RMA

Material Suplementario

Digital data in archaeology and indigenous communities: a view from a collaborative perspective

Guillermo L. Mengoni Goñalons[1] y María José Figuerero Torres[2]

[1]Instituto de Arqueología, Facultad de Filosofía y Letras, Universidad de Buenos Aires.
Email: wmengoni@yahoo.com.ar; mjofiguerero@yahoo.com.ar

Este trabajo es una traducción de: Mengoni Goñalons, G. L., & Figuerero Torres, M. J. Datos digitales en arqueología y comunidades indígenas: una mirada desde una perspectiva colaborativa. *Revista Del Museo De Antropología*, *16*(2), 345–362. https://doi.org/10.31048/1852.4826.v16.n2.41157

Abstract

The digital age has revolutionized our way of conceptualizing and managing information generated by research projects in the Humanities. Converting from "analogical data" to "digital data" has expanded how knowledge stored virtually in Open Access is preserved and shared. In spite of this, data from many collections categorized as archaeological and / or ethnographical come from contexts where intellectual property, author rights, governance and cultural sovereignty are blurred and pass from those who were the original makers/creators (or their descendants) to the science researcher. We analyze what data are in the scientific system, in archaeology in particular, and for indigenous peoples and we reflect upon who holds sovereignty. We propose working from a collaborative standpoint centered on dialogue with indigenous communities in order to negotiate a consensus on the ways of giving access and allowing governance of digital data on the history and culture of originary peoples. This is a way of recognizing indigenous rights and of contributing to the process of cultural recovery and visibilization that many indigenous communities are currently pursuing.

Keywords: Digital data; Indigenous communities; Collaborative perspective; Governance.

Introduction

The digital era has revolutionized the way we conceptualize, manage, and share information generated by research projects in the Humanities. This applies to archaeological projects related to the materiality of the ancestral peoples' past. The shift from "analog data" to "digital data" has expanded the ways of preserving, analyzing, sharing, and generating new knowledge (e.g., Kitchin 2014; Borgman 2015). Part of this data is gradually being hosted in institutional repositories, platforms, and other virtual spaces with open access, while some remains in the possession of the researchers themselves (e.g., Kansa et al. 2011; Richards 2017; Biehl and Prescott 2013; Kremers 2020; Geismar and Knox 2021; Izeta and Cattáneo 2021; Nicholson et al. 2023).

While increased accessibility has allowed for greater visibility of research results, there is still a long way to go in terms of managing scientific knowledge. This is because data from many collections categorized as archaeological and/or ethnographic arise from a context where intellectual property, copyright, governance, and cultural sovereignty become blurred, transitioning from the original creators (or their heirs) to the scientific researcher (e.g., Boast and Biehl 2011; Anderson 2015; Kukutai and Taylor 2016; Anderson and Geismar 2017; Christen 2018; Tsosie et al. 2021; Walter et al. 2021). As a result, there is a lack of critical analysis regarding the process of acquisition, construction, attribution, and use of this "digital materiality" in general (Miller and Horst 2012; Smith 2012; Isaac 2015; Anderson and Christen 2019; Carroll et al. 2020; Geismar and Knox 2021).

In our view, it is necessary to take this step to humanize the sciences, making them sensitive to cultural diversity and other ways of seeing the world, open to different ways of constructing, organizing, and relating knowledge, and respectful of the rights of other social actors to work towards reversing power inequities. Consequently, they become more compassionate, just, and socially committed from an ethical standpoint, as advocated by indigenous leaders and scholars today (Tuck and Yang 2012; Anderson and Christen 2019; Duarte et al. 2020; Laluk et al. 2022). In this sense, we embrace the ethics of care, which provides a framework for implementing concrete and realistic actions in relation to these issues within the field of research (Gillies and Alldred 2005; Tuck and Yang 2012; Luka and Milette 2018).

In this work, we aim to address the following questions:

1. What are data in general, for science, and specifically for archaeology, and what do indigenous data mean for the ancestral communities?

2. What principles govern the handling and use of data, and who holds governance and sovereignty over them?

3. How can science be humanized through a praxis that recognizes the rights of others over the data, whether they are scientists, academics, or other stakeholders?

What are data for the scientific system?

