Integration of Indigenous Knowledges in clinical, laboratory, and other science settings: a protocol for a scoping review

Abstract (Structure Summary)

Background: This project stems from concern that graduating students, specifically those of the dominant culture, have limited understanding about knowledge system concepts let alone those that inform their practices. Failure to recognise that multiple knowledge systems exist can reinforce dominant, colonial practices and perspectives. This scoping review protocol has been developed to identify valuable examples of where and how western and Indigenous knowledge systems have been integrated in various clinical and education settings to provide an evidence-base about what works and to inform the development of workshops to develop their understandings of knowledge systems.

Methods: This review uses PRISMA-ScR guidelines, the JBI Manual for Evidence Synthesis, and applies decolonising lens by deliberate privileging of Indigenous knowledges and perspectives, devolution of traditional power hierarchies within research teams, authentic engagement of team members from diversity standpoints and worldviews, and relationality considerations throughout. A systematic search of Web of Science, ProQuest, Medline, Scopus, and Google Scholar will locate peer-reviewed published literature as well as grey literature. Hand searching according to team members' knowledge and pearling methods will also be utilised. Search terms have been collaboratively developed through research topic team yarning, drawing on extant knowledge, group mind-mapping, and from preliminary readings. Pilot testing will be conducted by two team members to test the appropriateness of search syntaxes, and eligibility criteria will be applied according to title and abstracts. These results will be provided to all team members, who through research yarning, will refine source selection processes prior to full text searches. Articles will be managed through Covidence. Final text searches will be undertaken by two team members who will chart the data for all located articles and provide these to the full team for further yarning and group consensus. The Aboriginal and Torres Strait Islander Quality Appraisal Tool will also be utilised to ascertain the extent to which the located studies align with cultural protocols and ethical conduct for research with Aboriginal and Torres Strait Islander communities. Findings will be collaboratively agreed and presented in accessible formats.

Discussion: The scoping review will provide a narrative synthesis of where and how western and Indigenous knowledges are integrated and jointly utilised in clinical and education settings. This will identify important characteristics which will inform the development of workshops.

Introduction

Background and Rationale

The Australian Academy of Science (2017) defines 'science' broadly as "both a body of knowledge (the things we have already discovered), and the process of acquiring new knowledge (through observation and experimentation – testing and hypothesising)". Knowledge construction, however, is subject to researcher bias, with methods and approaches both informing and being informed by worldviews and associated philosophical and metaphysical perspectives (Muller, 2014).

Historically, in colonised spaces, what has been deemed 'legitimate' knowledge has been determined by the colonisers. That is, within Western institutions, what is understood as scientific or legitimate knowledge is that which has been produced by, or resulting from, Euro-Western philosophical perspectives and methods (Chilisa, 2020). Often characterised by reductionism, positivism, naturalism, determinism, and objectivity and neutrality, in western-dominant societies and settings this science is also referred to as mainstream, classical, and/or formal science.

In the face of the privileging of western modes of knowledge production within western institutions and its general "intolerance towards other persuasions" (Durie, 2005, p. 18) , globally, Indigenous academics have been arguing for the recognition and incorporation of Indigenous scientific approaches, philosophies, and knowledges systems.

