

# INDIGENOUS RESEARCH DATA CASE STUDY:

## TOWARD CONTEXTUAL INTEGRITY FOR INDIGENOUS DATA

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Cover design created by Kaitlin Srader. Photo is of the Suzzallo Library interior lobby with ravens hanging from the ceiling, courtesy of the University of Washington. Quote behind the ravens translates from Lushootseed to "Raven brings light to this house of stories."

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## INTRODUCTION

This white paper on Indigenous data is part of the Privacy Encodings for Sensitive Data (PESD) project funded by the Sloan Foundation. It contributes to a series of cases developed by the PESD team to explain the complexities and constraints inherent in the stewardship of sensitive qualitative data. The cases bring into relief the dynamics of sensitive data within an information economy where data are highly valuable resources within an increasingly open and fluid networked digital environment. The aim of PESD is to determine how data protocols, protections, and access restrictions can be established for sensitive data in ways that respect and accommodate the needs and interests of different stakeholder groups, especially as data contexts and locations change over time.

To this end, PESD is examining how the information norms and transmission principles associated with sensitive data differ within and between qualitative research domains. The focus on norms and transmission principles is informed by the Contextual Integrity Framework, a useful framing that reflects the intricate systems of social rules that govern information flows and normative commitments to privacy (Nissenbaum, 2010). The framework delineates four essential privacy constructs—informational norms, appropriateness, roles, and principles of transmission (Barth, et al., 2006)—essential dimensions in understanding how different domains and contexts of qualitative scholarship vary in their expectations and treatment of sensitive subjects, topics, or locales. These constructs are equally useful in examining the additional contextual dynamics introduced when data are shared and reused across domains or stakeholder groups.

In our examination of Indigenous data, the contextual integrity (CI) framing helps steer analysis away from assumptions or generalizations that may mask significant factors that make data sensitive in a given context. For example, on the surface, it might seem that qualitative Indigenous data could be treated the same as other types of sensitive qualitative data or that it could be governed primarily by the disciplinary orientation of the scholar. It is true that Indigenous methodologies have commonalities with other qualitative approaches, however there are distinct norms and roles that determine appropriate treatment, use, and transmission. CI offers a systematic and relatively precise way to consider the range of factors that govern who can access what content, when, where, and for what purposes (Nissenbaum, 2009; Shvartzshnaider et al., 2016).

Indigenous scholarship and methodologies have strong guiding norms that are deeply rooted in Indigenous worldviews and systems of knowledge. Research practices are grounded in relational accountability to land, community, ancestors, and future

generations. Tribal interests and rights add further cultural sensitivities, as do local community and family contexts. The Indigenous Data Sovereignty movement has made progress on principles that codify many of these norms. In particular, the CARE Principles for Indigenous Data Governance are guiding current best practices for ethical data curation and stewardship. The elements of CARE—collective benefit, authority to control, responsibility, and ethics—are also highly consistent with the intent of CI transmission principles.

To develop an informative case study of Indigenous scholarship and data, we begin with background on the Indigenous research paradigm and ethical engagement and tribal IRBs, and discussion of distinct Indigenous qualitative methods. We then consider progress made by the international Indigenous data sovereignty community, with a focus on the emergence of the CARE Principles for Indigenous Data Governance. Against this foundational backdrop, three of the authors present first-hand accounts of research and data production in their areas of Indigenous scholarship. We use these real-world examples to surface current perspectives, priorities, and practices of scholars committed to ethical work with Indigenous data and Indigenous communities. For each of the three cases, we extend the analysis by developing a “contextual integrity profile” and articulating associated data curation goals necessary for achieving appropriate protections and transmission within data infrastructure.

Our CI-based analysis makes explicit the significant contextual factors that need attention in the development of CARE compliant protocols for Indigenous research data. Additionally, our applied, collaborative approach prioritizes the experiences and expectations of active Indigenous researchers. It also respects Indigenous methodologies and data governance principles that need to be upheld to make valid progress on data services of real value to Indigenous scholars, tribes, communities, and families.

#### INDIGENOUS RESEARCH PARADIGM

To understand the methods and products of Indigenous research, it is essential to grasp the interplay of method with the more holistic research paradigm and its congruence with Indigenous worldviews (Kovach, 2019). The Indigenous paradigm assumes adherence to value-based principles of responsibility, respect, reciprocity, rights, and regulation, as well as contribution to the welfare of the community. Both the process and the outcomes of research should represent a convergence of researcher and participant values, as well as sociopolitical and environmental values (Snow et al., 2016).

### Primacy of Qualitative Methods

Qualitative methods are dominant in Indigenous research due to their high compatibility with Indigenous values and epistemologies (Snow et al., 2016). Tellingly, in a 2017 systematic review of Indigenous research methods, quantitative methods received only brief coverage, and then only as part of the discussion on mixed methods approaches (Drawson, et al., 2017). In fact, the dearth of quantitative work within the Indigenous research paradigm has been recognized as a liability in relation to health research (Hayward, et al., 2021). Comparisons between Indigenous methodologies and other qualitative approaches tend to emphasize similarities with participatory action research and feminist methodologies (Wilson, 2008; Kovach, 2010), as well as community-based research that prioritizes involvement of community partners, action, and change. Our focus here is on the distinctions rather than the commonalities with other methods, however as we make progress on protocols for Indigenous data, it will be worth assessing potential for application to participatory and action oriented research.

### Indigenous Knowledges

Indigenous epistemologies, grounded in legacy tribal knowledge handed down through generations (Hayward et al., 2021), permeate the context and assumptions of the Indigenous research paradigm. Indigenous researchers put “self-in-relation” to Indigenous and tribal worldviews, influenced by unique relationships with Indigenous lands as ancestral place, non-human entities, and the structure of tribal languages (Kovach, 2010). Empirical Indigenous knowledge is abundant, generated not through standard Western quantitative measures, but through convergence of real-world perspectives from different vantage points over time (Brant-Castello, 2000; Lavallée, 2009). Indigenous research is also intentionally positioned to resist the reproduction of extractive colonial relationships that persist within institutions and to rebalance power and promote healing (Drawson, et al., 2017). As explained by Kovach (2010), these decolonizing perspectives, originating in critical theory in the transformative paradigm, are imperative but not at the center of Indigenous methodologies.

