Databases for healing and justice:
Co-design with a grassroots, Indigenous organization

by

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ABSTRACT

This inquiry presents a grounded case study of a partnership between the Data + Feminism Lab at MIT and Waking Women Healing Institute, a grassroots, Indigenous organization. The partners co-design a case documentation and story gathering database that enables healing and justice for Indigenous women and people. The project reveals: 1) the vital role of trust-building, openness, and constant iteration in co-design practice, 2) the importance of designing for security in aligning the database with a need for Indigenous Data Sovereignty, 3) the practical trade-offs that come with choosing to use and configure commercial off-the-shelf software as opposed to using free and open source software or building custom software, and 4) how other institutional actors, like urban planners, can learn from this collaboration by centering trust-building, by welcoming ongoing revision and feedback rather than just 'going through the motions' of community engagement, and by taking tangible steps to enable institutional accountability to grassroots groups. Throughout, this thesis underscores the ways that a collaborative decision making process between institutional and grassroots partners allows the team to prioritize and operationalize grassroots needs and desires in a way that enables a useful technology solution for healing, harm reduction, and justice.

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To collectively build a place for the 7th generation in which Indigenous Women, Girls, and Two-Spirit people have reclaimed power over self in mind and body, free from settler and gender-based violence, with access to healthy Waters and respectful connection to Mother Earth for all beings.

Waking Women Healing Institute Vision

Chapter 1: Introduction

I begin this thesis first and foremost with an acute awareness of of an ongoing crisis - what has been termed a genocide - against Indigenous women in Turtle Island; Indigenous women, girls, and two-spirit people[1] are 4.5 times more likely to be victims of violence compared to the general population (Kennedy, 2019; Ficklin et al, 2021; National Inquiry into Missing and Murdered Indigenous Women and Girls, 2019). Murder is the third-leading cause of death among American Indian/Alaska Native women (Echo-Hawk & Lucchesi, 2019).

It is within this context that I introduce the partnership between the Waking Women Healing Institute (WWHI) and the Data + Feminism Lab (D+F) at MIT. WWHI is a grassroots, Indigenous-led organization based on Menominee land (in Gresham, Wisconsin, directly adjacent to the Menominee Nation) that promotes justice and healing for missing and murdered Indigenous women and people (MMIW/P) and their families. WWHI and D+F initiated a partnership in Spring 2022 and the team has been working ever since to realize a vision of collectively designing and creating digital tools that enable efforts toward co-liberation.[2] One major part of this extended collaboration is designing a case documentation and storytelling database platform to support WWHI's work with survivors and families, providing a systematic way to store and retrieve information to try to reduce families' retraumatization by retelling their stories. The needs assessment and collaborative platform evaluation and selection processes serve as the backbone of this thesis and of the database implementation itself.

By offering a grounded case study, this thesis contributes to literature on using participatory design methods to ethically and equitably design data driven systems, specifically defined here as technologies that further Indigenous sovereignty, Indigenous

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[1] The Native Justice Coalition (2023) describes the term 'two-spirit' as, "a direct translation of the Anishinaabemowin (Anishinaabe language) 'Niizh Manidoowag,' meaning Two-Spirit's. The term is most often used to describe or indicate someone whose body inhabits both a masculine and feminine spirit...For each Two-Spirit based on their specific tribal tradition, there may be a unique name in the language that honors who they are."

[2] The Building Movement Project (2024) defines co-liberation as "believing in the collective 'us' - by recognizing our liberation is inextricably connected, and we must work together towards our mutual freedom and redistribution of power. This means acknowledging the multi-generational consequences of white supremacy, anti-Black racism, and settler colonialism."

healing, and the reduction of trauma for families impacted by the MMIW/P crisis. What's more, it serves as a forum to reflect on our collaboration and offer learnings that might be useful to other academic, government, or technologist partnerships with grassroots organizations, and to other Indigenous-led, grassroots organizations looking to design databases of their own.

The WWHI/D+F team conceptualizes a "database" as a container for organized information that can be input, modified, related to other types of organized information, queried, retrieved, and deleted in a systematic fashion. This broad definition allows us to think and be in conversation with digital humanists and media studies scholars in addition to computer scientists, and it allows us, from the start, to think creatively about how to surface and implement WWHI's database needs and desires.

We - which will refer to the whole WWHI/D+F collaborative team in this thesis, unless otherwise specified - draw inspiration from the way that Indigenous movements, past and present, have used data. Indigenous data work is by no means new; the ways in which data is managed and stored sometimes shift in form over time, but the fact of data gathering is constant. Stephanie Russo Carroll, Desi Rodriguez-Lonebear, and Andrew Martinez (2019) put it this way:

> many Indigenous knowledge systems were based on generations of data gathering through observation and experience that then informed Indigenous practices, protocols, and ways of interacting with other people and with the natural world. The translation of knowledge into data was similarly evident. Indigenous data were recorded in oral histories, stories, winter counts, calendar sticks, totem poles, and other instruments that stored information for the benefit of the entire community (Rodriguez-Lonebear, 2016). (p. 2)

In recent years, organizations like the Native Land Information System, Native Land Digital, the Urban Indian Health Institute, and others have brought data and visualizations to bear in raising awareness about Indigenous traditional territories, protecting and defending Native lands, and advocating to bring additional health funding to Indigenous communities (Echo-Hawk & Lucchesi, 2019; Native Land Digital, 2024; Native Land Information System, 2024). In thinking about a database for story gathering and case documentation for missing and murdered Indigenous women and people, we follow in these advocates' footsteps, and the footsteps of many before them.

The thesis will answer the following research questions, which aim to understand the database needs and desires of WWHI, grapple with barriers faced during the process, and reflect on the academic partnership with WWHI and process of database co-design to inform future work that aims to engage with similar organizations:

- What are WWHI's specific database needs and desires? How do they differ from conventional databases created for non-grassroots, non-Indigenous-led, non-justice based organizations?
- What are the roadblocks, interpersonally and institutionally, to the platform that WWHI envisions, and how do we grapple with those?
- How and to what extent can institutional/grassroots Indigenous partnerships around data and technology move forward in a mutually beneficial way?

The field of urban planning has a particular stake in the answers to these questions. For one, planners maintain an acute interest in planning *with*, not just *for* communities, and especially historically marginalized communities. The WWHI/D+F collaboration offers one way that institutions - academic and government alike - can think about building long-term, reciprocal partnerships with grassroots organizations to co-design anything from digital tools to real estate developments to long-range plans that will enable communities to thrive.

Literature review

The crisis of missing and murdered Indigenous women, girls, and two-spirit people

It bears repeating: Indigenous women, girls, and two-spirit people are 4.5 times more likely to be victims of violence compared to the general population (Kennedy, 2019; Ficklin et al, 2021). Murder is the third-leading cause of death among American Indian/Alaska Native women (Echo-Hawk & Lucchesi, 2019). That is all just based on the data that we have available. Many scholars contend that data on missing and murdered Indigenous women is systematically *missing,* and current numbers are drastic undercounts (D'Ignazio & Klein, 2020; Echo-Hawk & Lucchesi, 2019). The violence against women and girls has traumatic impacts, body and soul, on the Indigenous communities from which victims and survivors originate. That said, it is by no means where trauma begins for Indigenous peoples of the Americas. As Skylar Joseph (2021) notes:

It could be argued that the issue of MMIW has been a crisis since the colonization of the Americas by Europeans began more than 500 years ago…The crisis of MMIW is but one symptom of a greater crisis of violence and oppression affecting Indigenous people today. (p. 1)

In recent years, as organizations like WWHI have raised public consciousness around the MMIW/P crisis, governments have created commissions and task forces to find better ways to prevent and respond to cases, as well as to collect more robust data (Not One More, 2023; Wisconsin Department of Justice, 2023). The vast majority of the everyday labor to end the genocide of MMIW/P, however, still rests on Indigenous-led, grassroots organizations who connect families with support, push government agencies to be accountable to their commitments, and facilitate individual and community healing amid persistent pain and grief. It is within this context that the Data + Feminism Lab and WWHI partnership emerged, in order to find ways to most effectively support the WWHI team in carrying out this vital work.

Indigenous ways of knowing

The scholarly consideration of Indigenous knowledge and ways of knowing operates both at an epistemological level and at a practical, grounded level. Indigenous knowledge is diverse and plural in nature, and it has been broadly defined as "culturally specific knowledge unique to a certain population…often depicted as being alive, in current use, and transmitted orally" (Simonds and Christopher, 2013). Indigenous *ways of knowing,* then, are related and deeply situated in their particular community context; information, histories, and expertise may be passed through storytelling and experiential learning like apprenticeships, ceremonies and practice (Stevens, 2008 p. 25). The experiential and relational nature of Indigenous ways of knowing often challenges the Western 'scientific' and 'scholarly' ways of knowing that privilege written texts, replicable methods, and quantitative data.

Some scholars have examined Indigenous knowledge in relation to digital interfaces and databases, and those inquiries are particularly relevant here. Notably, Christie (2004) interrogates the growing number of attempts to preserve Indigenous knowledge through databases, which he calls "archive fever" (p. 1, quoting Derrida). Skeptical of this trend but open to databases' utility, he offers recommendations and ways forward for architecting, structuring, and imbuing databases with "indigenous practices of meaning and representation." Highlighting the tension between Indigenous and Western ways of

knowing, Christie notes, "The best databases for indigenous peoples to use for their own purposes of knowledge transmission may be frustratingly difficult or counter-intuitive for western scientists to use" (p. 6). In an academic/grassroots, Indigenous-led organization partnership like D+F and WWHI's, this is a particularly important point to note. Not every piece of information or aspect of database design will be legible to the (majority non-Indigenous) academic researchers, and this is perfectly okay inasmuch as the database structure serves the needs of the Indigenous partners.

