka Country” as a formal and recognized author (Lloyd et al. 2012, Wright et al. 2012, Bawaka Country et al. 2014, Bawaka Country et al. 2015, Bawaka Country et al. 2018, Hernández et al. 2020, Bawaka Country et al. 2023). This same principle could be applied to the citation process should the First Nations group in question so wish it. However, citing Country could be met by the complexities of displacement from Country; specifically, uncertainties can arise from issues with native title where a group might not have an allocated title, overlapping boundaries among nations, or neighboring First Nations groups acting as caretakers of the Country of another group displaced during colonialism. In such instances, First Nations groups could cite their own Country, but acknowledge the other relevant First Nations groups or Country(ies) if they so wish.

Self-determination is also important when the Knowledges exchanged are sensitive, sacred, or allocated to a specific gender—for example, sacred women’s (Hercus 2020, Ponomareva et al. 2024) or men’s (Harrison 2002, Adams et al. 2017) business. For these Knowledges, it might be appropriate to include warnings in the text of the associated publication before such information is cited. Furthermore, the Knowledges can be integrated within the paper as an expurgated summary, where the specific details (e.g., a location) are withheld (Ravindran 2024) or obscured (analogous to the obfuscation of sensitive archaeological, palaeontological, or biodiversity detail published in the peer-reviewed literature) (e.g., Rodríguez-Rey et al. 2016, Saktura et al. 2023). Regardless, the decision of what to share, and the details of those Knowledges, should be determined by the First Nations group sharing them.

Autonomy of Knowledge and storage

Indigenous data sovereignty and data storage are arguably some of the most challenging considerations of the citation process (Maiam nayri Wingara 2018, Ravindran 2024). If implemented, the citation process could be built on the principles of Indigenous and research data governance, management, and stewardship represented in the C.A.R.E. (Collective benefit, Authority to control, Responsibility, and Ethics) and F.A.I.R. (Findable, Accessible, Interoperable, and Reusable) principles (Wilkinson et al. 2016, Carroll et al. 2021). This could be achieved by allocating a digital object identifier (DOI) to the reference for any cited information, taking the reader to an online data repository (e.g., github.com) or library (e.g., zenodo.org) where the relevant information is stored as an open-access source. This information could then be cited following styles adapted from the proposed templates of MacLeod (2021) and/or the *Indigenous Referencing Guidance for Indigenous Knowledges* (Indigenous Archives Collective et al. 2023). Again, the particulars of the information stored should be at the discretion of the relevant First Nations group(s), but could allow for supplemental information, such as the original language in which the Knowledge was shared, allowing for latitude in future linguistic assessments,

spellings, and interpretations (Bassnett and Trivedi 1999, Malcolm 2018, Simpson and Wigglesworth 2019). Currently, Australian university libraries are in the process of developing a provenance process for all First Nations material in their collections, which could potentially include the capacity to reference Indigenous Knowledges as suggested above. Public online repositories bring into question the possible transfer of data governance; however, to cite the information, one would need to meet the prerequisites established above, including a relationship with the relevant First Nations group and consent to use the information.

Another potential challenge is that adhering to F.A.I.R. principles could inadvertently contravene elements of C.A.R.E. where Indigenous Knowledges cannot be shared publicly. This challenge has been acknowledged extensively with respect to access to sensitive qualitative data (Alexander et al. 2020, Martorana et al. 2022, Prosser et al. 2023), with various approaches proposed to enable access while respecting anonymity and sensitivity (e.g., access control, usage and licence terms, release embargoes, generalized summaries) (Alexander et al. 2020, Martorana et al. 2022). There are, therefore, many analogous opportunities to modify such options to maintain the core principles of F.A.I.R. for Indigenous Knowledges, but we emphasize that there is no universal approach among contexts or Nations for sharing Knowledges (Prosser et al. 2023). To harmonize data access and control, reproducing elements of *The First Nations Principles of Ownership, Control, Access, and Possession* (fnigc.ca/ocap-training)—a Canadian tool developed to support First Nations data sovereignty—could be a practical and effective way forward.