### Relationality

Relationships and accountability are at the center of how Indigenous methods enact the Indigenous research paradigm (Wilson, 2009). Relational accountability is infused in the research process and takes many forms. As a fundamental norm, research involving Indigenous communities, within their land areas, must seek approval from community members, elders, or tribal councils, who act as advisors, contributors, or partners in the conduct of research. Elders and community members may serve as gatekeepers for

research related communication, and they may enforce or support expectations for engagement, such as participation in ceremonies and distribution of gifts. The data produced in the process of research should be thought of as being “borrowed” for a specific use under guidance from shared decisions with participants (Snow, et al., 2015), and explicit statements of accountability to individuals and communities may be required. Importantly, the relationships forged in Indigenous research do not adhere to standard academic cycles of research. They are enduring, potentially lifelong commitments, with important implications for many aspects of the research lifecycle, from conditions of informed consent to institutional obligations for data stewardship (Lavallée, 2009; Gross & Lefthand-Begay, 2021).

### Ethical Engagement

The need to secure tribal permission to conduct research is perhaps the most fundamental norm of ethical research engagement. Tribal approval is essential to honoring tribal sovereignty and authority to control research decisions, in adherence to tribal nation laws, governance, and goals (Kuhn et al., 2020). However, research requests for access to traditional knowledge and Indigenous sites and sources may be ignored or denied, due to the erosion of trust from historical mistreatment of tribal communities and members by researchers. Additionally, the existing standard processes for informed consent lack cultural protocols that would be expected for reciprocity, as do traditional academic expectations for reporting and dissemination (Ellis & Earley, 2006).

The central tenet of relational accountability may also introduce unique tensions, since the relationships required for achieving that accountability may be viewed as bias or a conflict of interest from a Western perspective (Kovach, 2010; Wilson, 2009; Smith, 1999). Strict enforcement of confidentiality and de-identification may also be misaligned with Indigenous norms. Explicit identification of contributors, including their ancestors and their specific locations, can be a critical part of local protocol and custom, and thus integral to the relational and situated nature of the research process and the phenomena studied. The small size of tribal communities and the close kinship/clan networks further complicates assurance of confidentiality. Other standards and practices that devalue community voices also risk diminishing tribal participation in research, such as uniform informed consent expectations stemming from the new federal single IRB process for multi-site studies (Kuhn et al., 2020).

### Tribal IRBs and Sovereignty

As discussed by Kuhn, et al. (2020), tribal IRBs are becoming the locus of approval and oversight for research conducted by and with Indigenous peoples. They work to counterbalance the conflicting principles, guidelines, review processes, and standards within existing Institutional Review Boards. Tribal IRBs are based in a range of different kinds of institutions and organizations, including tribal colleges and universities and tribal nations. Like IRBs more generally, they assess research risks and benefits but with an emphasis on community relevance and ownership, cultural sensitivity, and respectful and ethical conduct to “prevent further harm to communities ... and to promote justice within the research process” (Kuhn, et al., 2020, p. 279). Consideration of risks includes potential harm to treaty rights, traditional knowledge systems, and protection of natural resources for future generations. Categories of risk may include legal, financial, social, physical, psychological, and spiritual factors, as well as exploitation, appropriation, and misrepresentation of traditional knowledge or intellectual property (Marley, 2019).

Data management requirements are evolving in tribal IRBs and are expected to gain importance as part of the informed consent process (Gross & Lefthand-Begay, 2021). Three of the six tribal IRB processes studied by Kuhn et al. (2020) required data management plans or specification of storage and return of the data, with one enforcing a data sharing agreement and one specifying data as property of the tribal nation. Attention to tribal ownership and ethical protocols will be critical additions to the data management planning requirements quickly becoming the norm across the research enterprise more globally. And, as noted by Kuhn et al., navigating the variation and potential overlap across various tribal IRB jurisdictions adds complexity for researchers aiming to collaborate with tribes and Indigenous communities.

### University Research Policy

States and state universities are developing statutes that govern research with native peoples, as well as guidance on ethical conduct of Indigenous research within their IRBs and at broader levels of policy. Marley’s (2019) analysis of university policies at three state universities in Arizona outlines the unique risks and challenges of managing qualitative Indigenous data and honoring cultural sovereignty.

The scope of Indigenous qualitative data, as defined by Marley, is informative. Categories include Interviews, oral histories and stories, ceremonies, dances, and other cultural expressions as texts, images, and recordings. They clearly distinguish intellectual property

(IP), with IP defined as “information, knowledge, uses, and practices unique to Native Nation’s way of life” (p. 736) and delineated as:

- knowledge by remembered histories and traditions
- details of cultural landscapes and particularly sites of cultural significance
- records of contemporary events of historical and cultural significance
- sacred property, including images, sounds, and knowledge, material, cultural, or anything that is deemed sacred by the community
- knowledge of systems of taxonomy of plants, animals, insects, and other beings
- knowledge of current use, previous use, and/or potential use of land, water, plant and animal, fish, and insect species
- knowledge of planting methods, ecosystem conservation, preparation, formulation, processing or storage of species
- cultural images, sound, crafts, art, dance, symbols, motifs, and names, practices, and performances.

While there is some potential ambiguity between IP and Indigenous knowledge in Marley’s exposition, the IP categories encompass much of the data discussed in the Indigenous Research Cases section below, including remembered histories, records of cultural events, ecosystem knowledge, and performance and art images. More generally, the best practices seen in Marley’s University of Arizona case are notable for the inclusion of cultural competency, as well as direct attention to data sovereignty concerns related to data collection and storage. The collaboration guidelines also identify the need for data sharing agreements and indicate the possible need to exclude data on culture, tradition, and spiritual beliefs.

#### Contextual Integrity Factors

Many contextual integrity factors are evident in the above overview of the Indigenous research paradigm. They relate to the many different kinds of risks—the risks of exploitation, appropriation, and misrepresentation of traditional knowledge, but also legal risks related to treaty rights and physical risks to natural resources for future generations. Transmission principles are represented in many of the data sovereignty responses, such as tribal approval and gatekeeping processes but also in the practices that can make relational accountability concrete, such as prioritizing identification over confidentiality. In many ways, the development and enforcement of data management plans and data sharing agreements are a process of evolution and maturation of transmission principles to sustain Indigenous contextual integrity.