In concert with a scholarly attention to representations of data that reflect indigenous ways of knowing, there is an emerging body of work that underscores the need for Indigenous data sovereignty (IDSov) (Walter, Kukutai, Carroll, & Rodriguez-Lonebear, 2020; Bowen & Hinze, 2022; Kukutai & Taylor, 2016) that is, for Indigenous peoples to control the collection, access, analysis, interpretation, management, dissemination and reuse of Indigenous data. This movement aims to "leverag[e] Indigenous data toward Indigenous aspirations" (Walter et al, 2020), including by marshalling "disaggregated data; data that are relevant to Indigenous Peoples' ways of knowing and life ways; data that inform Indigenous nation rebuilding and data that disrupt the deficit narrative pervasive across policy spheres" (p. 12). The database described in this thesis is and and was co-designed and co-produced, but ultimately, in the spirit of IDSov, the database and the information it contains is wholly owned and controlled by WWHI and the families with whom they work. While the term IDSov is not typically applied to non-tribal entities like WWHI, this project maintains a commitment to Indigenous self-determination that is informed by and aligned with the movement for IDSov. The academic researchers aim to create the conditions for the case documentation and story gathering project to thrive on WWHI's terms and with their goals in mind, not to co-opt the project or enforce our own preconceptions.

Databases

This thesis draws on computer science and human-computer interaction, as well as new media studies and digital humanities to conceptualize a database in the way that most closely aligns with what WWHI is attempting to gain by building, interacting with, and updating their case documentation and story gathering platform: preventing retraumatization for families, supporting healing processes, and furthering advocacy efforts. As far back as the late nineties, new media studies scholar Lev Manovich (1999) refers to the database as the "new symbolic form of the computer age…a new way to structure our experience of ourselves and the world" (p. 81). This idea that a database's

utility lies in its ability to give structure to human experiences matches the way that the WWHI/D+F partnership approaches assessing and prototyping database options, balancing structure with a faithful and nuanced representation of individuals and their lives.

In addition, computer scientists Buneman et al (2008) write about "curated databases," or those databases that "are populated and updated with a great deal of human effort." WWHI's database is a special case of the 'curated database' that Buneman et al describe as comprising source, annotation, update, schema, and structure. WWHI's database-in-progress is similar in that structure is imposed on the entries, and the database brings together knowledge of many different sources - family members, WWHI staff, government officials, law enforcement agents, lawyers, the official records of government entities. Some of it was previously in an accessible format, but most was not. The WWHI database differs slightly in that it is curated for a specific organizational use, and not meant to be either open access or sold anywhere, unlike many curated databases that Buneman et al survey. Nonetheless, the idea of a curated database helps conceptualize some of the database's desired features as well as its authors' goals to render legible and accessible data from disparate, often unstructured, sources. Similarly, our collaboration with WWHI has parallels with Davies et al (2006)'s development of a personal knowledge base called Popcorn, an "experimental interface and database designed to store and retrieve a user's accumulated personal knowledge."

From a digital humanities perspective, there is an established legacy of using the term "data'' or "database" to discuss projects, like WWHI's, that are partially or wholly qualitative in nature but that also seek to support better understanding of trends and patterns in the source information and enable quick querying and retrieval (Oberhelman, 2015; Kim et al, 2015; Schoch, 2013). Gibson (2009), for example, writes about the creation of the Northern Territory Library's *Our Stories* database, in which Indigenous communities in approximately fifteen distinct cultural and linguistic regions in Australia contributed "important historical and cultural materials'' to their communities' own shared, multimedia, annotated databases.

Urban planning and community engagement
Urban planning scholars have long been interested in questions of how best to engage everyday residents in decisions about the ways in which we structure our built

environment and urban policy landscape. Traditionally, urban planning as it emerged in the Global North has been a field that values "expertise" (Fainstein & DeFillipis, 2016), and the people deemed to have expertise were largely people who were educated in university settings. Today, planners are in a unique position to funnel community voices, knowledge, and grounded expertise into the halls of power - many of the types of things that the WWHI/D+F collaboration aims to do. In his critique against the imperial tendencies of utopian high modernist planning, Scott (1998) notes how top-down planning's failure to incorporate the "embodied knowledge embedded in local practices" renders it ineffective at best (p. 6).

It follows that working alongside people who live in a place and valuing their knowledge and experience can begin to change the narratives around who we consider "credible" in the planning process, and it can change the outcomes themselves. Watson (2006) and Umemoto (2001) each urge a critical reckoning with difference that goes beyond surface-level inclusion. Both authors speak to the realities of engaging with and respecting the knowledge of people who have fundamentally distinct (from the researchers and often also from others in the group) and contextual views of the world. Sandercock and Attili (2014) and Bhan (2019) go one step further by providing examples of how to navigate deep differences and uplift alternate worldviews. Sandercock and Attili (2014) describe an action research project that uses the process of co-creating and viewing a film to promote truth-telling and reconciliation between Indigenous and non-Indigenous residents in a British Columbia town. Bhan (2019) contributes a new set of terminology generated to enable an alternate framing of urban planning practice and to promote Southern ways of knowing. By engaging in co-design of a database for healing and endeavoring to embed Indigenous ways of knowing into our work, the WWHI/D+F project aims to build upon this emerging set of planning literature.

Method(ology)

Positionality
As an author, I am conscious that all knowledges are "situated," as described by Donna Haraway (1988). This means that 'our' knowledge in the WWHI/D+F collaboration is politically and ethically based in and shaped by its purposes and positionalities. Our D+F team comes to this work from white settler, multiracial settler, and Indigenous backgrounds. As a settler, I acknowledge the ways I was able to "learn how to know" from

an early age without my lived realities contradicting the dominant paradigms. These dominant epistemic lenses include some of the logics I have begun to make visible and unlearn - and hope to continue to do so in this thesis - including: the preference for knowing in quantifiable ways, the implicit suggestion that lived experience is a less credible or valuable way of knowing, and the idea that professionals in academia, governments, nonprofits, and companies know better how to "fix" oppression than the people who experience it. In addition to unlearning some of those dominant ways of knowing, I would like to affirm ways of Indigenous knowing as well as Black, queer, feminist, and disabled ways of knowing. I recognize and seek to uplift the varied ways of knowing that are bound up in the different languages we speak, how we translate between them, and, more generally, ways of knowing that don't depend on a white, Euroamerican exemplar. It is with this intention and a personal ethic of reciprocity that I come into the project of partnering with Waking Women Healing Institute on database design.

Participatory action research

The partnership with WWHI has explicitly operated as a PAR project. PAR is an approach to research that aims to fundamentally alter the binary and oppressive power dynamic between researcher and research subject by rendering 'subjects' participant-researchers with full decision making power and agency to drive the research questions, research design, data collection, data analysis, and interpretation and communication of results. The PAR approach takes its theoretical inspiration from the work of Paulo Freire and his seminal book *Pedagogy of the Oppressed* (Freire, 1970). Writing on education, Freire lambasts the oppressive teacher/learner binary and calls for a switch from the *banking* model of education wherein teachers deposit information into the heads of learners to the *problem-posing* model of education, wherein teachers and learners engage in dialogue, gaining critical consciousness along the way. Since Freire, many scholars have taken up the mantle of extending his theories in novel ways (Torre et al, 2017; Fals-Borda, 1987), including Unangax̂ scholar Eve Tuck. Tuck, an education researcher who engages in a variety of PAR projects, calls attention to academia's near-obsession with "damage-based" research that focuses on the pain, trauma, and harms experienced by marginalized communities. She argues instead for a "desire-based" research paradigm:

> Pain narratives are always incomplete. They bemoan the food deserts, but forget to see the food innovations; they lament the concrete jungles and miss the roses and the tobacco from concrete...This is not about seeing the bright side of hard times, or even believing that everything happens for a reason. Utilizing a desire-based

framework is about working inside a more complex and dynamic understanding of what one, or a community, comes to know in (a) lived life. (Tuck & Yang, 2014 p. 231)

This move toward "desire-based" research in PAR animates the D+F/WWHI collaboration. The case documentation and story gathering platform maintains a focus, in line with WWHI's values and advocacy, on healing, rather than solely on pain and trauma. This also follows To et al (2023)'s call to move beyond damage-centered HCI for BIPOC communities. "Datafication" of treasured information about people's lives is fraught, and the use of a database in this project therefore led us to be exceptionally reflexive throughout the process to avoid creating something that was counter to the collaborators' values and/or reified the extractive patterns of damage-centered research.

What's more, because PAR is an approach to research rather than a specific method, it can be used with a variety of methods. In using PAR for a database evaluation, selection, and implementation process, we draw on perspectives and lessons from authors who have used PAR for the analysis of big data to gain insights about gentrification (Daepp et al, 2022), for participatory geographic information systems for grassroots advocacy in Chicago (Elwood, 2010), and even for designing IT systems for knowledge management in large governmental and non-governmental organizations (Butler et al, 2008).

Co-design

The WWHI/D+F collaboration also employs co-design methods. Co-design is just one of the many methods that can be approached with a PAR lens. It serves as one of the collaboration's guiding methods partially because of the rich work that has already been done by scholars co-designing digital tools and data(bases) for Indigenous language and cultural heritage preservation (Stanley, 2020; Tsai et al, 2023; Peters et al, 2018; Park et al, 2022; Du et al, 2022) and those co-designing digital tools for justice-based advocacy (Seguin et al, 2022; Nigatu et al, 2023; Teeters, 2017; D'Ignazio, 2024; Guerrero Millan, 2023; Ehrman-Solberg et al, 2022). Peters et al (2018), notably, emphasize that *participation* of Indigenous partners in a co-design process is not enough to forward epistemic justice on its own; rather, they advocate for *Indigenous-led* co-design. For Peters et al, that meant training 'user-leaders' to facilitate participatory design workshops, with academic partners stepping back. While due to capacity constraints, we did not pursue an exactly analogous approach to co-design with *full* "user-leadership", the D+F academic

partners do co-facilitate most workshops alongside WWHI staff and strive for the principles of humility, flexibility, and relinquishing control.

With this in mind, similar to other authors such as Seguin et al (2022), the activities of our co-design inquiry revolved around collaborative workshops, interviews, and discussions (*see Table 1 below for a selection of key co-design activities*).