Undoubtedly, the term "data" has become a "buzzword," as expressed by Furner (2016), although its usage history spans several centuries and is primarily associated with the emergence of modernity (Rosenberg 2013). Currently, it is employed by all disciplinary fields within the academic-scientific world and also in various social and cultural contexts. This complexity in its conceptualization and decision-making concerning curation and management has been accentuated with digitization (Floridi 2012; Borgman 2015).

As an example, we have the characterization of the term provided by Mayer-Schönberger and Cukier, who state: "data refers to a description of something that allows it to be recorded, analyzed, and reorganized" (2013: 65). While it is a basic definition, it offers a starting point that serves as a framework for the following discussion. The digital era has expanded the use of the term, as it serves to categorize different types of data (e.g., open data, computational data, mobile data) that are hosted and visible in various virtual spaces (e.g., platforms, portals, applications, digital files, and repositories), thus increasing their availability and potential accessibility. Therefore, its meaning varies contextually, depending on the function they fulfill within each knowledge and/or information production, organization, and communication system (Markham 2013).

A separate chapter is dedicated to the importance that the "data" topic has gained within Digital Humanities, concerning open and free access to information generated in the academic-scientific sphere (Kitchin 2014). In this context, it is necessary to consider other aspects that go beyond their digital availability and potential accessibility. It is not only a matter of having free access to data but also having the technical skills required to use them (Bezuidenhout et al. 2017). The latter not only depends on the information and communication technologies that each actor or community possesses but also on the existence of initiatives that promote user training (del Río Riande 2022).

Another important aspect is determining who owns the intellectual property of these data, depending on who exercises governance and sovereignty over them. This is a consequence of data generation and management always occurring within a context of situated knowledge (sensu Haraway 1991). As Drucker (2011: 3) points out: "Humanistic inquiry acknowledges the situated, partial, and constitutive character of knowledge production, the recognition that knowledge is constructed, taken, not simply given as a natural representation of preexisting fact." In this sense, data are not neutral (Luka and Milette 2018), which is particularly applicable to all fields of Digital Social Sciences and Humanities.

At the same time, "data" is central to any research, as it provides a framework for understanding where knowledge comes from and how it is produced (Markham 2013). Hence, it can be considered as "units of information" (Gitelman 2013; Markham 2013). The process by which something is transformed into "data" is what Mayer-Schönberger and Cukier refer to as "datafication." These authors define the term as follows: "To datafy a phenomenon is to put it in a quantified format so it can be tabulated and analyzed" (2013: 65-66). To categorize and define the diversity of existing data types, extensional, intensional, classificatory, and other criteria are employed (Furner 2016).

It is worth noting that in the Humanities, qualitative or categorical variables and nominal or ordinal scales are also used. This does not mean that such data cannot be analyzed from different perspectives, using the necessary methodological tools for that purpose. In fact, phrases and words contained in texts can be analyzed using software and algorithms (Bernadou et al. 2018), which broadens the meaning of the concept of datafication. This is applicable to all humanities, including archaeology (Gattiglia 2015).

To proceed with our analysis, we will consider the definition of "data" used as a reference in the official scientific context of our country. Then, we will examine the meaning of the term in archaeology. Finally, we will explore the significance of the word "data" for indigenous communities.

On the official website of the Institutional Repository of the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) of Argentina, they refer to the paper by Actis and Carlino (2017), presented at the VII Conferencia Internacional BIREDIAL-ISTEC'17, who state: "Research data are representations of entities that those engaged in scientific and technological activities define as evidence to support their hypotheses and results" (Actis and Carlino 2017: 216). This definition is a Spanish variant of the one given by Borgman (2015), who says: "data are representations of observations, objects, or other entities used as evidence of phenomena for the purposes of research or scholarship…Entities become

data only when someone uses them as evidence of a phenomenon, and the same entities can be evidence of multiple phenomena" (Borgman 2015: 28). This comes from her book "Big Data, Little Data, No Data," which is cited by the mentioned authors.

It is worth clarifying some of the terminology used in these previous definitions as it helps understand the impact of their meaning. Firstly, the term "evidence" comes from the Latin word "evidentia," which derives from "videre" or "to see." This means what is made manifest or visible, that is, what can be perceived with our senses. Hence its connection with the empirical and observational. On the other hand, "data" comes from the Latin word "datum," which means "the given." That is why "data" and "evidence" form a pair in the structure of knowledge. Both serve a purpose. This is how some authors who have worked on the subject see it: "facts are ontological, evidence is epistemological, data is rhetorical" (Rosenberg 2013: 18).