## INDIGENOUS QUALITATIVE METHODS

Recognizing the problems inherent in using Western concepts to characterize Indigenous research (Lavallée 2009), in this section we introduce selected Indigenous methods to underscore how they differ from standard qualitative approaches. We use the examples of sharing circles, yarning, and other conversational methods (Kovach, 2010; Lavallée, 2009; Mahuika, 2019) to demonstrate how Indigenous protocols, values, and beliefs are represented in qualitative data collection techniques, the prioritization of respectful engagement, and the importance of representing Indigenous knowledge within the lived experience of research participants.

Sharing or talking circles are a method applied in research but also in teaching and other types of group engagement. While comparable with focus groups in terms of the group orientation, the dynamic and mode of conduct are quite different. The talking circle approach is grounded in the oral storytelling traditions in Indigenous culture and intentionally structured for sequential and equitable turn-taking. Talking circles invite and encourage reflection on the knowledge shared within the circle (Archibald, 2008). Knowledge is shared in an open environment that respects tribal cultural protocols, such as an opening ceremonial process, passing of an object, and gift giving. Each person participating in the circle is given an opportunity to share their thoughts from the mind, heart, body, and spirit.

A variety of other Indigenous conversational methods are somewhat comparable to the exchange generated through conventional interview approaches, but they are also unique in their focus on evoking stories through informal, flexible, and collaborative means. Yarning, for example, is purposeful shared storytelling where researcher and participant voices are equally important, conducted in a culturally safe collaborative space that increases authenticity of the data produced (Datta, 2018; Atkinson, 2021). Other conversational methods may produce stories similar to life narrative interviews, enriched by techniques such as “hanging out,” “talking story,” or by “walking along-side”, designed to capture interactions but particularly the centrality and specifics of a place and the environment. Similar to interviewing techniques that use visual prompts, Indigenous symbols may be used in Indigenous conversational methods to elicit reflection and insight.

As an Indigenous methodology, oral histories are produced with significant commitments to developing personal narratives of historical significance. Indigenous interviewing, as discussed above, often incorporates environmental and physical place and prioritizes the intellectual context of Indigenous knowledge represented not just in the oral responses to

questions but also in stories, proverbs, and songs. Histories also encompass genealogies and personal identities that span the past, present, and future. Like other conversational methods, oral history is often conducted through field work, comparable in some ways to participant observation. However, Indigenous research in the field is not “observational” but rather focuses on hearing and learning by incorporating, for example, hanging out, walk along, and other active engagement practices. Of particular significance for our applications to data curation, professional standards in Western oral history include commitment to preservation of the interviews and related materials for current and future users (Oral History Association, 2009). The CARE Principles can provide a much needed layer of guidance in assuring the sensitivity of Indigenous content is fully addressed in approaches to preservation and support services for future use of research data and materials.

All the Indigenous qualitative methods discussed above honor orality, uphold relational priorities, and maintain collectivist traditions in relation to tribal knowledge, with protocols determined by epistemology and place. Participants are considered collaborators rather than informants, and researchers do their work as engaged listeners and learners. As mentioned above in relation to institutional research standards, the collaborative relationship may alter prevailing assumptions of the need for confidentiality, in part because identification of collaborators can have strong empowerment value. Additionally, the prestige and positionality of a collaborator can lend legitimacy to the research itself. Accordingly, conditions of informed consent will need to account for adequate and appropriate representation of tribes and individuals (Gross & Lefthand-Begay, 2021).

Analysis methods are also influenced by relationality and systems of knowledge, privileging holistic and collective stories rather than standard thematic interpretation. The fluidity of the digital environment has the ability to represent and support non-linear Indigenous approaches, such as narratives that have circular rather than linear structures and the use of sound and symbols in combination with text. The book publication described below in Research Case #1 includes a digital version published on a platform designed to support Indigenous protocols and enhance access and sharing of Indigenous knowledge.

#### INDIGENOUS DATA SOVEREIGNTY

International data sovereignty declarations and principles recognize the critical value of data as cultural, strategic, and economic resources, and that Indigenous Peoples have been alienated from their data, creating severe deficits in access to high-quality, culturally-relevant data to pursue their goals (IWGIA, 2020). North American data

sovereignty initiatives are grounded in the Canada's First Nations Principles of [OCAP](#)<sup>1</sup> (Ownership, Control, Access, and Possession) released in 1998, which served as an important early model of information governance designed to align with a given tribal nation's world view, traditional knowledge, and protocols. In the U.S, sovereign government status and associated human and cultural rights of Native American communities are recognized by federal and state law (Underhill, 2006). Internationally, the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) reaffirms Indigenous peoples' rights to control data about their peoples, lands, and resources. The history of UNDRIP ratification is interesting—144 nations voted for the Declaration, 11 countries abstained, and notably, Canada, New Zealand, Australia, and the United States voted against it. Years later the four countries that voted against reversed their position and now support the UN Declaration (United Nations, 2007). While the U.S. has not endorsed the UNDRIP, it has agreed to support the Declaration (USAID, n.d.).

With the OCAP and UNDRIP as strong foundations, the more recent CARE Principles for Indigenous Data Governance provide the most authoritative guidance in adherence to Indigenous data sovereignty for contemporary data systems. CARE is an important roadmap for working toward authority for Indigenous peoples (tribes, communities, families) to control data that impacts Indigenous land, territories, resources, and knowledge. Attention to CARE, however, will be intertwined with the enforcement of the FAIR principles, a more general, global set of principles that has been rapidly adopted as best practices for management and stewardship of research data.

#### CARE and FAIR Principles

CARE was developed by the Global Indigenous Data Alliance (GIDA) through international dialogue among the Indigenous Data Sovereignty network, the International Indigenous Data Sovereignty Interest Group within the Research Data Alliance, and other allied initiatives. The acronym, CARE, refers to: Collective benefit, Authority to control, Responsibility, and Ethics. CARE promotes Indigenous values and equity, and it addresses deeper historical barriers for underrepresented communities and knowledge systems (Carroll, et al., 2019). In fact, CARE extends beyond the authority to control data, assuming significant roles for indigenous peoples in the production of research, as discussed above, but, importantly, also in the development of data systems. The Responsibility and Ethics categories of the principles make explicit the need to create positive relationships through ethical engagement with Indigenous data and communities.