Indigenous knowledge systems, as inferred by the pluralisation of system*s*, are made up of "thousands of knowledge systems in the world" (Indigenous Knowledge Institute, n.d.). Indigenous knowledge systems ontologically, epistemologically, and axiology understand knowledge as relational (Moreton-Robinson, 2013; Wilson, 2008), having multiple realities that are determined by relationships (Wilson, 2008), with people being an extension of the environment (Durie, 2005). UNESCO (n.d.) provides the following: "Indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings… this knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality". Thus, Indigenous knowledges are adaptive, cumulative, dynamic and holistic, not static, and always evolving (Indigenous Corporate Training Inc., 2021; Ryder et al., 2020). Unfortunately, there are still those who dispute Indigenous knowledges meet the criteria required for the label of 'science'. Recently, for example, seven academics in Aotearoa implied that Maori knowledges "in the discovery of empirical, universal truths…falls far short of what we can define as science itself (Clements et al. 2021 cited by Ngata, 2021)). As cited by Ryder et al. (2020), the healing and medical advancements of the Ngangkari (traditional healers of Central Australia), firestick farming as a process of ecological and food systems management,, and numerous examples of fish traps demonstrating feats of engineering and aquaculture and sophisticated understandings of sustainability, all refute the claims by Clements et al. The objective of this article, however, is not to debate whether Indigenous knowledges are scientific or legitimate. Instead, this article operates from the standpoint that Indigenous Knowledges are valid, legitimate, and beneficial, and that rejection of, and refusal to value and include these in institutional processes and practices, such as research in universities, is revisionist, assimilationist and colonising. Appropriate and respectful incorporation and application also requires consideration such that the very inclusion of Indigenous knowledges is not in and of itself, a further colonising process with benefits only for the dominating majority.

Recognising that multiple philosophical perspectives underpin both knowledge and knowledge production does not infer that one system is necessarily lesser, nor greater, than another. Instead, the integration of Indigenous and western sciences seeks to "harness the energy from two systems of understanding in order to create new knowledge that can then be used to advance understanding in two worlds" (Durie, 2005, p. 18). That is, the *weaving* together of two distinct knowledge systems, drawing appropriate and relevant aspects from each, creates an interface whereby rigorous and innovative methods and approaches can ultimately serve to strengthen understanding and knowledge (Ryder et al., 2020).

According to Wilkinson et al. (2020, p. 596), however, until recently, there has been "discord between [western] science and Indigenous knowledge [which has] prevented the synergies that do exist between the two knowledge systems from advancing new understandings".

Increasingly, across numerous disciplines, Indigenous knowledges have become more widely accepted and valued (for example, land and water management and ecological and environmental sustainability). However, "we have only begun to scratch the surface" (Popp, 2018). It is also important to acknowledge that it is imperative that acceptance and inclusion of Indigenous knowledges in these disciplines is interrogated to ascertain a number of key concerns, for example, who is benefiting for this knowledge and in what way? This is, however beyond the scope of this review.

This, along with an awareness that both under- and post- graduate students often graduate without recognising that scientific knowledge is socially constructed and hierarchical, and, that even though multiple knowledge systems exist simultaneously, that some knowledge systems are dominant and some subordinate, with no training on why or how knowledge systems can be integrated safely to produce richer answers to complex social and scientific phenomena. It is this lack of education and that training underpins the rationale for the development of knowledge workshops for higher degree students. Failure to recognise the legitimacy of multiple knowledge systems reinforces dominant constructs, perpetrating scientific- and socially- colonising practices, white possessive logic, and limits scope for the development of innovative practices and enhanced outcomes for community members. To ascertain how the integration of knowledge systems is already utilised or drawn upon in other similar settings, a scoping review is warranted.

Objectives

The objectives of this scoping review relate to exploring how epistemological perspectives and methodological approaches emanating from western and Indigenous knowledge systems have been woven or integrated together in clinical, laboratory, or medical research and/or teaching or education settings, and the associated benefits ascribed to this.

Specifically, the aims are to identify:

- examples of/situations where Indigenous Knowledge Systems are integrated and utilised within research and practices that are typically informed by positivist, western sciences (specifically, education, laboratory, and clinical based settings);
- how, that is the key ways in which, Indigenous Knowledges Systems are respected and implemented in those typically western-dominant settings; and
- specific purported benefits that are understood to result from the inclusion of Indigenous Knowledge Systems approaches and concepts.