For consent to cite Indigenous Knowledges to be genuine, it must be able to be withdrawn at any point, including post-publication, facilitating genuine autonomy over the Knowledges. Any Indigenous Knowledges data repository must therefore be able to retract information upon request, and perhaps would need to be managed within Australia where the importance of removing such information would be understood and implemented promptly when necessary. This situation is not a rare possibility, and therefore should be included in the systematic design of the process. If required, any associated research article could also be retracted; for example, a recent research article (Ward et al. 2022) was retracted after “... the journal received evidence confirming that the required university approvals were not sought prior to the research being conducted” (Geoarchaeology 2024). The retraction followed a complaint by Murujuga Aboriginal Corporation (figure 1) to the University of Western Australia stipulating a lack of collaboration or adequate consultation demonstrated by the researchers. However, that article is still available to read, simply with the word “retracted” in the title and downloadable citation. The permanent nature of information uploaded online could mean that (A) autonomy of knowledge (Carroll et al. 2021) will ultimately clash with the (F)—Findable, and (A)—Accessible (Wilkinson et al. 2016) goals outlined above. A catch-all solution to this contradiction has yet to be developed, but one possible solution would be to explore sustainable ways to appoint First Nations groups or individuals as managers of the relevant repositories, thereby avoiding third-party players. Although not necessarily universally applicable, such direct control would increase First Nations control and sovereignty of their Knowledges stored online.

Dynamic approach

Deriving a homogeneous citation solution for reporting the Knowledges of First Nations peoples within Australia and else-

where could possibly operate as another means of colonialism and undermine the celebrated diversity among First Nations groups. We therefore suggest the development of a dynamic citation protocol, where a decision tree assists researchers in citing the information through means that support the requests of the relevant First Nations group(s), rather than a static citation protocol (see an example decision tree in figure 2). A dynamic process would serve as an optional tool for researchers and First Nations groups who agree to citing these Knowledges. For example, best practice in research project development and implementation in Australia is based on authentic co-design where Indigenous Knowledge-holders and researchers identify the proposed project and the methods and workflow to achieve it (CIEHF 2025). Such project development explicitly includes discussion and decision-making defining the types of Indigenous Knowledges and Indigenous cultural and intellectual property to be used and any restrictions on its use, identifying cultural authority holders, approval processes, community benefits, appropriate citation, and authorship on any products arising.

The outcome of following the decision tree would be a Harvard or APA style in-text citation, reference, and a DOI link to a repository connected to the reference that displays a partially or fully completed table of information on which non-Indigenous researchers and First Nations group(s) agree. The information provided in the table could follow the prompts from the decision tree, but could also be amended by the First Nations community via an edited table or by indicating how information could be obtained through an alternative medium. Providing flexible and transparent opportunities to change the decision on what data are shared enables self-determination and promotes data sovereignty (Wilson et al. 2020). If choosing to implement a citation, the needs of the First Nations group must be at the centre of the process and align where possible with the goals or larger needs of the group. For example, some groups might prefer to cite a specific organization, corporate entity, or landholding council, rather than themselves or the Country, because it supports adjacent goals of the community. This flexibility, therefore, honours the structural, cultural, and social differences and changing needs of the First Nations groups.

The right to say “no” underpins our described citation process. The process must prioritize the needs of the First Nations community, and therefore, the citation process should not be considered essential within any research project or publication. Researchers should not associate particular judgements of quality or authority to publications based on whether they include such citations, because they will not correlate with the strength of relationships implied therein; rather, they merely uphold the requests of the First Nations community.