Date	Activity
Fall 2022-Summer 2023	Biweekly meetings with academic team and WWHI to iterate on and prioritize platform evaluation criteria and platform prototypes
August 2023	Collaborative evaluation and selection workshop with WWHI staff and volunteers (including testing of each platform and guided discussion and activities about trade-offs)
Fall 2023	Initial implementation of selected database platform (Airtable) in Crowd Sourced City course with weekly discussion and revision sessions with WWHI executive director
January 2024	In-person knowledge sharing workshop to facilitate use of the database platform by WWHI staff and make changes for day-to-day usability
March 2024	Virtual knowledge sharing workshop for WWHI Board to refine the database, begin to transition full functionality of Airtable database to WWHI staff for implementation

Table 1: Key co-design activities for WWHI case documentation and storytelling database

What's next?

The following chapters will describe, reflect on, and distill lessons from D+F and WWHI's co-design process. Chapter 2 will cover how we collaboratively surfaced WWHI's database needs and desires and collected and organized background information about the candidate database platforms accordingly. Then, Chapter 3 will describe how we operationalized WWHI's database needs and desires, from initial prototyping and selecting a platform to creating a working database implementation for WWHI staff use. Chapter 4 will dive more specifically into the PAR process, including the team's reflections on personal and institutional opportunities and barriers to doing our best, most reciprocal

and mutually-valuable work. Finally, Chapter 5 will look forward; it will consider how we think about the WWHI and D+F partnership in a broader context of databases for healing and liberatory data futures and outline pathways for future work.

Chapter 2: Assessing WWHI's needs and desires

In order to begin to understand what types of tools might be useful to WWHI to fulfill their mission and better serve MMIW/P families and survivors, we worked together to surface the organization's needs and desires. This chapter will discuss how we did this, including through visiting and in-person collaboration, constructing an evaluation matrix, constantly iterating, and building from the WWHI-developed case documentation and storytelling template.

Initiation(s): Summer 2022 Visit to Menominee Nation

During the summer of 2022, several students and researchers from the Data + Feminism Lab were invited to the Menominee Nation to visit the WWHI team. This visit was meaningful for the project on a number of levels. WWHI and D+F team members spent quality time together building relationships and trust, which are vital to following a robust PAR approach. The collaborators also had an opportunity to have focused, in-person time to share information and ideate about what the ideal tool to meet WWHI's needs and desires would look like. These conversations laid the groundwork for what would become the case documentation and story gathering tool.

The WWHI team communicated aspirations for a tool that would support: 1) case documentation for future advocacy targeting legislators, agency rulemaking, and law enforcement practices (not just extracting and storing people's information for the sake of it), 2) querying and retrieval of specific case details so that families don't have to retraumatize themselves over and over again, and 3) storytelling as a healing practice for families that desire it. Ideally, this tool would consist of a frontend that allows data input via form(s) or survey(s) and a backend relational database.

This is markedly different from the stated aspirations of most databases for business or government systems (*What Is a Database?*, 2023; DalleMule & Davenport, 2017; *Types of Database Management Systems*, 2020; *Government Databases*, 2024; Domeyer et al., 2021). Databases in non-grassroots contexts are often focused on goals like the ones that database giant Oracle describes: "to run more efficiently… become more agile and scalable…optimiz[e] access and throughput" (*What Is a Database?*, 2023). "Optimization," in particular, is a watch-word for typical forms of data strategy as described by DalleMule and

Davenport (2017). Whether that means optimizing "data extraction, standardization, storage, and access" or optimizing "data analytics, modeling, visualization, transformation and enrichment," optimization is at the center of how many professionals conceptualize data management (DalleMulle & Davenport, 2017). With this context, it becomes clear how WWHI's approach differs. Maximizing efficiency or getting the most value from the stories and case information that the organization gathers was never the goal; rather, WWHI aims to standardize their information *just enough* to be useful for advocacy and quick retrieval while still preserving enough richness and nuance to enable storytelling and placing dignity for missing and murdered relatives and their families at the center of the work.

The WWHI and MIT partners then needed to discern the details of what exactly a database system that meets those needs and desires could look like. The WWHI and D+F teams decided to examine four potential technology platforms for case documentation and story gathering: Airtable, ArcGIS Survey123, Google Forms, and KoboToolbox. The first three platforms are commercial off the shelf software (COTS) and the latter platform is a free and open source software (FOSS) platform. The academic researchers and the WWHI staff and volunteers brainstormed factors relevant for choosing a platform during their time together, which they then formalized into criteria in an evaluation matrix as they moved into the phase of evaluating and selecting a platform for the project.

The evaluation matrix initially included criteria for pricing, online/offline capabilities, ease of use for WWHI staff, technical know-how required to maintain the system, features for collaboration, the nature of the forms the platform offers for submitting data, aesthetic customization/flexibility, stability of the platform, technical support available, privacy and security, political commitments, and database functionality. I worked with an undergraduate in the D+F lab to create concise, accessible information describing the details of each of the four technology platforms being evaluated. They primarily focused on a background scan on the platforms and collecting as much basic data as possible for each criterion. The intent was not to make a decision on behalf of the group, but rather, to enable a collective decision-making process by providing the group with relevant information. When the point is not to be technocratic or to ensure profits, but rather to promote affective values like healing and harm reduction, the WWHI and D+F teams found that it became even more important to make decisions collectively and led by those who are closest to the issue.

Iteration as a co-design practice

Vitally, the research for the evaluation matrix was not completed in a vacuum. As the academic researchers worked on filling out the matrix, they provided consistent updates and brought forward questions and concerns to the broader group. For example, in the first few weeks of their work, the academic team noticed a potential gap in the initial set of criteria. The criteria didn't include any direct reference to whether or not the database platform could use branching survey logic; while this is a platform feature that could conceivably fit under 'ease of use' or 'the nature of the forms available for submitting data,' the functionality also varies considerably between platforms, and can be complex (e.g., does the survey logic only allow users to skip sections, as in Google Forms, or can you make certain sets of questions appear based on the answer to a date field, as in Airtable?).

Therefore, the academic team brought the issue to the WWHI team, asking, for one, whether branching survey logic would be useful at all for the platform, as well as whether the WWHI team thought survey logic might be an important and nuanced enough issue to warrant its own category in the evaluation matrix. The WWHI team indicated that survey logic would be both useful to have in a database platform - especially when differentiating between the information that needed to be added for documenting cases and stories of missing people versus murdered people - and meaningful to add as an evaluation criterion in the matrix. The academic team subsequently incorporated it. WWHI and academic collaborators went through several similar iterations of the matrix during the background research phase in order to make the evaluation matrix as robust and reflective of WWHI's desires as possible.

This constant iteration distinguishes the WWHI and D+F process from typical database evaluation processes in industry, large government organizations, or the vast majority of academia. Oftentimes in other contexts, coworkers may work together to create an initial set of criteria to evaluate in different technology platforms, but the collaboration largely ends there, at the beginning. In our case, pausing to deliberate and ask questions substantively changed how the team collected this basic background information. Each and every decision about what to evaluate and document was intentional and based on the collaborators' aims - not determined arbitrarily or based on any 'objective' technical

framework. Even background information comes with particular assumptions, creates a structure for how the team views the capabilities of the platforms, and influences collective decision making.

Case documentation and story gathering template

Simultaneous with the academic team's effort to fill out the platform evaluation matrix, WWHI's executive director went through a process to distill her work into a case documentation and story gathering template, to be used as the basis for sample forms in each database platform being evaluated. As she frames it:

> *"This is a template we created to ensure we are gathering information that empowers MMIW/P families and reduces the trauma experienced by continually repeating their relative's story. It also helps us gather critical information that is used across multiple systems in navigating missing and murdered cases and organize it for MMIW/P families to use. These organized stories, or data, can then be used to identify areas of prevention, improve responses, empower survivors, create awareness, and uplift solutions."*

The template meticulously covers the aspects of a case that WWHI seeks to capture, from logistics and timelines to deeper reflections on colonial barriers that missing or murdered relatives faced during their lifetimes, or the ways that justice and law enforcement systems served or failed them and their families. It also provides for data entry that is ongoing, not just one-time, such as updated case notes, additional meetings with systems or families, and new relevant contacts for the case. Built based on the WWHI team's lived experience working directly with families and survivors, the template serves as a guiding framework for designing a survey and database that will be genuinely useful for the organization in the long term.

In the sense that the template is meant to reflect a set of priorities with long term meaning and utility to WWHI, the data and story collection that it suggests is sometimes aspirational in nature. That is, when WWHI's executive director created the template, her organization did not formally take note of all the different types of information, especially retrospective items, like reflections on ways in which the law enforcement and justice systems had both served and failed MMIW/P families. The WWHI team conceptualized the template creation and database design process not just in terms of adding structure and technology to their current documentation system, but also in terms of things they *wish* they knew across many different cases, or wanted to better be able to communicate to

partner organizations and funders. For WWHI, creating the case documentation and story gathering template provided an opportunity to step back and think about what an ideal information system would look like for their advocacy and case support work, and that intent is reflected in the multifaceted nature of the final product.

See the case documentation and story gathering template.

Conclusion

In this initial part of our collaborative endeavor, the WWHI/D+F team engaged in two key practices and developed two documents. The key practices were open-ended discussion and establishing iteration as a core component of our co-design. The documents included the ever-evolving database evaluation matrix and the WWHI-developed case documentation and story gathering template. We left this early part of the co-design process with a strong sense of collective purpose and an understanding of the types of functions an effective case documentation and story gathering platform would have to fulfill in order to fit with WWHI's needs and desires - together, their vision - for the tool.

Chapter 3: Operationalizing WWHI's database needs and desires

As we moved from assessing WWHI's database needs and desires into operationalizing them, we went through several different phases of collaborative work, which will be described in the following pages. The first was to develop four survey prototypes - one for each platform, Airtable, ArcGIS Survey123, Google Forms, and KoboToolbox - so that the whole team could test and uncover the benefits and challenges that come with each one. Operating with our key practices of open discussion and constant iteration, we came to understand the paramount importance of security for the case documentation and story gathering system and worked to find a robust solution for security in the prototypes. We then held a collaborative database evaluation and selection workshop to do the actual platform testing, as well as to discuss potential trade-offs between the systems. Once we selected a platform of choice, Airtable, we expanded the capacity of our team with the help of the MIT Crowd Sourced City class to move into the implementation phase. At the end of the chapter, I make the argument that moving forward with implementing Airtable, a commercial off the shelf software, for the case documentation and story gathering database was a deeply practical solution. Airtable is not without its flaws, but it works best given its ability to meet the majority of WWHI's needs - enabling them to quickly take action alongside MMIW/P families - while requiring much less technical organizational capacity than a custom-built solution, or even the free-and-open-source software solution that we evaluated.