Methods

Protocol and Registration

This protocol is primarily informed by the PRISMA-ScR statement (Tricco et al., 2018). However, it also references JBI advice regarding pilot testing and relational analysis diagrams for data presentation. Additionally, balancing the value of a robust procedures and the recognition that currently accepted protocols for undertaking scoping reviews are informed by western perspectives and the expectation of complying with these, decolonising methodologies will also underpin the protocol and review process. Specifically, this will comprise of the following key points:

- <u>Ensuring diversity of standpoints and worldviews with the team</u>. There will be an expectation that all researchers will interrogate and be familiar/cognisant of their positionality, and there will be a deliberate appointment of team members who represent diverse worldviews and backgrounds.

- Deliberate privileging of Aboriginal and Torres Strait Islander knowledges and perspectives (as well as Indigenous and First Nations people globally) and centering of these voices within research (D'Antoine et al., 2019).
- Devolution of power / disruption to traditional power differentials. Decisions will be made through achievement of consensus established through collaboration and discussion. Time will be built into the process to allow and support this process.
- Relationality respected through holistic engagement with the literature through respect, respecting the relationship created between the reader and the content, as well as that with other readers and communities, and the contexts in which the literature and reader were situated (Chambers et al., 2018, p. 183) which contrast with western researchers compliance with neutrality, objectivity, distance (Bishop, 1998).
- Dissemination of findings. Presentation will be provided in multiple formats and locations, such that the findings will be readily accessible and publicly available.
- The Centre of Research Excellence in Aboriginal Chronic Disease Knowledge Translation and Exchange (CREATE) Quality Appraisal Tool will be utilised. This tool has been developed to appraise research quality from the perspectives of Indigenous peoples (rather than against western research principles) in so-called Australia. thus effectively "privileges Indigenous epistemologies, values and principles for ethical research" (Harfield et al., 2020, p. 7) which is imperative to decolonising practices.

Eligibility Criteria

To be included in the review, papers need to focus on methods, practices or approaches that describe or include the utilisation or integration of both western and Indigenous knowledge systems. The settings for these must be based in tertiary or higher education settings relating to STEMM areas. This may include topics, course, curriculum. Research (for example clinical or laboratory) settings will also be included, but not those related to physical science studies that involve biological or chemical cultures or colonisations as these words have meanings that differ according to context and their inclusion could potentially clutter the search with articles not related to Indigenous knowledge systems.

Table 2: Selection of Sources of Evidence

Domain:	Inclusion Criteria	Exclusion Criteria
Knowledge Systems:	Studies/articles that comprise methods, practices, approaches, that utilise or integrate both western and Indigenous knowledge systems	Studies/Articles that do not include approaches or practices that integrate western and Indigenous knowledge systems or draw only from western knowledge system
Focus:	Tertiary and higher education (including topics, courses, curriculum) in areas of science, technology, engineering, mathematics, medicine, medical and health sciences	Physical science experimentations involving biological or chemical cultures or colonisations Tertiary and higher education outside of the focus area (i.e. Arts or Law)
Language:	English only	Not in English
Dates:	1980 to present	Published prior to 1980

Information Sources

The search strategy aims to locate published research literature as well as other grey literature from multiple sources to enhance the capacity to capture relevant data.

On advice from a librarian employed by Flinders University as well as the Flinders University Library recommendations for Health Education databases, the researchers identified four electronic databases, as well as Google Scholar, that will be used to source articles and data. These will be accessed through Flinders University library and include Web of Science, ProQuest, Medline and Scopus.

Articles may also be located through hand searching according to team knowledge, pearling reference lists of sourced articles, as well as locating articles that have cited the articles sourced through the search process. Grey literature and other online news articles may be sourced via Google Scholar search and/or Flinders library search engine (such as conferences, abstracts, presentation, reports) and wherever possible their origins to primary research will be traced, with the most primary source available being utilised.

Search

Search terms informed by keywords identified from articles located in preliminary readings, extant knowledge of team members based on prior works, and team mind-mapping and collaborative yarning are detailed in the table below (end of document). Boolean search operators will be used to focus the search in each of the above databases and Google Scholar.