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<sup>1</sup> <https://fnigc.ca/ocap-training/>

As noted by leaders of CARE (Carroll et al., 2021), there is serious risk of exclusion of Indigenous peoples and interests from data related futures, and, with the growing prominence of AI, production of harmful bias in data solutions. They emphasize acute threats of Indigenous data being “left aside” at the system level, due to lack of identifiers, provenance, and attribution metadata, but also at the institutional level, through lack of experience interacting with Indigenous Peoples or their data (Carroll et al., 2021, p. 4). Compliance with CARE enforces development of data systems through meaningful partnerships that produce tangible benefits for Indigenous communities, such as innovation, improved governance, citizen engagement, and wellbeing. The notion of control is, in fact, contingent on reciprocal activities that expand capability and capacity. Thus the category of Responsibility includes development of “digital infrastructure to enable the creation, collection, management, security, governance, and application of data,” as well as responsibility for enhancing “data literacy within Indigenous communities.”

The potential impact of CARE has been greatly enhanced by its deliberate acknowledgement of and positioning in relation to the FAIR Guiding Principles for scientific data management and stewardship (Carroll et al., 2021). Since their 2016 release (Wilkinson, et al., 2016), FAIR has made significant inroads internationally in research communities, data repositories, and libraries. CARE alignment with FAIR is of great practical importance but introduces many new conditions and considerations for institutions building research data collections and systems, as well as those caring for legacy data collections. Fundamental aspects of CARE are in direct tension with FAIR, which stands for Findability, Accessibility, Interoperability, and Reusability. FAIR prioritizes access and reuse to support a global research environment that promotes open data. CARE prioritizes control by and support for Indigenous nations, consistent with community values, “increasing community data capabilities, and the strengthening of Indigenous languages and cultures” (Carroll et al., 2021, p.2). The international data community recognizes the need to align the two sets of principles (“be fair and care”) and to begin operationalization and implementation within our actively growing research data systems.

### Principles Informing Practice

For large-scale data systems, some of the most holistic examples of translating Indigenous data principles into practice have come out of New Zealand. National progress is reflected in the sophisticated resources and services provided by [data.govt.nz](https://data.govt.nz) (the counterpart to [data.gov](https://data.gov) in the U.S.). Developed in 2018 by Stats NZ and Māui Hudson (Te Kotahi Research Institute at the University of Waikato), [Ngā Tikanga Paihere](#) underpins the Ethics component of the national framework. Māori world concepts guide appropriate research

use of data about Māori and other under-represented groups. Having since expanded from the original focus on data infrastructure for the New Zealand census, the approach can serve as a model for initiatives in other countries (Dharmaraj, 2020). In Australia, the AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research has been influential in moving principles of data sovereignty into practice. Their existing guide to applying the code of ethics was revised in 2020 to explicitly include CARE and FAIR data principles (AIATSIS, 2020).

Important progress has also been made on technology for more localized Indigenous data systems. [Mukurtu](#) content management platform has been an influential exemplar in the implementation of Indigenous protocols, especially in application to digital cultural heritage collections. Additionally, the system of labels and notices for categorizing traditional knowledge (TK), developed by [Local Contexts](#)<sup>2</sup> (Anderson & Christen, 2013), has been a breakthrough for enacting principles of data sovereignty in new digital systems. TK labels have been adopted by the Library of Congress and the Smithsonian Institution, and they are informing many other digital Indigenous initiatives in Canada, New Zealand, Australia, South America, and parts of Europe. TK labels were originally designed for application to cultural heritage content, rather than research data, but a more recent set of biocultural (BC) labels for genetic resources has been developed for use within the biological and genomic data sciences. TK and BC Labels and Notices represent CARE principles by aligning community specific protocols for access, authorship, and attribution with specific content and data at the level of metadata. Further, the Labels provide machine readable and durable locators that allow repositories and libraries to operationalize the systems at the item, series, or collection level to support Indigenous communities in defining how their digital resources can be used, re-used, circulated, and attributed.

The professional archives community also has an established base of relevant work on protocols for culturally sensitive Native American materials that unfortunately has received limited attention by the global data sovereignty initiatives. The Protocols for Native American Archival Materials (Underhill, 2006), for example, cover critical aspects of Native research protocols, including the provision of context, intellectual property, and repatriation of culturally sensitive materials. The 2014 Protocols for the Treatment of Indigenous Materials, produced by the American Philosophical Society confronts the difficult balance of traditions of open access to collections with the need to protect sensitive Indigenous materials. Promoting the practice of “co-stewardship”, the APS

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<sup>2</sup> <https://localcontexts.org/>

protocols define key concepts and provide steps for determining legitimate need in managing tribal consent for access processes.

## INDIGENOUS RESEARCH CASES

Above, we examined Indigenous research from the perspective of the research paradigm and methodologies. We then traced how Indigenous data sovereignty is currently enacted in principles to guide data management and data systems. In this section, co-authors Teuton, Hohn, and Belarde-Lewis provide first-person narrative profiles of their own Indigenous research and data practices through accounts of specific projects. The profiles were developed through a series of conversations with co-author Palmer, guided by the Privacy Encodings for Sensitive Data (PESD) objectives. These conversations were documented and elaborated through iterative writing, review, and revision by the authors as a group.

For the first two cases, we include a separate Contextual Integrity Profile that highlights areas of contextually informed data sensitivity that we believe are likely to need specialized protocols. The CI Profile is followed by an outline of related data curation goals. For the last case, Palmer and Belarde-Lewis created a more integrated project profile with direct discussion of contextual integrity for specific data sources. This profile was then used to develop a Data Documentation Exercise, as a preliminary trial of how contextual integrity might be represented in research data metadata. For our interests in informing QDR curation processes and workflows, the exercise points to where additional care and considerations would be involved in the curation of an Indigenous Data Project.

**Research Case #1 - Indigenous Cultural History** by Christopher Teuton, Professor and previous Chair of the Department of American Indian Studies at the University of Washington; citizen of the Cherokee Nation.

Project: *Cherokee Earth Dwellers: Stories and Teachings of the Natural World--Ani Tsalagi Elohi Anehi*

Contextual integrity significance:

This case provides a prime methodological example Indigenous community collaboration where collaborators are both research partners and knowledge authorities. The case also surfaces potential roles for data repositories in supporting scholars who produce public scholarship and create enhanced digital publications.

## Teuton Project Profile

My research examines Indigenous textuality, cultural practice, cultural revitalization and language revitalization. I develop Indigenous research methodologies within the study of Indigenous literature, engaging decolonization by centering Indigenous knowledge systems, cultural and epistemological revitalization, and living cultural traditions. This case describes my recent book project on Cherokee ecological knowledge. The text will be released as a print book through University of Washington Press, with digital publication of selected segments through the RavenSpace platform.