Resources

Strong, authentic, and meaningful engagement is required to develop trust, exchange research priorities, gain consent for research on Country, or share Knowledges (Sidik 2022b). Therefore, timelines, budgets, infrastructure, and institutions must be sufficient to foster genuine connections and collaborations (Adams et al. 2014, Sidik 2022b). Two-way learning projects (also referred to as “both-ways” programs) are developed with a common purpose of knowledge development and exchanges and aim to meet research priorities of First Nations groups and non-Indigenous researchers collectively (Knowles et al. 2021, Skroblin et al. 2022, Sinclair et al. 2024). Project budgets ideally incorporate time and funding for early engagement, training, cultural immersion, goal

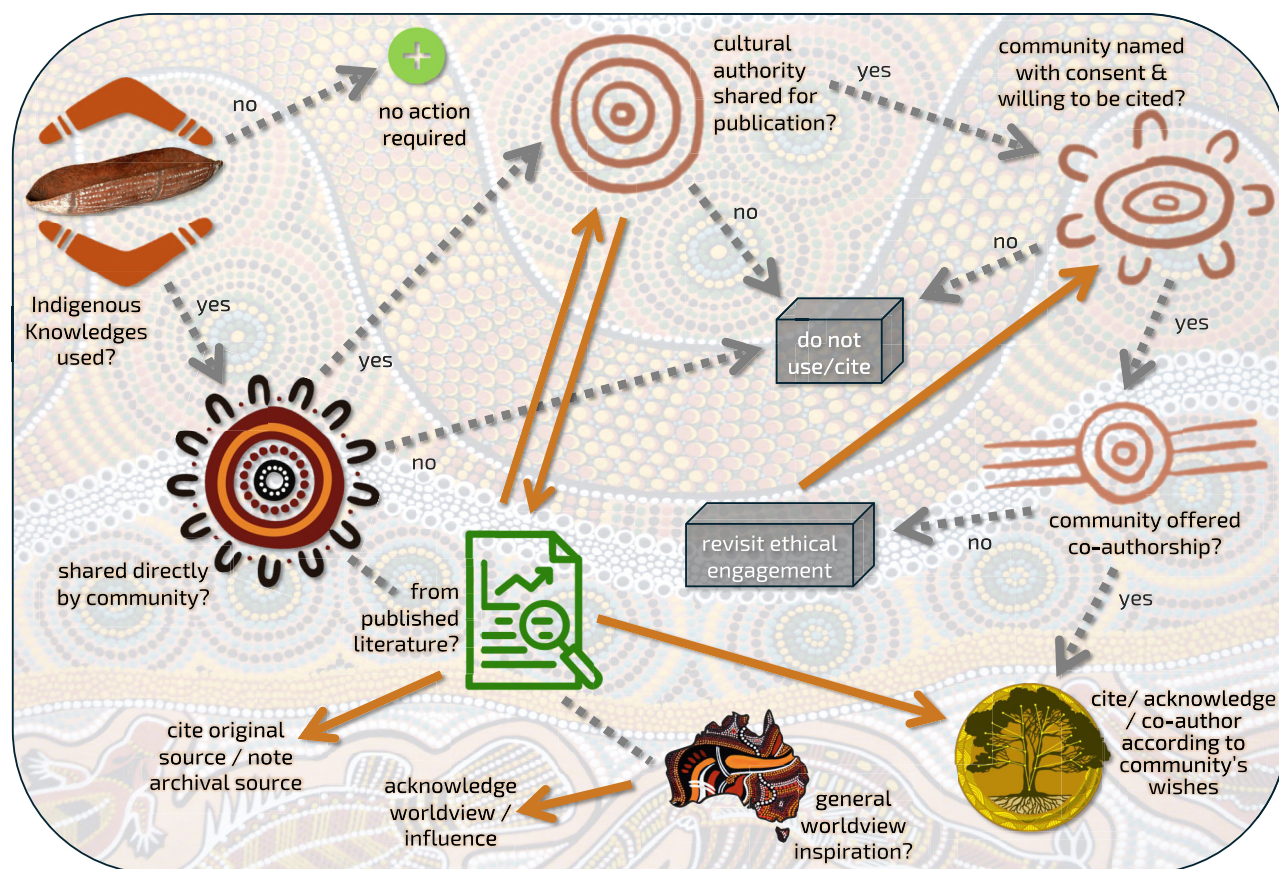


Figure 2. An example decision tree demonstrating how researchers could work with Knowledge holders to determine the appropriate citation process that supports the aspirations of relevant First Nations group(s). Dashed-line arrows indicate a binary (no | yes) choice, and solid-line arrows indicate an obligatory progression or relationship. Dashed lines (no arrows) link possible sources of Knowledges. If Indigenous Knowledges are intended to be used and if they are shared by community, they must be accompanied by the relevant cultural authority to share for publication, the community itself must be named with free prior and informed consent and provide explicit permission to be cited, and the community should be offered the option of co-authorship. Cultural protocols and custodianship should be respected at all stages. Citations themselves could follow styles adapted from those proposed by MacLeod (2021) and the *Indigenous Referencing Guidance for Indigenous Knowledges* (Indigenous Archives Collective et al. 2023). Even when Indigenous Knowledges cited have been published previously, any reuse requires renewed consent—for example, according to the AIATSIS Code of Ethics (AIATSIS 2020) “Indigenous people have the right to manage the creation, collection, analysis, interpretation, management, storage, dissemination, access, re-use, disposal of and access to their data.” Boomerang icons adapted from game-icons.net (CC BY 3.0). Coolamon image (museivaticani.va; Western Australia; Donated via New Norcia; Cat. 109933). “Shared directly by community” icon from unisa.edu.au. Ochre icons (cultural authority, community named, community offered co-authorship) from commonground.org.au. Tree icon from figure 3. Background image in Australia map © M. Loke (CC BY-NC-ND 2.0; flickr.com/photos/22816815@N08/3561886005). Background image © B. Dieu (CC BY-NC 2.0; flickr.com/photos/bee/2215146239).