Selection of sources of evidence

The JBI Manual for Evidence Synthesis (11.2.6) recommends pilot testing to refine their guidance and source selection tools. The RA (PH) will therefore pilot test searches of two agreed databases and Google Scholar. The first 25 articles from each of the library database searches will be downloaded (n=50 articles) and first 15 from Google Scholar to produce the first working list. The research team will be provided with both the title and abstracts of articles from this list and asked to apply eligibility criteria to determine articles for inclusion and exclusion and to develop their (pilot) final list. A team yarning session will be held to discuss any differences between team members' (pilot) final list and collaboratively agree to search terms. This strategy will be confirmed when team members have achieved 75% (or greater) agreement on articles for final inclusions.

The RA (PH) will then apply the search strategy to all agreed databases, and upload located articles to Mendeley to remove duplicates. Articles will be transferred to Covidence, where two team members will independently apply the eligibility criteria to the title, abstract and key words assess to obtain a final list. At this stage, both the original list and final list will be provided to the full team, who will meet to confirm the final list. If consensus is not achieved, the opinion of an external third-party reviewer will be sought. This will produce a final list of articles to include in the review. Team members will also submit suggestions for other content not located via database searches (e.g. works they are familiar with through their involvement in the field and Google/other search engine searches, etc.) which will be added to the final list to undergo the same process outlined above to determine their inclusion or otherwise.

Data Charting Process

Two team members will create a data chart in Covidence to determine detail to be extracted. Full-text examination of two agreed articles will be independently undertaken by RA (PH) and CI (CR) who will map data to the data charts. These completed data charts will be provided to all team members who will meet to discuss the application and outcomes. The purpose of this is twofold. Firstly, it will allow confirmation of data items for charting, and, secondly, it will provide the opportunity for the team to bring together multiple worldviews and perspectives that may influence what data is included or excluded for consideration. This aligns with the decolonising methodologies of ensuring multiple

worldviews are represented and power over decision making is shared. The team will collaboratively work to achieve consensus on the data charting process and data items. In the event that consensus is not achieved, the opinion of an external reviewer will be sought.

Data Items

Research topic yarning will be employed to determine key data items for abstraction from located articles. Data will be extracted over the following areas:
1. Demographics: reference, country, setting, duration, aim, participant numbers
2. Indigenous knowledges and Community Engagement: Aboriginal leadership, methodology and methods, knowledge systems, community consultation and governance, and strength-based analyses
3. Study: study location, program of study, type of educational intervention, delivery and administration mode, student recruitment, key findings, strengths, and limitations

Critical appraisal of individual sources for evidence

Peters et al. (2020) indicate critical appraisal assessment is not generally recommended in scoping reviews. However, we contend that in this review, the inclusion of a critical quality appraisal is important because of the intended use of the protocol (to inform development of education material and workshop content) and thus it is appropriate to ascertain the extent to which studies respect and adhere to Indigenous community protocols. To do this, The Aboriginal and Torres Strait Islander Quality Appraisal Tool (Harfield et al., 2020) will be utilised. This tool comprises 14 questions related (but not limited) to the research being guided by an Indigenous research paradigm, having Aboriginal and Torres Strait Islander governance, including community consultation and respect and adherence to community protocols. The more 'yes' responses infers closer alignment with respectful practice in that specific research space. While scoping reviews (in contrast to systematic reviews) typically do not involve the critical appraisal of individual sources of evidence (Tricco et al., 2018) in keeping with the decolonising imperatives, the team assert that these considerations are important to include and consider when analysing the findings (for articles both developed from an Australian and global context)

Synthesis of results
Following team consensus of data charting process and data items, the RA (PH) will independently chart the data for all articles in the final list. All team members will have access to the completed data charts for all articles in Covidence.