In the Cherokee Earth Dwellers project, I constructed Cherokee ecological knowledge through storytelling traditions and oral history–narrative forms essential to Cherokee selfhood and cultural belonging. The subtitle of the book, *Ani Tsalagi Elohi Anehi*, invokes a concept at the heart of the Cherokee perspective on the natural world–*Ayetli gadogv*, to “stand in the middle.” Throughout the research process, I worked directly with, and at the direction of, Cherokee elders and knowledge keepers to develop a complex understanding of the natural world through ideas embedded in stories and names. My deep, long-standing collaboration with Cherokee elder, Hastings Shade, provided the genesis for the work. My continued collaboration with his wife, Loretta Shade, and son, Larry Shade, made it possible to continue the project after Hastings passed away.

The book is grounded in a monumental collection of over 600 Cherokee animal and plant names, documented by Shade in six handmade booklets over the course of his life. I enriched this invaluable base of Cherokee knowledge by integrating oral traditional stories and reflections from other elders and Cherokee knowledge holders to relate the creature names to teachings about the body, mind, spirit, and wellness that have been shared through many generations. As stated in the University of Washington Press’s description of the book: “from clouds to birds, oceans to quarks, this expansive Cherokee view of nature reveals a living, communicative world and humanity’s role within it.”

Our hope is the text will contribute to the perpetuation of knowledge of the relationships and forces inherent in how creatures relate with each other–knowledge of great ecological and cultural significance that was weakened and was at great risk of being lost due to the effects of settler colonialism. I worked to craft a narrative that is approachable for a general audience. At the same time, it was essential to retain the historical and cultural significance that communicates to Cherokee readers and knowledge holders about place, health, and wellness within the cosmos. Our cultural revitalization in the work takes form through the narrative’s personal voices, stories, and the interweaving of deep context to reflect

Cherokee lived experience, values, and relations to the natural world, as well as in conversations and reflections among contributors. I apply an interpretive approach that shares teachings in a way that opens up subjects for further engagement. For example, I chose to introduce facets of Cherokee knowledge that are effective for explaining expansive concepts, such as how the three tiers of Cherokee cosmos relate to each other.

The names, translations, stories, and oral traditions recovered by the interviews and consultation with elders and friends of Shade contain both general and specialized Indigenous knowledge. Shade was intentional in creating a collection of creature names that excluded knowledge not suited for a general audience, and I was able to sustain that intent through the continued collaboration with Loretta Shade. A guiding tenet is that knowledge is shared, not in response to curiosity, but on a need to know basis. That is, access to living knowledge is contingent on the growth and maturity of people as they live ethically in the world. This orientation is at the core of why I choose to share Cherokee “teachings” rather than information.

The highly collaborative research process involved many different activities and sources. For example, extensive work went into verification of the creature names and species identification and development of a taxonomy for organizing names and associated knowledge. I digitized Shade’s booklets and gathered many other printed texts, including stories, teachings, and other self-published writings by Shade drawn from a unique family archive. Interviews conducted with Loretta Shade and other elders and Cherokee community contributors were recorded and transcribed. Information about meeting sites was captured in photographs and notes. Ongoing informal exchanges and interactions included many queries and consultations through phone calls, email, and texts.

#### Contextual Integrity Profile

The Indigenous ecological knowledge produced by this research requires a highly nuanced approach to data stewardship, due to its unique sensitivities and arena of control for the knowledge products. The case offers much to consider in relation to data access, but the role of preservation is also critical since the research efforts have rescued significant, at-risk Indigenous ecological knowledge. There is a strong argument for long-term protection of as much of the cultural content as possible.

The research methodology is integral to how data products need to be represented. The deep collaborative partnerships with community members would require specialized contextual protocols to identify and provide background on the individual collaborators,

including their roles and relationships to the project goals. The significance of Hastings and Loretta Shade's work, its trajectory over time, and their relationships with Teuton, would need to be articulated and distinguished from the participation of other community contributors.

This case also reveals questions about balancing family, community, and tribal interests and priorities for control of data, a dynamic that will likely need to be addressed in many cases of Indigenous data governance. Here, data sensitivities would need to be fully assessed by the Shade family and other community members who have cultivated and propagated the knowledge through the generations. Further engagement will be necessary to develop guidance on determining when family or individual authority would preside in access and control decisions.

As a case of public scholarship, there is an opportunity to explore how research data repositories can provide a platform for stewarding important research outputs that are not typically included in publications developed for a general audience. The methods, sources, and other intermediary products of the research process may be of tremendous value for researchers, Indigenous families and communities, archives, and other historical and cultural collecting institutions. Documentation and recognition of these kinds of outputs from the research process are also important for researchers who are evaluated within existing academic reward systems that prioritize methodological rigor and validity.

The publication formats of Cherokee Earth Dwellers also suggest additional areas for data stewardship contributions, in relation to the segments to be hosted on the RavenSpace platform. Designed to make "knowledge accessible and sharable across communities and generations," RavenSpace's approach to multimedia content and interactive engagement is designed to respect Indigenous protocols. The digital segments of the book will include enriched content, including, for example, audio recordings of creature names spoken in the Cherokee language. Data repositories can support scholars who work with innovative Indigenous publishers like RavenSpace by providing control, security, and long-term preservation of research products that may be outside the purview of publishers' interests and capabilities.

#### Data Curation Goals

##### Content

- Preserve at-risk Indigenous ecological knowledge, where appropriate
- Instantiate unpublished research products

- Support digital publication

#### Context

- Represent significance and meaning of Shade family collaboration
- Document significance and meaning of Indigenous methodology

#### Governance

- Determine where authority lies for determining access constraints
- Specify and implement access restrictions and conditions

**Research Case #2 - Indigenous Language Revitalization** by Tami Hohn, Assistant Teaching Professor, American Indian Studies at the University of Washington; Puyallup tribal member.

Projects: Salish Language Research Guide; Nisqually Language Program

#### Contextual integrity significance:

This case surfaces several intersecting problems related to humanities scholarship, where bibliographies, finding aids, and inventories often constitute data. It is also rather unique in the project's direct relationship to library collections. The research process involved in the Research Guide raises questions about the application of descriptive practices and if and how metadata may introduce risks of exposure of sensitive content, such as spiritual and sacred knowledge or names of people and other entities. The Language Program project suggests a need for clarity on where the responsibility lies for identifying and gaining approval for use of content that already exists in an institutional collection. It highlights the need for mechanisms to assure access by tribe and community members to their cultural materials held in university libraries and other collecting institutions.