setting, jobs, regular face-to-face meetings, and post-project briefings, thereby providing opportunity for exemplary cross-cultural collaborations (Knowles et al. 2021, Skroblin et al. 2022, Sinclair et al. 2024). However, many research projects are resource-constrained and/or are of insufficient duration to achieve this ideal. We encourage funding bodies and institutions to acknowledge and support researchers to develop and maintain service and training obligations within communities, irrespective of funding constraints (Mauro and Hardison 2000, Knowles et al. 2021, Doering et al. 2022), but especially considering the momentum of making data open-source and open-access across platforms (Murphy et al. 2021).

The policies and budgets of most non-Indigenous organizations are typically not designed to accommodate the timeline needed for engagement and follow-up suggested in our article. The onus therefore falls indirectly on the non-Indigenous researchers to engage within “free time” or “borrow” time from other projects to fulfill cultural obligations to communities, at times creating unnecessary urgency or rushed communication and breakdowns in

trust. Furthermore, funding or in-kind services must be considered for the First Nations community who should not be expected to volunteer indefinitely in the name of advocating for their community’s wishes (potentially leading to “burnout”) (Doering et al. 2022, Tujague and Ryan 2023). Cultural “down times” are also built into First Nations communities with “sorry business” (a time allocated for mourning; see Glossary) (Tonkinson et al. 2009, Carlson and Frazer 2015), and “rest time” (time allocated for rest; ~ 1 month per year) being inappropriate times for outside engagement (e.g., Kimberley Aboriginal Health Research Alliance 2023). Factoring these customs into project timelines can therefore facilitate project success if supporting institutional policies can be adapted in kind (Mauro and Hardison 2000, Adams et al. 2014, Gitelsohn et al. 2020, Doering et al. 2022). Individual non-Indigenous researchers should not be expected to organize all suggested components without proper support or backing from their institutions and funders (Mauro and Hardison 2000). Ideally, First Nations researchers should be part of the larger research team to facilitate interactions.



Figure 3. Infographic summarizing the main considerations for crediting and citing Indigenous Knowledges. **prerequisites:** traditional shield and two boomerangs to represent cultural and legal authority, and framing it with two faces to represent face-to-face conversations; **heterogeneity:** diversity of First Nations peoples with different patterned backgrounds; **autonomy:** arrow pointing upward represents First Nations peoples in decision-making position; **dynamic approach:** decision tree representing formal procedures (also see figure 2); fig tree representing staying grounded and being connected to Country; **resources:** hourglass represent time, also framed by faces. Commissioned original artwork by Tarquin Singleton, Yirrganydji Creative, Red Ochre Republic (redochrerepublic.com.au).