Developing initial survey prototypes

I and an undergraduate in the D+F lab used the WWHI executive director's template to design prototype forms in each of the four survey/database platforms. They created the forms to allow WWHI staff who would be using the tool to test the usability of each of the platforms based on their own anticipated workflows for story gathering and case documentation. In the prototype creation process too, the researchers quickly had to pivot and iterate on their initial ideas.

Stark trade-offs between the different platforms quickly became apparent in ways that had not been clear from the background research alone. For example, the WWHI case documentation and story gathering template includes questions that a member of the WWHI staff, or volunteer helpers, might fill out based on their conversations with families

and survivors in cases of MMIW/P, including sections covering information about an initial meeting, details on the past-departed relative's story, an ongoing list of key contacts, a separate ongoing information form, and a MMIW/P family impact and needs survey. The information generally submitted on a one-time basis (e.g., initial meeting, story details) needs to be easily connected to details about case contacts and information about follow-on meetings, as well as a family's answers to the impact and needs survey.

While database functionality had been a criteria in the background information matrix, it was unclear just how vital it was until the WWHI executive director passed along her template, which clearly articulated a desired future workflow that would require one-to-many relationships between data input through different forms (i.e., one main case/story file connected to many contacts,meetings, and interactions that take place between different parties related to a single case). This realization required the researchers creating the prototype to delve more deeply into the most optimal and user-friendly ways to enable relationality in the platforms. Still, one of the platforms, Google Forms, had almost zero database functionality and few workarounds, and another one of the platforms, KoboToolbox, provided very limited connections between different forms (primarily 'autofilling' particular fields based on another form, not actually creating a relationship between the data created). Through iteration, it became clear that WWHI needed not only collaborative, multi-user editing, user-friendly forms for data entry, and branching survey logic, but also required features offered by relational database management systems (DBMS).

Centering security and privacy

As the D+F team presented initial prototype surveys to the WWHI team during a biweekly meeting, the WWHI team asked a question about the platforms' security. The academic team had compiled research on security and privacy (it was one of the criteria during the background information gathering phase) by asking the following questions: What kind of privacy policies does the platform provider have? Do they sell your data? What measures are in place for data security? What guidance/marketing is there on their site about security? Are there any recent major data breaches involving this platform? However, WWHI's executive director was interested in one aspect of data privacy and security that the researchers hadn't looked into as a part of the initial information gathering phase: could the data input into the form, particularly personal, traumatic information about

missing and murdered relatives' stories - including sometimes about their struggles with addiction - be subpoenaed in court, based on each of the platforms' policies? Protecting the data from breaches would be important, but protecting it from subpoena would be just as important.

The desire for protection from state visibility is an aspect of database management that differentiates the database that WWHI seeks from databases that are being created by corporations and platforms, and it has also come up as a key issue in other academic/Indigenous co-design projects (Bowen & Hinze, 2022). The A in the CARE Principles for Data Governance created by the Global Indigenous Data Alliance stands for the *authority to control* information, and WWHI believes that ultimately the MMIW/P survivors and families should have the sole authority to control which, if any, aspects of their own or their relative's story are shared, and if so, to whom (*Data Rights,* 2023).

As a result of this more specific emphasis on security, we returned to more deeply investigate the security features of each of the platforms we were evaluating and attempting to create prototypes for. We looked at whether, and under what circumstances the information stored within each platform might be subject to subpoena and found that unless WWHI were to take advantage of either KoboToolbox or Esri ArcGIS' on-premises options (which would require WWHI to stand up and administer its own servers), any data stored in Google Forms, ArcGIS Survey123, KoboToolbox, or Airtable could ultimately be subject to a subpoena. Some providers (Esri and Amazon Web Services, which KoboToolbox uses for its data storage) indicated that they would "attempt to redirect the law enforcement agency to request that data directly from you" and, if still compelled to provide information, "give reasonable notice of the demand to allow the customer to seek a protective order or other appropriate remedy" (*Products & Services Privacy Statement Supplement*, 2024; *Data Privacy*, 2024). However, none of the companies could provide an assurance that the personal information stored in their hosted databases wouldn't be able to be subpoenaed at all, which was what WWHI needed.

The WWHI/D+F team decided to consult the Harvard Cyberlaw Clinic for help. One of the clinical instructors there suggested that, barring "keeping our server in our lawyer's office," a potential workaround for high quality, subpoena-safe security may be to use zero-knowledge encryption for the subset of the data that is most sensitive. As the Chainlink Foundation describes it, with zero-knowledge encryption, "the data is encrypted

before a user ever communicates with the service provider—making it effectively impossible for the service provider to decrypt the data without knowledge of the encryption key even if they're hosting it" (Chainlink, 2023). For the purpose of the WWHI/D+F project, this means that the service provider would only be able to hand over an encrypted, (and therefore useless) version of the data even if they were subpoenaed or otherwise compelled by courts or law enforcement. The workaround met WWHI's needs, but with a usability cost; in order to integrate with each of the platforms under evaluation, it requires a user click a link to go to a separate site (a zero-knowledge encryption file dropbox) for a couple of the most sensitive questions like "Describe colonial barriers faced at the time the relative traveled on." and "Describe violence the relative experienced over their lifetime." Then the staff member has to navigate back to the main survey once they are done entering the sensitive information. This creates a disjointed user experience that, even before any formal testing, struck both the academic team and the WWHI team as less than ideal. For the limited number of users who were slated to perform data input (largely the WWHI executive director and a few additional staff and volunteers), the collaborators decided that the user experience trade-off was worth it to ensure robust privacy for families and survivors.

Collaborative database evaluation and selection workshop

All of the iteration on background information gathering and survey prototyping culminated in a hybrid collaborative database evaluation and selection (CDES) workshop (see *Figure 1* below for one illustration of how the facilitators distilled the background information into decision aids for the workshop). Taking a desire-based approach into the CDES facilitation materials, the facilitators aimed to orient our conversations around the *possibilities* of what a database technology could add to WWHI's varied work and how community members would use it in practice, rather than offering a narrow prescription of how to document damage using the platforms.

Figure 1: Simplified version of part of the platform evaluation matrix on background capabilities, used as a decision aid during the collaborative database evaluation and selection workshop.

This led to generative discussions that drew out the WWHI team's priorities and their ideal future workflow(s) around documenting case information and gathering relatives' and survivors' stories. It exposed how WWHI approaches both *using* and also *refusing* data (D'Ignazio, 2024). The staff refuse the siren call of technosolutionists to collect and submit data in real time in the field, for example. Such a practice - pulling out an iPad and running through a formulaic set of questions during an intense, emotional conversation - might strike families as odd or extractive. Instead, the process of translating notes and memories into a form and submitting it as 'data' is a task that inherently involves interpretation and meaning-making, not 'simple data entry.'

Recognizing the case documentation as a second-order task for the team was a key way that the WWHI/D+F team was able to differentiate and choose between different platforms and their trade-offs. Indeed, this meant that online/offline support for a platform was less important than workshop participants had initially assumed, and the Airtable platform bubbled to the top as the most functional for all of the team's core needs: sharing and collaboration, survey logic, limited technical know-how needed to keep up the system, and, perhaps the deciding factor, simple-to-use functionality for relating tables.

From prototype to working implementation

Continuing iteration: Crowd Sourced City course

In fall 2023, after the CDES workshop was held and the decision made by the WWHI and D+F team to move forward with the Airtable platform, the collaborators' focus shifted from prototyping into figuring out what revisions and enhancements would be necessary to actually implement the form and database into WWHI's work. For this portion of the project, the team expanded to include not only members of the Data + Feminism lab and the WWHI staff, but also seven students (including me, the author of this thesis and an existing member of the collaborative project) from Professor Catherine D'Ignazio's Crowd Sourced City (CSC) class. The class, in which students support community partners on data and technology projects, offered an opportunity for additional capacity for the detailed implementation work, as well as new ideas and perspectives to add to the ongoing co-design meetings between WWHI and academic partners. WWHI and the students in the course entered into a memorandum of understanding regarding the care, use, and sharing of sensitive data, which I will discuss in further depth in Chapter 4.

At this stage of the project, iterating, updating, and adapting the database schema and accompanying surveys continued in earnest - at the very same time as the CSC team was inputting WWHI's information into the Airtable system and creating customized views and visualizations (which Airtable calls "Interfaces'') to aid WWHI's work. Rather than locking in changes after a certain point, we took the opposite approach, noting that it was more important than ever to keep the co-design dialogue open as we moved closer to incorporating the case documentation and story gathering system into WWHI's day-to-day operations. Small changes could make or break the utility of the system for WWHI's director and her team.

For example, the WWHI template includes a multipart question about whether the missing or murdered relative has children, and if so, it asks for their names and birthdays so that WWHI can send a care package on that day. In the prototype survey, this question was a 'Long Text' type in Airtable. This 'Long Text' box provided room for someone entering the data to put as many names and birthdays as they would like, with a suggested format for names and dates in the question description. While this is flexible, it's not easily searchable. In a September co-design meeting between the CSC and WWHI teams, the WWHI executive director noted that she would like to automatically populate a calendar with dates on which to send care packages. This would have been tricky with the 'Long Text'-type field. A new student member of the team then suggested a more structured alternative (see *Figure 2* below) in which the person inputting data could, rather than

typing all of the name and date information by hand, enter the number of children that the relative has and trigger conditional fields to appear for their name(s) (a "Short Text" field) and their date(s) of birth (a "Date" field). The latter date of birth field allows those inputting case information to interactively select the date from a calendar, and it is stored in a format that can be transferred directly to a calendar, as the WWHI director expressed a desire for.