#### Hohn Project Profile 1: Salish Language Research Guide

Drawing on my decades of work on Salish languages, I have developed an extensive research guide for the UW University Libraries on Coast Salish and neighboring Native languages in the Pacific Northwest. The guide covers a range of languages, many of which are classified as endangered or dead. Those that no longer have any first-language speakers are at risk of linguistic extinction. To advance the Guide project, I have worked with the Special Collections unit in the UW Library where there is strong professional expertise in archival practice and understanding of protocols for sensitive cultural heritage materials. As a web-based resource, the guide functions as a comprehensive finding aid for exploring and identifying language materials held within the library's Special Collections, as well as valuable language resources in collections outside of the UW. It provides a pathway for research and discovery of rich language materials that would otherwise be obscured for

users, especially those unfamiliar with how special collections are managed within research libraries and archives.

Reclamation of Indigenous language and cultures is essential to the empowerment of Native communities, and this compilation is a major contribution to cultural history and language revitalization research and learning for scholars and Salish native communities. I have organized much of my research and analysis work in a spreadsheet that, while informal in nature, is an additional resource of tremendous potential value to other language researchers and learners, if made accessible with appropriate context and documentation.

Before the guide and any associated research products can be made accessible online, there are significant questions and potential barriers that need to be addressed. In particular, the extensive base of materials identified in the Guide may include culturally sensitive items, such as representations of spiritual and sacred knowledge or names of people and other entities that need to be assessed and possibly protected or removed.

#### Hohn Project Profile 2: Nisqually Language Program

With a new initiative to develop a language program library for the Nisqually tribe, we have the opportunity to be guided by principles of Indigenous data sovereignty from the outset. The project aims to extract, revitalize, and preserve usable language and associated historical materials to develop a new language resource library for the tribe. The foundation of resources will also give the tribe the ability to conduct their own 'on-site' studies and build upon their base amount of available traditional language to enhance their language revitalization efforts.

Many relevant materials have been identified through the Language Guide project, discussed above, but the aim for this program is to have the materials accessible and facilities available for active use by the Nisqually community. Other stakeholders include local school districts, language learners and researchers, and sites of language and cultural restoration. For example, museums and science centers may use language materials to name and label plants, and families may use the resources to select names for their children or to preserve the meaning of Indian names.

Project activities will collect and produce both physical and digital materials to support language learning, revitalization, and preservation. Multimedia capabilities are essential. Audio and video will be important components of the collection, and some formats will be

transformed--printed from the digital for use on site or digitized from the print for online access. Translations and transcriptions will be important for making content usable and, for example, for the recovery and preservation of damaged recordings.

#### Contextual Integrity Profile

This is an especially instructive case for considering sensitive data within the context of the humanities and the intersecting issues of institutional collections and control. The Guide is a common kind of tertiary “data” product for humanities scholarship. However, these kinds of bibliographic compilations and catalogs have received little attention as first class research objects. There are many questions about how to interpret and apply principles of Indigenous data sovereignty to metadata and catalogs. In the case of the Salish Language Research Guide, the issue is complicated by the nature of the research product that documents or points to a large body of primary and secondary materials, which may include identified or unidentified sensitivities. As functional, structured data about the collections, the spreadsheet developed by Hohn through the research process is another object of considerable potential value for community research. It also needs assessment to determine if it has inherited or made evident underlying sources that may need restrictions or specialized descriptions of Indigenous cultural content.

Both the Research Guide and the Language Program prompt important general questions about Indigenous content within institutional digital access systems. For example, how and at what point should norms and protocols for control and restriction by tribes be introduced into a catalog? How should responsibility and accountability for adherence to CARE be balanced between researchers and collecting institutions? With the Nisqually program, how can tribe and community members gain ready access to materials about their languages confined in university library special collections? These questions and issues also have direct implications for other areas of library operations, particularly research data services, that will need to adhere to the Indigenous data sovereignty principles, as well as standards for trusted repositories and the FAIR principles. Other library personnel working in collection development and those who work with Indigenous scholars and students in reference and instruction also need to have expertise in Indigenous data are managed within their institutions and access systems

Approaches to transformation and preservation of content will need to be informed by data curation standards and best practices, especially in regard to protections for sensitive data in the digital environment. When a secure digital platform with functional access restrictions is outside current library capabilities, solutions may lie in partnerships with

research data repository environments such as QDR. The broader partnership with the Nisqually tribe will also ensure that the past research materials will be in the hands of dedicated tribal program staff invested in pursuing the interests of tribal members and community. By working in collaboration with the Nisqually tribe, the aim will be to put responsible processes into action, and to analyze and modify those processes, to develop a model that can reduce complications for similar work by other tribes.

#### Data Curation Goals

##### Content

- Treatment of tertiary scholarly work as first-class research objects
- Optimization of structured data from research processes for community use

##### Context

- Due diligence for sensitivity assessment for referenced materials
- Representing traditional knowledge and both known and potential sensitivities or restrictions (such as application of TK labels)

##### Governance

- Expectations for relationships/responsibilities between scholars and collecting institutions
- Explication of tribal access rights for institutional materials containing tribal knowledge

**Research Case #3 - Indigenous Knowledge Scholarship** by Miranda Belarde-Lewis, Assistant professor and Faculty Fellow in Native North American Indigenous Knowledge at the University of Washington; enrolled citizen of the Pueblo of Zuni and member of the Takdeintáan Clan of the Tlingit Nation.

Project: *From Six Directions: Documenting and Protecting Zuni Knowledge in Multiple Environments*

Contextual integrity significance:

This profile directly addresses a series of contextual integrity concerns on sustaining relational accountability through data protocols. Each has implications for metadata for research data, including how to document official tribal organizational contexts and possibly intentional exclusions, and how to potentially repair or raise awareness of abuses of sensitive content.

Unlike the previous two cases, with this case we take the contextual integrity analysis further by integrating it into the project profile narrative, rather than treating it separately

at the end. An additional Data Description Design exercise has also been developed as a preliminary descriptive framework for documenting aspects of relational accountability.

#### Belarde-Lewis Project and Contextual Integrity Profile

As a scholar and an exhibition curator, my research focuses on knowledge creation, transfer, and documentation within Native and Indigenous communities. I examine knowledge creation through art and the layers of Indigenous knowledge contained in complex art works, including a tribal community's language, ecology, politics, history, and spirituality. My scholarly outputs include scholarly publications, curated exhibitions, and exhibition catalogs.