Results

Selection of sources of evidence
A PRISMA flow diagram will be presented to detail the results of the literature searches and report the number of citations screened, duplicates removed and full-text documents charted. For transparency, reasons for exclusion will also be reported.

Characteristics of sources of evidence

Full tabulated charts including citations and key characteristics and how they related to the research questions and objectives will be provided as an appendix to the final documentation.

Critical appraisal within sources of evidence

Findings from the application of the CREATE Quality Analysis Tool will be reported as an appendix to the final documentation.

Synthesis of data

To address the key research objectives, a narrative synthesis will be undertaken to help 'tell the story' and draw conclusions based on the evidence provided through the review process (Popay et al., 2006). Initially, the RA (PH) will develop a preliminary synthesis; the purpose of which "is to develop an initial description of the results of included studies" (Popay et al., 2006, p. 13). This will be undertaken by the RA (PH), with support and guidance from the CI (CR). This preliminary analysis will involve identifying key themes, grouping articles according to these themes, and presenting these to the research team. While the preliminary analysis process will be undertaken by a single researcher (PH), because "analysis inevitably involves subjective choices" (Seers, 2012, p. 2), the proposed themes will be presented to the full research team, who being informed by different worldviews, will then come together to for collaborative yarning about their interpretations, standpoints and perspectives in order to collaboratively develop the key themes, and inform the discussion component of the review. Further, an additional 'lens', relating to the application of the Quality Appraisal Tool identified earlier, will be another consideration. Following team yarns to develop the discussion, these finding will be presented in written format and, if relevant and appropriate, presented diagrammatically to illustrate relationality of key aspects.

Discussion

Summary of evidence

The proposed scoping review aims to explore where and how western and Indigenous knowledge systems are utilised together (be it, alongside or integrated) in specific settings, how successful the implementation and outcomes have been (based on what measures and for whom), and what barriers and enablers support or hinder both the implementation and the outcomes. The findings from this review provide a strong evidence based about 'what works' to inform next components of the overall project.

Limitations

Despite seeking input from knowledgeable team members to identify examples, known to them but that might not be captured via the search strategy, the possibility remains that the search strategy might miss some examples of situations where western and Indigenous knowledges are integrated effectively and to good outcomes. Missing these will mean the opportunity to learn from these exemplars is lessened.

Funding

Search Syntax

		AND			AND	AND
	western	traditional	American Indian	Native Hawaiian	laboratory	practice
OR	mainstream	Sovereign	Aynu	Nava?o	education	use
OR	science	First People	Cymry	Nunangat	clinical	utility
OR	modern science	First Nation	Cherokee	Ojibwe	medical	implementation
OR	formal science	Mātauranga Māori	Ethnic Group	Pacific	health sciences	paradigm
OR	conventional	non-western	Eskimo	Pacific islander	human biology	application
OR	technology	bi-cultural	Greenlandic	Sami	health medicine	evidence-based practice
OR		Maori	Inuit	Saami	public health	integration
OR		Te Tihi o te Maunga	Inupiat	Skolt		knowledge integration
OR		Indige*	Inuvialuit	Taiga		decoloni*
OR		Aborigin*	Islander	"tangata whenua"		multi science
OR		Torres Strait Islander	Kalaallit	Trib*		knowledge translation
OR		Nunga	kānaka Maoli	Wampanoag		two-way street
OR		Koori	Lapps	Welsh		two-way learning
OR		Koorie	laplander	Yuit		epistemological pluralism
OR		Murri	Mapuche	Yupik		co-production
OR		Nyoongar	M?ori	Zuni		Te Tihi model
OR		Narrunga	M?tis			co-innovation
		Anangu	Native	Kaupapa Māori		knowledge*
		Bining	Native American			co-production
		Yolngu	Native People			epistemol*
		Palawa*	Native population			ontolog*
		Ainu	Native Siberian			wisdom
						knowledge systems
						bicultural
						Mana Wāhine

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