Figure 2: Updated schema and data entry form with date-type input for children's date of birth

That is just one example of an iteration during the period of ongoing co-design and simultaneous implementation work with the CSC and WWHI teams. Other key updates included taking the Family Impact and Needs survey out of the main story gathering form and separating it into a related table/form to reflect a difference in intent between the forms; while the main form would likely be administered in the midst of an ongoing case of a missing or murdered relative, the Family Impact and Needs survey is more retrospective. This shortened the main form considerably, enhancing usability for WWHI staff. The CSC and WWHI teams also worked to learn about the security and privacy permissions available in Airtable and select the proper set of permissions to ensure that families could have access to a tailored view or set of views with information pertaining to their relative's case while still restricting access from other families' sensitive information.

Implementation challenges

As we were working through implementation during the CSC course with our expanded set of team members, a few core challenges arose that we had to grapple with. One of those was revisiting the question "what is the purpose of this database and how is the schema being conceptualized?" As CSC team members were going through an inputting some of the existing WWHI information, case details, stories, etc., into the format of the case documentation and story gathering template, they discovered that there are many *blanks*, or missing information vis a vis the scope of information that the template aims to collect. The team members were concerned by the missing data and suggested either that they were missing something in the legacy documentation or that the schema might need to be modified to take account for the fact that it doesn't conform with the data available.

After dialoguing with the WWHI team, however, we consciously decided to keep the data schema as-is. Why? First off, this relates to something that we discussed in Chapter 2: the aspirational and transformative nature of what WWHI is trying to do with the story gathering and case documentation database. Much of WWHI's legacy data was brought together from various sources and collected before they went through the process of creating the story gathering and case documentation template; they had not yet systematically conceptualized what it was that they really want, need, and desire to know and document. Inherently, then, the legacy information won't be as extensive as the questions in the template assume, and so we observe *missing* data. In addition, we know, as discussed in Chapter 1, that there is systematically *missing* data about missing and murdered Indigenous women and people. Obfuscating this in the name of creating a cleaner-looking case documentation database was not what WWHI desired; in fact, the WWHI team emphasized that highlighting pieces of information that are systematically missing can be useful in advocacy settings.

The team also faced some technical challenges with implementing the Airtable platform in a way that would meet all of WWHI's needs, desires, and aspirations. For example, in an effort to center healing in the case documentation and storytelling database, WWHI's executive director suggested that it might be useful to incorporate a "Timeline View" capability as one way to visualize the important meetings, events, and moments in a MMIW/P survivor or family's story; ideally, this functionality would be generated from information in the database automatically but could be customized and elaborated upon by survivors or families who wished to do so as a healing exercise. However, the CSC team

found that the built-in timeline functionality in Airtable was altogether unsuitable for this purpose, and was geared more toward project management or task tracking. Instead, the CSC team leveraged outside tools to support the timeline-creation process for families. While the timeline functionality wasn't necessarily a core desired capability for the case documentation and story gathering database, it was nonetheless notable that Airtable could not accommodate the nuances needed for a timeline to be useful for WWHI and the families with which the organization works.

In addition, while inputting some of the existing case documentation and story information into the Airtable, CSC student team members discovered a number of what they took to calling "complUXities", or things that made the user experience, or UX, of Airtable, complex – in the students' view, more complex than necessary. For instance, the "Long Text" fields don't allow formatting, which presents some issues for inputting case notes that include things like bullet points and bolding. Moreover, multimedia integration is limited; while users can attach photos to a record, things like sound and video are not supported, which limits the *types* of storytelling - and the epistemologies embedded in modes of storytelling (i.e., written vs. oral storytelling) - that WWHI and families can do from within the platform.

More broadly, throughout the Airtable platform implementation process, the team struggled not to become too myopic. While there were many detail-oriented challenges to tackle, discuss, and make decisions about collectively, it became just as important, especially for the CSC students working on the partnership for a limited period of time, to focus on creating clear, extensive, and digestible documentation. This documentation was intended primarily for WWHI staff, present and future, looking to start using the case documentation and story gathering database in their work, as well as for the awareness of current team members from the MIT side and WWHI side who had varying levels of knowledge about the working details of the new platform. After conversations within the WWHI and CSC teams about what documentation formats would be most useful, the students created short videos and written explainers for various tasks in querying and visualizing information from the database, in accessing and using the zero-knowledge encryption Sync platform, as well as in setting permissions for various potential users or viewers of subsets of the data (e.g., WWHI volunteers, MMIW/P families, outside funders).

Knowledge sharing workshop

WWHI invited members of the CSC team to their headquarters on Menominee land (in Gresham, Wisconsin, directly adjacent to the Menominee Nation) in early January. The purpose of this visit was to share the work from the semester with a broader community and have additional, ongoing feedback and co-design discussions to make certain that the case documentation and story gathering database was as robust and user-friendly as possible. The workshop included technical demonstrations and discussions interwoven with big picture conversations about purpose and goals of the case documentation and story gathering platform, always centering that the platform is first and foremost meant as a tool so that families don't have to keep retraumatizing themselves by retelling their stories. This workshop was the time in which the database started to become real and tangible in the eyes of those who would most often use it, and especially those staff members at WWHI who had been less involved in the earlier parts of the co-design process.

In this case, the WWHI executive director invited interested collaborators from the Mole Lake Band (Sokaogon Chippewa), who live about an hour away from the Menominee Nation's reservation lands, on the border of which WWHI's headquarters sits, to join the knowledge sharing workshop. Four visitors took her up on this offer. WWHI's openness and desire to share lessons in real time again differentiates the organization's database from corporate databases. Yes, the data that WWHI stewards is sensitive and needs to be protected and cared for, but not because it's *proprietary*; indeed, WWHI maintains that they don't own the data, the families they work with do. The WWHI schema and methods are meant to be shared - hence, why it's important to write an externally-facing report like this and invite broader communities like the partners from Mole Lake to learn about the work.

How to contend with using commercial off-the-shelf software (COTS) when our aims are liberatory? Or, in defense of the practical

D+F and WWHI both see the case documentation and story gathering project as a strategy in working toward a world that eradicates gender-based violence and respects Indigenous sovereignty. As evidenced by the explicit trade-offs that the team made throughout the database platform evaluation, selection, prototyping, and early implementation processes, COTS platforms are rarely created with liberatory aims in mind, and therefore, cannot always accommodate the full scope of the capabilities that a project like ours desires. The team intentionally decided to move forward with configuring and using COTS instead of

building a custom software application or using the FOSS platform that we evaluated, KoboToolbox. One major reason for this is that COTS are usable and practical for a small grassroots organization like WWHI that has important, time-sensitive, and emotionally draining work, and limited staff time to devote to technology implementation. During the collaborative evaluation and selection workshop, it became clear that the KoboToolbox would be tedious and cumbersome for many of the WWHI staff to use because of its complex user interface. Along these lines, WWHI/D+F team aims to avoid some of the pitfalls that Sucheta Ghoshal et al (2020) found in their work with the Southern Movement Assembly:

> ...use of ICTs leads to inequitable outcomes in their sociotechnical systems: technically competent people having more power and voice, technical expertise being associated with whiteness, masculinity, young age, and other normative characteristics, and value-driven technical choices (i.e. adopting FOSS solutions) coming with hard trade-offs such as finances, usability, and technical labor. (p. 2)

How can designing with commercial software help avoid these issues? 1) COTS can enable users without a technical background to fully manage, query, and analyze their data in the long term without the assistance of outside consultants or significant training, 2) the costs for any subscription services are known and generally don't fluctuate significantly, and 3) the time it takes to evaluate, select and design/configure within COTS is still significantly less than it would be to develop a workable custom application, allowing the team to spend time and money on other vital tasks (Nicoara, 2023).

Moreover, this emphasis on usability and practicality relates directly to the PAR approach taken by the D+F/WWHI project. With an emphasis on enabling action, joint agenda-setting, and providing tangible value to the grassroots partner, not just the academic one, moving forward with COTS for the database platform became the clear choice given WWHI's needs, desires, and internal capacity. Even with the knowledge of trade-offs with COTS, the organization wanted something they could use and modify based on their evolving needs, not just a beautiful-looking, well-conceived prototype that would be difficult to implement in practice (Bødker & Kyng, 2018). In addition, because WWHI's mission puts healing for survivors and families of missing and murdered Indigenous women and people at the forefront, a major goal of this project was harm reduction - preventing retraumatization - as WWHI and D+F discussed both in the summer '22 visit and through the executive director's story gathering template. In the interest of this immediate goal, the team was willing to live with the 'good' - COTS - instead of pursuing

the 'perfect' case documentation database that may or may not even exist with current tools and frameworks in database technology, commercial, opensource, or otherwise.

With all that said, it is worth highlighting that no COTS platform met all of WWHI's needs and desires for a case documentation database. Chief among those is security, as discussed earlier in this chapter. A platform that could bridge the need for a user friendly, cloud-based collaborative database tool with configurable forms on the front-end while enabling users to have complete control over their own data would come much closer to supporting a database like WWHI's that aims to align with principles of Indigenous data sovereignty. In the case here, we were able to use a zero-knowledge encryption dropbox as a workaround that still met WWHI's security needs. However, this was at the expense of user experience while filling out the form. The zero-knowledge encryption adds an extra layer of complexity for WWHI, families, and survivors to manage the data as it will exist in two separate platforms. It remains to be seen if this will be workable in the long term for WWHI staff. Even the open-source platform that we evaluated couldn't provide an adequate workaround without WWHI standing up and managing their own server, which would not be feasible for them from a financial and technical standpoint.

Conclusion

Operationalizing WWHI's needs and desires into a workable database included a number of challenges, modifications, and iterations along the way. The team worked through challenges from evaluation, prototyping, and selection to implementation in a thoughtful, collaborative, and practical way. We always returned to our central goal to fulfill the needs, desires, and aspirations of the WWHI team - to better support MMIW/P families, to reduce the trauma (and re-traumatization) they experience in seeking justice, and to forward advocacy efforts. Keeping this in mind throughout the process enabled us to use Airtable to collectively design and implement a workable case documenation and story gathering database.

Chapter 4: Reflecting on PAR and partnerships

Collaboration is never frictionless, and there were a number of challenges that arose for the WWHI/D+F team in the course of our work. I detail them here in order to think more systematically about the barriers for ethical technology development alongside grassroots, Indigenous organizations and how to work to overcome those barriers.