Here I concentrate on my dissertation research on Zuni knowledge protection, *From Six Directions: Documenting and Protecting Zuni Knowledge in Multiple Environments*, to highlight data sensitivity and contextual integrity issues. *From Six Directions* explored legal and theoretical applications of intellectual property rights to protect Indigenous knowledge. The analysis is grounded in 3 case studies of projects initiated by the Pueblo aimed at protecting and documenting Zuni history—a tribal resolution and two art projects. All aspects of my methodological design were based in relational accountability that demonstrates respect, reciprocity, and responsibility to Indigenous people, communities, and concepts. This accountability is especially pronounced for me, as a member of Zuni, necessitating that I take great care in data collection, reporting, and dissemination to conscientiously document and protect Zuni Pueblo knowledge. My discussion of my data sources below is aimed at advancing our understanding of how to develop data protocols for scholarship that puts relational accountability at the forefront of its goals.

The data collection process for conducting the three case studies involved many different kinds of source materials, as well as respectful, active listening to those who hold traditional knowledge within the community. I collected data through conversations, conversational interviews, observations, participation, self-reflection, and examination of digital and analog sources of evidence. As informative examples of different forms of Indigenous research data and associated sensitivity issues, I selected three data sources for analysis below—map artworks, tribal council materials, and social media data in the form of videos of Hopi social dances and associated comments.

Map artworks produced by Zuni artists were the primary materials for the case study of the Map Art Project. The map paintings are housed at the A:shiwi A:wan Museum and Heritage Center, but they have been exhibited in Flagstaff, New York City, and Los Angeles. The exhibition opened in 2011 in Flagstaff and provided inspiration for my entire dissertation

project. During the opening I was able to view the maps in person, obtain an exhibition catalog, and interview the AAMHC Director, Jim Enote. Reproductions of the artworks are available through the catalog and three of the maps have since been reproduced for every Zuni household as part of the initiative. I developed further context about the Map Art Project and the artworks through sustained consultation with the project director and staff. Interactions with the director were essential for understanding the community-guided process of creating the maps and for meaningful interpretation of the artists' maps. For example, the conversations revealed how the knowledge of Indigenous places and lands lies not just in what is displayed but also in what is left out of the map representations. Interestingly, in this sense, the images have been both culturally enriched and controlled by the community advisors and the map creators.

The analysis I conducted through qualitative documentation, coding, and interpretation processes raises interesting considerations for how data sensitivities might be generated through the interpretive work. Sensitivities stemming from a primary source could be captured in the coding data, or new culturally sensitive content could be generated through the interpretive process. For example, with the map sources, I learned that creation of anti-colonial maps for the Zuni people resulted in intentional exclusions. My documentation of a particular map could include conjectures or observations about locations, known or determined through other means, that do not appear on a map, thereby identifying sensitive locational knowledge. The map posters mentioned earlier do provide place names in the Zuni language, but again, a conscious exclusion of translation has occurred. The lack of translation into English, further requires a student of Zuni history to engage with Zuni language speakers to get a sense of the knowledge embedded within the paintings and the place names.

The second case on tribal resolutions relied on official Pueblo of Zuni governance documents. Through correspondence with the Cultural Resources Office, I obtained photocopies of the official tribal resolutions related to ceremonial activities. This example highlights the need for best practices in data documentation for official sources held privately by tribal governments and Indigenous organizations. This unique organizational context would require, for example, a description that makes clear the nature and role of cultural resource offices and specifies the restrictions or requirements for access.

The social media dataset covered 52 YouTube videos of Hopi social dances and the comments contributed by viewers. Since social dances were performed in the plazas where filming is prohibited during ceremonial "dances," sacred spaces were captured in what

became public video, as was sensitive tribal information in the forms of dance. The videos essentially produced photos of sacred materials that, by tribal regulations, would require permission for documentation and a release for any research purposes. At the same time, the short duration of the audio resulted in some protection for the lyrics and music, since the songs were incomplete as recorded. The comments, which constitute unauthorized informal explanations of the dances, may not fall into any category of sensitive cultural knowledge, but they may reference and describe material that should have been protected, and they explicitly identify several people in the recordings.

Another outcome of the project is a collection of secondary sources, covering a forty-year history of Zuni ceremonies, produced by researchers, tourists, and military and civil engineering campaigns of the US government. As a common output of humanities based research, this kind of bibliographic compilation is an important genre of humanistic data, where protocols for their treatment as data may have similarities to the Salish Language Research Guide described in Case 2.

On a more holistic level, this case points to the importance of the provenance and linkages among different sources that work together to reveal contextual understanding of cultural significance. Sensitivities might be pronounced in the context for a particular component of a data source or introduced by the dynamic relationship between complementary sources. With the social media data, we see a unique and challenging issue of how to document and curate data sources that are publicly available but, from an ethical standpoint, contain community-contested imagery that should be restricted, or alternatively include guidance on its cultural significance and controversial status in the open access environment.

#### Data Description Design

As a preliminary design for description of the data associated with the *From Six Directions* project, we developed the set of figures, appended below, to demonstrate how content and context could be represented in metadata or other documentation. Figure 1 is an overview of the data resources grouped to retain the relationships among the different sources, in line with the case study orientation of the research project. Figures 2-4 illustrate a preliminary representation of Content, with structured elements for data source, extent, and access information, and a free-text Context element.

While the framework and encoding are crude at this point, they provide an initial descriptive depiction, with a particular focus on contextual integrity in the context description. For the *From Six Directions* project, conveying relational accountability, such as

the relationships involved in data collection and access, is vital, as is more general information on cultural significance of the data resources, including data origins, other factors related to provenance and authenticity, and restrictions, protections, and related governance aspects. With this initial exercise, the free-text Context element is clearly overloaded, but it provides a starting point for more systematic investigation.

As a first step, we have represented the data sources at the resource or data file level of granularity. A primary aim in further analysis will be to identify how this representation translates to appropriate metadata schemes, what additional common structured Context elements could be applied, and the kinds of encoding vocabularies needed. In the case of the videos, for example, description of the controversial nature of the postings is needed to achieve relational accountability. This may be an area where TK labels or notices would be appropriate, but not yet sufficient for the kind of explanation or awareness building needed.