Reflections

One intention of the citation process is to elevate the status of Indigenous Knowledges within academia and other research institutions. Both entities can operate alongside one another as separate means of knowledge attainment to provide reciprocal benefits (Lilleyman et al. 2022, Oliver et al. 2023). Another intention of the citation process is to enhance transparency between non-Indigenous researchers and First Nations groups and to specify how the Knowledges are being integrated within the non-Indigenous research in question. Furthermore, clear citation at the point of integration will bring Indigenous Knowledges out of the shadows, spotlighting the breadth of epistemologies of First Nations peoples in Australia and beyond. By shifting the narrative to emphasize that Indigenous Knowledges are dynamic, evolving, and current, we can break down misconceptions that they are merely “traditional,” outdated, or irrelevant. First Nations groups interested in Knowledge documentation will also have the added benefit of a cross-cultural imprimatur and legacy of their records. Most importantly, the process can strengthen relationships between non-Indigenous researchers and First Nations groups by ensuring explicit communication and by providing a means for scientists to pay homage to the Indigenous Knowledges they are integrating into their research.

Conclusion

We have argued that citing Indigenous Knowledges in the peer-reviewed literature amplifies the pre-existing (and at times, subliminal) acceptance of Indigenous Knowledges within non-

Indigenous research. We consider the complexities of citing the Indigenous Knowledges of First Nations people of Australia, specifically focusing on required terminology and protective prerequisites in the Australian context to maintain heterogeneity, autonomy of knowledge, and supporting resources (figure 3). We suggest a dynamic citation protocol that is flexible and optional to prioritize the needs of the represented Knowledge keepers. The likely next steps to achieve our aspirations will be developing a dynamic citation approach, a decision-tree to aid implementation, and establishing or modifying appropriate online repositories to meet the basic requirements of good practice now often required in research data management plans. We earnestly request feedback and responses from the readership (both Indigenous and non-Indigenous) to highlight unforeseen complexities, considerations, and possible solutions that we might have overlooked. We also encourage feedback and lessons learned from Indigenous and non-Indigenous peoples globally.

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Data availability

No new data were generated or analyzed in support of this research.

Author contributions

Christine Barry (Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing), Bob Muir (Conceptualization, Investigation, Methodology, Resources, Supervision, Writing – original draft, Writing – review & editing), Vincent Backhaus (Investigation, Resources, Writing – review & editing), Cynthia Coyne (Resources, Writing – review & editing), Emma Donnelly (Resources, Writing – review & editing), Elizabeth Evans-Illidge (Resources, Writing – review & editing), Luciana C. Ferreira (Resources, Writing – review & editing), David Flagg (Resources, Writing – review & editing), Michael-Shawn Fletcher (Resources, Writing – review & editing), Adrian C. Gleiss (Resources, Writing – review & editing), Matthew Harris (Resources, Writing – review & editing), Jenna L. Hounslow (Resources, Writing – review & editing), Danielle Kampers (Resources, Writing – review & editing), Linda Keevers-Lock (Resources, Writing – review & editing), Charmaine Koroi (Resources, Writing – review & editing), Jayshree Mamtara (Resources, Writing – review & editing), Melissa Marshall (Resources, Writing – review & editing), Mark G. Meekan (Resources, Writing – review & editing), Anne Poelina (Resources, Writing – review & editing), Yanti Ropeyarn (Resources, Writing – review & editing), Lynette Russell (Resources, Writing – review & editing), Michele Thums (Resources, Writing – review & editing), Raymond Tobler (Resources, Writing – review & editing), Sean Ulm (Methodology, Resources, Writing – review & editing), Corey J. A. Bradshaw (Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Supervision, Visualization, Writing – original draft, Writing – review & editing)

Conflict of interest

The authors declare that they have no competing interests.

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