Time, capacity, and fostering a co-constituted, reciprocal partnership

Both the WWHI team and the academic team juggled many different projects at once throughout the duration of the process to evaluate, select, and implement a case documentation platform. This posed logistical problems that sometimes made it difficult to find times to synchronously connect, schedule workshops, and generally find the collaboration time necessary for the deliberative, shared decision making and reflexivity required for an ideal PAR process. Given our geographic distance - more than 1200 miles between Cambridge, MA, and the Menominee Nation - and time constraints, all those interacting with the case documentation and story gathering database co-design have recognized that our time in-person is important for realizing the potential for truly collaborative and consensus-based decision making. Moreover, knowing that limited capacity is a common obstacle for busy partners of all types, whether academic, government, or grassroots, we hope the WWHI/D+F team's experience (imperfectly) navigating power-laden collaborative work through intention-setting facilitation tactics, reflexive discussion techniques, and formal memoranda of understanding (MOU) can serve as a grounded precedent for others.

Facilitation tactics

To give one illustration of how we tried to make the most of these in-person moments, I'll first describe an example from the collaborative database evaluation and selection (CDES) workshop in August 2023, for which I led the facilitation. From the moment I joined the WWHI/D+F project in fall 2022, I have been inspired by the way the project team uses a desire-based rather than damage-based approach to knowledge creation around missing and murdered Indigenous women, in the spirit of Eve Tuck (2009). As discussed in Chs. 2 and 3, while the project does not sugarcoat the reality of violence on Indigenous women and girls, and it supports the process of families seeking justice, it is also firmly rooted in values of healing and in the assets and resiliencies of Indigenous communities. While

developing the CDES workshop facilitation materials, I attempted to honor this desire-based approach in two major ways. First, I aimed to orient our discussions around the possibilities of what a database technology could add to WWHI's varied work and how community members would use it in practice, rather than offering a narrow prescription of how to document damage using the platforms. Second, instead of using traumatizing imagery in the workshop slides, I chose images of collaboration taken during the MIT team's visit with WWHI in summer 2022 and images of the natural landscape in Northern Wisconsin that the D+F/WWHI team has identified as design inspiration (see *Figure 3* for examples of the imagery on the slides).

Figure 3: Slides from the collaborative database evaluation and selection workshop in August 2023.

More broadly, in thinking about how to frame and structure the CDES workshops in a way that would allow WWHI and D+F participants to make the most of our time together, I took a cue from the collaborative research design and data analysis workshops that Binet et al (2019) crafted as a part of a multi-site PAR project here in greater Boston called the

Healthy Neighborhoods Study (HNS). Binet et al (2019 highlighted, in particular, the need to leave space for adaptation and improvisation while facilitating a collaborative workshop by building in flexible activities that can be modified based on the direction that the group's conversation is going. This proved to be important when we had a last-minute switch of the format from completely in-person to hybrid due to travel difficulties; because of the workshop's flexible-by-design structure, we were still able to fully include virtual participants in all of the activities. I also constructed the deliberative and consensus-making process in the CDES workshop based on the tenets of Kemmis et al's (2014) conception of communicative action: "a) intersubjective agreement about the ideas and language they use among participants as a basis for (b) mutual understanding of one another's points of view in order to reach (c) unforced consensus about what to do in their particular situation" (p. 35). From setting shared values and norms to various activities to help spur mutual understanding, many of the exercises I devised can be understood through the lens of communicative action. Communicative action served as a useful driving framework, even if we didn't discuss it explicitly during the workshop, primarily because of its orientation toward action, helping us bridge the gap between something as seemingly mundane as a database and the transformational change that we want to make in the world.

Reflexive discussion techniques
Next, I'll shift to the ways in which the WWHI/D+F team endeavored to promote reflexivity and constant reflection in our collaborative work. The ideas motivating the WWHI + MIT collaboration are deeply tied to a Freirean (1970) "problem-posing" approach to education and knowledge production, wherein critical thinking and dialogue are paramount, and, as PAR projects that I have learned from, like the HNS, have put it: "no one knows everything but together we know a lot" (M. Arcaya, personal communication, October 2023). I noticed this orientation almost immediately when I began attending the routine WWHI/D+F project meetings. Not only is everyone on the calls an active participant in discussions (WWHI team members just as much as MIT team members), but, critically, there were also a few times when a participant spoke up to reframe the discussion in terms of the coalition's deeper values and ask how we might approach the topic at hand while working to combat systemic challenges. For example, during the early stages of the database platform evaluation process, we were having a conversation about our collective *desires* for the database, and what sorts of functionalities would support that. A student researcher spoke up and noted that we were becoming very focused on government, law enforcement,

and court systems and how the WWHI case documentation system would interface with those. They suggested that we recenter our conversation around the components a platform would need to support families' healing - and in flexibly either supporting or reducing their contact with systems, per their preferences, rather than only privileging the types of information conducive to institutional legibility.

This reframing struck me as an example of what Freire (1970) might call the "emergence of consciousness and critical intervention in reality" (p. 79). Our ethic of constant iteration as a co-design practice, as discussed in Chapter 2, builds directly from this attempt to constantly reflect on each individual team member and the collective team's assumptions and revise our approach where needed. Reflexiveness served as a key discussion technique to remember our shared values and goals, as well as to surface potential problems or tensions in the project before they came to the forefront.

Memoranda of understanding
Finally, we navigated capacity-constrained collaborative work during the implementation phase of the case documentation and story gathering project by entering into a memorandum of understanding, or MOU. We considered a memorandum of understanding between WWHI and academic partners an useful step to take at this juncture in Fall 2023 firstly because of the entry of six previously unaffiliated MIT and Harvard students into the project team for the Crowd Sourced City course. These new team members had not yet had the same opportunity to build trust and rapport with the WWHI team as I, Professor D'Ignazio, and several other of the student researchers in the D+F lab had done over the previous year. In addition, the implementation phase for the database represented the first time that the academic researchers would be entrusted with the responsibility of accessing and co-stewarding sensitive WWHI case information and stories, which for many families and survivors includes details that are deeply personal and traumatic. Within this context, both the D+F researchers and WWHI staff are acutely aware of the extractive legacies of academic researchers interacting with Indigenous peoples and organizations. The longstanding nature of the partnership and our mutual commitment to PAR, reciprocity, and co-design offers perhaps some conceptual "protection" from conventional, extractive academic practices that take Indigenous knowledge and stories for "learning experiences" or to subjectify for academic clout (Tuck, 2009 provides detailed examples of how these extractive and damage-centered academic projects have functioned). However, in light of new research team members and the

increasingly sensitive nature of the information shared between WWHI and D+F, the WWHI team requested that we codify our commitments to one another regarding data sharing via an MOU.

The MOU ([see the full text](#)) outlines a framework for the Crowd Sourced City team's access and use of WWHI's sensitive data and documents that is centered around the principles of "need to know," "consent," and "care."

- *"Need to know"* represents the commitment that only those team members with a need to see sensitive information to complete their tasks for the case documentation and story gathering project would access the data, and the team won't share any original information or sensitive outputs with the course instructors or students in the CSC course outside of the WWHI project team.
- *"Consent"* respects the idea that families own their own sensitive data; WWHI, and the course student-researchers are only stewards. Before sharing the data, the MOU outlines that MMIW/P families will provide affirmative consent that they agree to its use by members of the Crowd Sourced City team. Indeed, if families remove their consent at any time, members of the Crowd Sourced City team will cease using the data from that family's case and delete any records that reference that case.
- *"Care,"* then, represents the CSC team's commitments to WWHI, to families, and to each other. They access and use the sensitive information provided by WWHI with caution and care, keeping in mind the highly personal and traumatic nature of the content and its importance to families. In addition - and this was of particular importance to include in the WWHI executive director's perspective - the MOU affirms that students will take care of one another, providing collective support, debriefing, and processing space as needed for viewing traumatic material.

The MOU was useful for the students involved and for WWHI not only because it was a written codification of our commitments to one another regarding data stewardship and sharing, but also because it started a lively and ongoing conversation about our expectations and responsibilities in the project more broadly. This conversation about consent and collaborative norms built trust and enriched our partnership outside of the relatively narrow bounds of the MOU itself.

Institutional reflections

The team faced institutional challenges, too. Academic funding structures are not commonly set up to support long-term, ongoing engagements with community partners. This project has been funded through faculty discretionary funds and a patchwork of small grants for faculty research. As some of the more significant funding sources began to run out, the work has continued under the auspices of a practicum course at MIT and student research. We applied for a larger research grant in public interest technology, with a focus on participatory technology methods as the primary research innovation, but this grant was unsuccessful. Our work was rejected from the Designing Interactive Systems conference as well. Potentially, our choice of methods jeopardized our chances at funding and at publishing our work. That is, PAR and co-design, along with the Indigenous values of respect, relevance, reciprocity and responsibility, put our partner's questions and needs before those of the academy and thus is less legible as Research (with a capital 'R'). Our carefully-considered and explicitly-explained choice to configure COTS rather than develop our own database platform appeared to dilute our Research contribution in the eyes of some DIS reviewers. Deciding *not* to build something and leveraging existing technology, for some in the academy, is a less valuable contribution than building something - anything - even if it might not be used at all.

Despite the fact that we could not convince the funding organization or the conference paper reviewers, we still assert our work as making significant contributions to scholarly debates in ethical technology and participatory methods. Its deeply grounded and applied nature is precisely the point and precisely the contribution that we hold up as a model for ethical technology research and design. That said, funding and resources are ongoing and ultimately unresolved tensions in our work and in community-engaged participatory work in general (Raynor, 2019). Truly generative and reciprocal partnerships are difficult to cultivate under current academic funding regimes, but this project has and does aim to push back against the status quo.