Levels of description also need further investigation. For example, application of TK labels may be more appropriate at the study level, in alignment with the DDI (Data Documentation Initiative) standard. Within QDR, the standard study, or project level, metadata elements include: Title, Creator, Summary, Abstract, Keywords, Time Period Covered, Geographic Coverage, and related publications. For Indigenous data, it would be critical to also articulate the Indigenous research methods applied and the cultural specificity that shapes the overall dataset and potentially alerts users to file level data sensitivities and access constraints.

Figure 1. Overview of data sources for the *From Six Directions* project

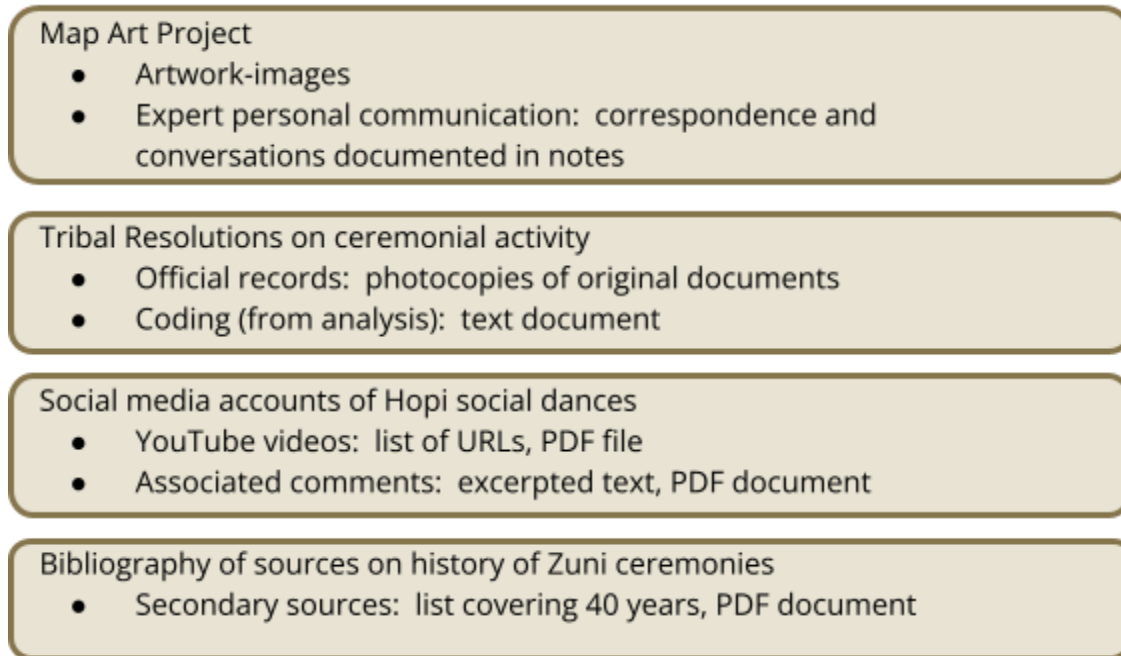


Figure 2. Descriptive elements for MapArt Project case data

CONTENT	
Data source	artwork collection
Extent	3 of 31 (photographs of originals)
Access	Reproduced in the exhibition catalog: <i>A:Shiwi A:wan Uhlonanne: The Zuni World</i> [ISBN #0897341473 9780897341479].  Original MapArt Project artworks held at the A:shiwi A:wan Museum and Heritage Center (AAMHC).
Data source	personal communication
Extent	9 (conversation notes); 27 (emails)
Access	private; held by researcher

CONTEXT	
	<ul style="list-style-type: none"> <li>• Analysis concentrated on 3 artworks based on examination of 1 full size reproduction and 2 exhibition catalog images from the MapArt Project collection of maps.</li> <li>• Personal communication with the MapArt Project director and AAMHC staff provided consultation and context.</li> </ul>

Figure 3. Descriptive elements for tribal resolution data

CONTENT	
Data source	tribal resolutions
Extent	12 (photocopies of originals)
Access	restricted; held by Zuni Pueblo Cultural Resources Office
Data source	thematic coding
Extent	4 variables
Access	private; held by researcher
CONTEXT	
	<ul style="list-style-type: none"> <li>• Photocopies of tribal resolutions related to ceremonial activities we obtained through direct engagement with the Zuni Pueblo Cultural Resources Office.</li> <li>• Content analysis identified material on ceremonies, photographs, banishment, and appropriate behavior, in relation to secondary sources on recording of ceremonial activities.</li> <li>• Thematic analysis applied a framework based on the Peoplehood Model (Holm, et al, 2003)--land, language, ceremonial cycle, sacred history.</li> <li>• A timeline was determined for official actions taken by the Pueblo leadership in response to photographs being taken of ceremonies.</li> </ul>

Figure 4. Descriptive elements for social media postings of Hopi social dances

CONTENT	
Data source	YouTube videos
Extent	52 (text file of URLs)
Access	private; held by researcher
Data source	YouTube user comments
Extent	undetermined
Access	private; held by researcher
CONTEXT	
	<p>The videos, while publicly accessible, include Hopi dances performed in plazas where filming is prohibited and may capture sacred spaces or other sensitive cultural knowledge in the form of dance and song.</p> <p>The associated comments are informal and not authorized by the tribe. They may include material that should not be available to the public. The comments reveal tensions and a lack of consensus in the community on how to handle the videos being posted online. They also indicate widespread knowledge that the posting of cultural materials on social media was a controversial action.</p>

## CONCLUSION

This Indigenous Research Data Case Study provides a foundation for comparison with other cases of sensitive data with unique conditions that impact data stewardship approaches. Grounded in understanding of the Indigenous research methods, ethical engagement, and first-hand accounts of Indigenous research and data practices, we used this case study to develop an analytical approach for “contextual integrity profiling” as a tool for informing data curation goals and the first step toward a data description design that responds to relational accountability, as a primary target of contextual integrity for Research Case #3.

This contextual integrity analytical process makes explicit the significant contextual factors that will need to guide development of CARE compliant protocols for Indigenous research data. CI profiling may also prove applicable to other types of sensitive research data. We will continue to develop and apply the process in the next phases of work made possible by an award to the University of Washington by the Mellon Foundation for the Data Services for Indigenous Scholarship and Sovereignty project (DSISS), a collaboration among information scientists, Indigenous scholars, librarians, and data curation experts at UW, QDR, the University of British Columbia, and Washington State University.

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