It was essential for the academic partners at D+F, who had taken point on some technical aspects of the database implementation (as the conceptual and meaning-making aspects of the database were primarily led by WWHI partners) to facilitate project continuity in other ways, beyond traditional academic funding sources. One of those ways was through the documentation of the work during the Crowd Sourced City course as described in Chapter 3: written content about common administrative tasks in the Airtable platform as well as short videos. These documents and video walk-throughs were meant to facilitate

the transition of students off of the project and ensure that WWHI staff members, as the stewards for MMIW/P families' sensitive information, have the capability to not only possess but to wholly control, manage, and use the story gathering database with or without academic partners, in line with the CARE principles for Indigenous data governance (*Data Rights,* 2023). What's more, the D+F team funded travel in January 2024 for the in-person knowledge sharing workshop at WWHI's headquarters under the auspices of the Crowd Sourced City course, furthering needed project collaboration without dedicated research funding. This document, even, is a result of the effort to work around the institutional barriers to continued, long-term work between D+F and WWHI. By authoring a master's thesis helping to distill the processes and reflections from this project, I am able to dedicate more of my time and energy to it, and to longer-term support of the implementation of the Airtable database by WWHI staff, even without being paid as a research assistant.

Outside of funding, the WWHI/D+F team has faced institutional challenges related to interfacing with government systems as well. One of WWHI's early aspirations was to integrate their case documentation and story gathering database with the National Missing and Unidentified Persons System (NAMUS). It was the team's goal to include this capability in each of the survey prototypes so that WWHI staff could evaluate how each of the platforms did or did not support integration. Unfortunately, this possibility was indefinitely foreclosed by an institutional force. The US federal Department of Justice failed to set up a technical mechanism for external data import. Despite a listing on the Office of Justice Programs' website that their staff was in the process of creating an API for trusted outside organizations to submit cases programmatically, a DOJ representative told the team in January 2023 that,"the capability to allow automated data interchange is mostly conceptual and there are no immediate plans to begin active development" (C. Hestor, personal communication, 2023). We were not able to find a suitable workaround for this functionality, and it remains a long-term priority of the team to connect components of the case documentation and story gathering database with NAMUS.

Conclusion

Overall, the WWHI/D+F team faced time and capacity constraints, and we used intentional facilitation, reflexive discussion techniques, and memoranda of understanding to make our synchronous and asynchronous collaboration as meaningful and generative as

possible. We also faced institutional barriers with academic research funding and database connections to key government systems. While we took steps to work around these institutional barriers, both remain acute limitations of our work thus far. Ours is just one story of collaboration between academic researchers and a grassroots, Indigenous-led organization, but our experiences working through, with varying levels of success, these individual and institutional constraints may offer ideas and inspiration to other organizations in academia, government, and advocacy looking to undertake mutually beneficial partnerships.

Chapter 5: Looking forward

Recall that while the WWHI/D+F team moved forward with configuring an Airtable database for the case documentation and story gathering system, no COTS platform met all of WWHI's needs and desires. There was an acute trade-off between security needs and survey usability in the final implementation, an inability to automatically create timelines from the data within Airtable in a way that WWHI staff and MMIW/P families would find meaningful, as well as a number of other small user interface complexities. If neither COTS nor existing FOSS meets the totality of the needs of a grassroots, Indigenous-led organization like WWHI, who would develop technologies that could actually meet Indigenous grassroots organizations' needs? The following pages will outline channels for industry to create technology that serves grassroots needs, for grassroots collaboration with academia, government, and open-source developers, and for more radical, alternative data futures. The chapter will end with a reflection on the contribution of this thesis as a grounded case study as well as the work still left to be done.

Channels for industry to create technology that serves grassroots needs

The tech industry today is built on the assumption that platforms, products, and services should make a profit, and oftentimes, not just a profit, but an exponentially-increasing one. Products are expected to scale to wider and wider audiences. As Hanna & Park (2020) put it, "Scale thinking presumes that everything can be made more efficient – that products and services can be supplied and consumed at faster and faster speeds, for more and more people. And such growth is indisputably a good thing." But in that quest for scale and profitability, technologies often lose their usefulness for some users, especially those who aim to operate outside of the state and/or in opposition to capitalist norms (Hanna et al, 2020). Many authors argue that some technology, by definition, should not scale; instead, it should be small-scale and rooted in the specific, context-dependent needs and desires of grassroots groups like WWHI who are not wholly served by commercial off-the-shelf software. Hanna et al (2020) draw on the concept of mutual aid (as explained by Spade, 2020) as a framework for resisting scale and building technologies that nurture collaboration, participation, and decision-making. While their provocation is aimed toward designers and tech workers, the question remains of exactly how and within which companies, grassroots groups, or institutions this resistance work occurs. This is especially true in the context of what Whittaker (2021) describes as the technology

industry's "increasing…efforts to create tech-positive narratives and to silence and sideline critics." The path forward for tech workers to resist the call to scale and create technologies that could meet Indigenous grassroots organizations' needs is not entirely clear.

Channel 1: Tech worker subversion
With that said, some researchers in human-computer interaction (HCI) and critical data studies offer pathways for tech workers to make subtle changes, embed values, and create space for the types of functionalities that would come closer to meeting WWHI and other orgs' software needs in ways that would not totally upend the status quo (Flanagan, Howe, & Nissenbaum, 2008; Dombrowski, Harmon, & Fox, 2016; Pierson & Milan, 2017). While likely not sufficient to wholly meet grassroots actors' technology needs and still largely embedded in harmful systems of profit- and scale-seeking, these types of tactics could nonetheless produce useful outcomes for grassroots actors and allow a greater number of tech workers to begin thinking about ways to upend restrictive norms in the industry.

For example, Flanagan et al (2008) present a methodology (and an accompanying case study where it is implemented) for incorporating values into technology design processes. The "constitutive activities" include: value discovery (or, understanding what values matter in the definition of the project, in specifying its instrumental design features, and to the designers as people); translation, or embodying those values in the technology design; and verification of the actually-existing implementation of the target values within the system. These practices could be implemented at various scales, including small teams within larger tech companies, making them approachable for a variety of tech workers looking to subvert the status quo in concrete ways. Not dissimilarly, Dombrowski et al (2016) write about "social justice oriented interaction design." Rather than allowing teams to "discover" their own values like Flanagan et al (2008)'s approach, Dombrowski et al specify the overarching goal of "social justice," which they recognize as a fluid, malleable, and always-evolving concept, and they orient their work toward designing for *transformation, recognition, reciprocity, enablement, distribution,* and *accountability.* The authors also set forth three major commitments in their technology design practice that bear a striking (and perhaps auspicious) resemblance to the commitments that partners entering into a PAR project together make. Those commitments include 1) conflict, or surfacing and legitimizing contestation when discussing potential problems or interventions, 2) reflexivity, including "acknowledgement of, and critical reflection on, one's own positionality" and 3) explicitly engaging with ethics and politics (Dombrowski et

al, 2016 pp. 663-665). Dombrowski et al (2016) make the argument that an orientation toward social justice in technology design can tangibly benefit the resulting product, especially when it is designed to engage with social issues. That said, such a rigorous approach to social justice with commitments to conflict, reflexivity, and, especially explicit engagement with politics, could be difficult for tech workers to navigate in the context of risk-averse companies. Generally, human-computer interaction scholarship like Flanagan et al (2008) and Dombrowski et al (2016) provides methodologies and theories of practice that offer generative, if limited, possibilities for tech workers to break out of profit-driven molds.

Channel 2: Social movements influencing industry
Another path through which we can think about industry being made to create software that would meet the needs of grassroots organizations like WWHI is through the coordinated steps by actors external to the dominant technology industry, including social movements. Jain et al (2022) outline a compelling precedent for this happening: the free and open source movement's influence on the emergence of the open-source operating system Linux. The authors argue that the free and open source movement developed Linux as a niche within the broader software development community, shaped its identity, amplified its presence, and mainstreamed it (in that order). This could serve as a playbook for database software oriented toward Indigenous, grassroots organizations to be developed first as a small-scale, context-specific product and then shaped, amplified, and mainstreamed by advocates. The outcome likely will still be contested. Jain et al (2016) note that their case study "reveal[s] the ongoing and unfinished nature of social movements, one in which the new order, while becoming part of the regime, does not quite replace or be subsumed by it" (p. 15). Nonetheless, the precedent of Linux being mainstreamed by the free and open source movement represents a promising pathway to push the tech industry to create software that meets grassroots needs.

Grassroots collaboration with academia, government, and open-source developers

A separate option to answer the question of "who might develop technologies that could actually meet Indigenous grassroots organizations' needs?" would involve grassroots organizations sidestepping industry and collaborating with academia, government, and open-source developers. While it's possible for grassroots orgs to develop their own custom software, it is not always feasible or desirable. This is true especially in resource-

and capacity-constrained environments where grassroots actors would be developing the technology on their own, but it is true even in institutional/grassroots partnerships like our own where the grassroots *ownership* and *control* of the technology platform is paramount, as I described in Chapter 3.

While our focus here is a database *platform* to store, query, and organize information important to WWHI and MMIW/P families, it is useful to make the distinction that processes for *creation* of data (as opposed to the software development required to create the ideal *platform*) are generally more feasible and desirable for grassroots actors. The issue is less that grassroots organizations aren't able to build technical capacity at all, but rather, in often small, capacity-constrained organizations, that they desire to build strategic technical capacity to further their organizational and advocacy-related goals. Public participation geographic information systems (PPGIS) and "community geography" scholars and practitioners have proven the viability of community data creation and management across a number of different collaborative (largely academic/grassroots) endeavors that advance the worldviews and ways of knowing of historically-marginalized groups of people (see Elwood, 2008; Sieber, 2013; Elwood, 2006; Henry-Nickie, Kurban, Green, & Phoenix, 2008).[3] Anecdotally, software development is often seen as less directly connected to grassroots organizations' epistemic goals, and it is a more time consuming and expensive arena in which to build workable skills.

Collaborating with civic coders and the FOSS community
Barring grassroots organizations doing their own software development work for custom tech like database platforms, they might instead connect with civic coders and the FOSS community. Knutas et al (2022) outline pillars of civic tech for social change, including co-design (pp. 67-68). They give a specific example of a project called Sensor.Community where coders collaborated with environmental justice activists:

> In Sensor.Community, this pillar is represented by activists and civic coders working together on issues that matter to their respective communities. Measurement features are co-created with the movement for cleaner air, and deployment sites are chosen by the community. The civic coders not only created a software and hardware platform, but also provided documentation and support

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[3] Note that it is still not always feasible/desirable for grassroots organizations to keep data collection and analysis entirely "in-house", see Ghose (2001).

among individual communities: more experienced communities provided advice and resources to less experienced ones. (p. 68)

This collaboration worked to effectively enable grassroots organizations to make use of software developed alongside organizers and tailored to organizers' needs. However, since Knutas et al (2022) write to an audience of software developers, they do not address the question of how grassroots organizations with a technology need might meet or access civic coders who would be willing to work with them, nor do they suggest any structures around how and if civic coders would need to be compensated for their time. They acknowledge that ensuring deeply participatory collaboration between grassroots organizers and civic coders can be a barrier, as many coders "have less experience" with engaging with the public in a way that goes "beyond the usual requirements engineering process" (Knutas et al, 2022, pp. 71-72). This means that not only do grassroots organizations have to connect with civic coders in the first place, but also either 1) connect with a smaller pool of civic coders who already have some experience with community co-creation or 2) use additional capacity of the grassroots organization to train civic coders in better collaboration skills. With that in mind, collaborating with civic coders and the FOSS can be a viable channel for grassroots organizations to create technology that works for them, but only in select circumstances.

Interacting with government systems and planners

Interacting with government systems and planners is another potential channel through which we might be able to build technology that would better meet grassroots groups' needs, but this channel can be fraught. In the case of WWHI, particularly as an Indigenous-led group, the organization desired some interaction with 'systems' actors like (settler) governments, law enforcement, and legal systems (e.g., the desire to connect with NAMUS, query information for use in investigations, and using the data for political advocacy). Yet, they were also careful to place boundaries on which things gathered in the case documentation platform that would be useful or generative for government systems to know and those that could be harmful or unnecessary to share. The WWHI/D+F collaborators always paid close attention to Indigenous Data Sovereignty and MMIW/P survivors' and families' ultimate control over their own data when thinking about how to approach any interactions or potential integrations with 'systems' actors.

In more limited terms, then, there are some ways in which interacting with government systems could advance grassroots technology goals. Past examples of this have primarily

included open data portals, similar types of enterprise systems that allow community members and groups to access municipalities' and other governments' data holdings, or even things like 311 complaint reporting systems (Le Dantec et al, 2021; Puussaar et al, 2018; Yoon & Copeland, 2019). Though some of these tools, or extensions of them, include the capability for external organizations to upload their own datasets and analyze them alongside government data, past work has not focused on fully-functional 'create your own database' software as a service platforms around which the WWHI/D+F partnership centered. With that said, they still provide some lessons on the promises and pitfalls of current approaches to grassroots/government technology collaborations and/or feedback loops. Puussaar et al (2018) take the tack of co-designing a new custom interface with which to explore official data as an academic/grassroots collaboration rather than interfacing directly with systems actors. Le Dantec et al (2021), however, explicitly try to investigate what "community organizing practices take shape around joint initiatives with local government" and how to support those (p. 2), and they noted the tensions around data ownership, wherein "questions of whether [data collection and warehousing] required an ongoing commitment from the City to maintain access [to the open data platform] continuously undermined the autonomy of the community initiative" (p. 15). Le Dantec et al (2021) come to the conclusion that a distributed or federated model wherein even a government-owned platform provides more autonomy for grassroots groups rather than centrally controlling the platform or even 'collaborating' with them explicitly may allow for more fruitful partnerships that enable community organizers to achieve their goals with the platform. This is largely consistent with what the WWHI/D+F partnership found in our own work and suggests the efficacy of an 'arms-length' approach to government/grassroots partnership that respects grassroots control and ownership of data. Leveraging government technology resources to support grassroots autonomy, not co-opt grassroots groups' credibility or monitor their actions, is an ideal partnership setup.

Where do planners fit into this equation?
In addition to the technical idea that distributed or federated technology systems are better suited to grassroots/government collaborations, there are some strategies that urban and regional planners, often seen as first-line representatives of government systems, can take from the case study of the WWHI/D+F partnership as well as previous studies of government/grassroots collaboration.

- Trust is key. We found that setting ourselves up for a long-term working relationship between a group of academic-affiliated and grassroots actors took time, shared space, and open conversations about how to collaborate to achieve shared goals. This set the foundation for the rest of the WWHI/D+F partnership. Corbett & Le Dantec (2019) underscore the need for trust and what they call "the relational work of *closing distance*" at the basis of partnerships in civic technology.
- Iteration is the point. Structure the entire community engagement process to enable it. As evidenced in Chapters 2, 3, and 4, we welcomed constant change, feedback, and updates during our co-design process in order to best achieve WWHI's needs and desires for the case documentation and story gathering platform. For planners, this can help ground truth ideas with community expertise from conceptualization of a plan to implementation of particular projects, and, what's more, it can make real the idea of incorporating non-dominant worldviews into planning.
- Hold government systems accountable for commitments made to grassroots community groups. Planners have autonomy within their organizations and must move to make sure that the collaborative endeavors that they take on with grassroots groups can exist beyond just one individual planner or their department. Whether it's through advocating for dedicated funding streams for grassroots/government partnerships or codifying reciprocal relationships between government entities and grassroots partners through things like MOUs, it's important to keep in mind that grassroots organizations may have a well-founded mistrust of 'systems' actors. It is up to planners to ensure that they don't repeat the harms of the past.

Toward alternative data futures

If we are looking to go past the realm of what has already been put into practice by other scholars and scholar/grassroots or government/grassroots partnerships, and into more radical domains, we can turn to the people theorizing about and working to enact alternative data futures. A rich and varied literature is emerging with ways of thinking about data that cannot be contained within a platform like Airtable or its COTS brethren. What would that look like, and how would organizations use it? Writings on feminist web server collectives, modeling abolition, Black feminist technoscience, and design for ongoingness could be a starting point for those looking to think beyond the practicalities of

a single organizaton's needs and into building a future where technology better meets those needs by default, without the same types of quandaries and trade-offs that we faced, and without working within the constraints of existing systems (Mauro-Flude & Akama, 2022; Sherman, 2023; South et al, 2021).

Design for ongoingness strikes me as a meaningful thread to pull for developing a broader ethic of what, in the broadest sense, databases for healing could like. South et al (2021) describe ongoingness as, "a form of continuing bonds in bereavement that prioritises the present and an ongoing, positive relationship with the deceased," and they offer three designs for objects that would help families or loved ones maintain this sense of ongoingness: ReFind, a handheld device that holds an archive of tagged photographs from a deceased person's lifecourse; Blueprints, a series of collages made up of 'scrap' materials taken from old objects and clothing; and Ivvor, a piece of jewelry that holds a permanent archive of photographs representing multiple deceased individuals. Objects like this have useful analogs to a database like WWHI's. While WWHI's case documentation and story gathering database does not only aim to foster *ongoingness* with people who are deceased, the idea of forming *continuing bonds* can be extended to the idea of honoring and connecting with past selves, in the case of survivors and missing relatives, as well as those who have died. Each of the objects are meant to encourage dialogue and engagement with the richness of the information gathered and hosted within the objects. This addresses one of the core challenges that we found with the Airtable platform; we found the most issues in representing the nuances of story gathering in the database. Ideas like South et al's design for ongoingness are exactly the type of transformative understandings of information design that we will need to move toward alternative data futures that better represent worldviews and epistemologies outside of the positivistic, Western norm.

A case study: powerful in its context and richness, purposefully limited in its scope

This thesis has been a reflection on a single participatory and collaborative project between an academic lab and a grassroots, Indigenous-led organization. Case studies like this one are characterized by depth of knowledge and context about a particular situation, but sometimes unclear generalizability. Rather than making the claim that *all* grassroots, or even *all* grassroots, Indigenous-led organizations have the same database needs, desires, and challenges as WWHI does, we instead highlight the ways in which deeply rooted collaboration with grassroots, Indigenous-led organizations can reveal the most generative ways to build databases for their purposes. A story of collaboration can help

direct future work toward a 1) attentiveness to the opportunities and barriers at play in grassroots database design, 2) how and why those form, and 3) the types of collaborative practices - iteration, open discussion, codifying shared norms - that can help foster fruitful and reciprocal outcomes. Future work could undertake additional case studies, drawing from the lessons from the WWHI/D+F collaboration. It could also use a broader survey method to attempt to understand if other Indigenous and/or justice-based organizations have similar database needs and desires as WWHI's, if and how they differ, and the implications for database design and configuration broadly.

Conclusion

Taken as a whole, this thesis, and the broader WWHI/D+F co-design surfaced the nuances of WWHI's database needs and desires - including the primacy of information security and privacy for MMIW/P families, the need for streamlined data input and retrieval via related tables for WWHI staff, the always already multiple-use nature of the case documentation and storytelling information that WWHI collects, and more - through open discussion and constant iteration. Academic institutions, government entities, and the companies that own database platforms did not always make the process of implementing these desires a smooth or easy one. Funding challenges, a lack of ability to integrate with key government data streams like NAMUS, the push and pull for WWHI of both *using* and *refusing* the data and platforms of systems actors, and limiting (for storytelling and for security) technological capabilities of COTS platforms complicated our work in ways that did not always offer a neat workaround (D'Ignazio, 2024). Yet, in the end, we were able to configure a workable solution for WWHI's case documentation and story gathering needs, sticking with our ethic of constant iteration, keeping the end goals of healing and justice at the center of our "routine" co-design meetings, and with the help of a diverse, trusted team. We are keenly aware that our partnership didn't form in a vacuum, but rather, in the shadow of hundreds of years of institutional extraction from Indigenous communities. We leaned on our commitment to a long-term partnership between the D+F team and the WWHI team, our shared goals, and, when appropriate, codified written agreements, in order to build and maintain trust. The outcome was not the most perfect database that *completely* or *totally* achieves healing and justice, but it is something that WWHI can implement immediately for their vital work, and it can evolve. In this project, as we develop a deeply practical solution that will serve the needs of the present generation, we also move toward healing and justice for the *7th generation,* galvanized by WWHI's mission.

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