In general, three types of data are distinguished: primary, secondary, and tertiary. Primary data are essentially observational, secondary data derive from the analysis of primary data, and tertiary data are those used in publications. This is the logic of the flowchart for the research, curation, and publication process in science, as presented by Lord et al. (2004: Figure 1).

In Argentina, there is a legal framework that establishes the public policy of Open Access for the scientific and technological production of the organizations and institutions that make up the Sistema Nacional de Ciencia, Tecnología e Innovación Productiva. In article 16 of Resolution 753 (2016), which regulates Law 26.899 (2013) on Institutional Digital Repositories of Open Access, primary data are defined as follows: "They are raw data on which any research is based and which may or may not be published when a scientific advance is communicated, but they are the ones that underlie new knowledge. They can be classified as observational, experimental, or computational. Primary data includes, for example: numerical records, textual records, audiovisual materials, questionnaire responses, genetic sequences, which are used as primary sources for scientific research and are commonly accepted in the community to validate research results. Excluded are: preliminary analyses, drafts of scientific articles, personal annotations, communications with colleagues, etc." This definition is extensional as it lists what is included in this category of data.

The obligation for projects funded by CONICET to submit a Data Management Plan (DMP) enhances the value that the scientific system assigns to primary data. In this way, the Data Management Plan (DMP) "describes the treatment that research data collected or generated during a research project will receive and after it has been completed... it describes the lifecycle of the entire dataset that will be collected, processed, or generated by the research project" (Actis and Carlino 2017). Data would fall under the "results" chapter of any research project, regardless of the problems, questions, hypotheses, or expectations that motivated their acquisition.

The requirement for projects funded by CONICET to submit a Data Management Plan (DMP) enhances the significance that the scientific community attributes to primary data. The Data Management Plan (DMP) outlines how the research data collected or generated during a project will be treated both during and after the project's completion. It encompasses the entire lifecycle of the dataset to be collected, processed, or generated by the research project (Actis and Carlino 2017). Regardless of the problems, questions, hypotheses, or expectations that prompted their acquisition, data would be classified under the "results" section of any research project.

They also classify data as "observational, experimental, or computational" and provide examples of what is included, such as "numerical records, textual records, images and/or sounds, and computational models." This list excludes: "laboratory annotations, preliminary analyses, physical objects (letters, inventories, samples, bacterial strains, test animals, vessels, specimens, etc.)." The reference to "vessels" or "specimens" makes it clear that the material elements studied in archaeology do not fall under the category of "data." This is consistent with what we will discuss next.

They also consider data as those generated by the scientific community "within the framework of their research projects and are commonly accepted to validate research results" (DACyTAr 2020). In this categorization system of information, what they refer to as "raw data" or "primary data" would include data resulting from both observation and analysis, which, according to the flowchart by Lord et al. (2004), would be classified as "primary data" and "secondary data," respectively.

At this point, it is essential to highlight that data by themselves are not directly reusable unless accompanied by the methodology of acquisition and/or production. This includes specifying the procedures and protocols used to generate them since universal standards may not always exist in this regard. Even if there are standards (national or international), they can vary depending on the authors and criteria used to observe a particular phenomenon under study, take measurements, and analyze them. Furthermore, data management plans should include the potential future application of these data to ensure that they can truly be reused by other researchers or stakeholders.

What are data in archaeology?

This conceptualization of "primary data" provides us with the opportunity to review the specific literature in archaeology, a disciplinary field whose central interest lies in studying human society, cultural diversity, and its materiality, both present and past.

In his classic book "Systematics in Prehistory," archaeologist R. Dunnell (1971: 128) refers to data in the following way: "Phenomena categorized for use by a specific science are customarily called data, and the term data will hereafter be restricted to such categorized phenomena. Phenomena will be retained for things and events without such categorization. In the widest sense, the data of prehistory are artifacts." This definition is abstract, and while it restricts data to study objects, it considers them an analytical phenomenon of the present.

Later on, D. H. Thomas, another archaeologist, refines the concept, delimits its meaning, and operationalizes it by stating: "Data are not people, objects, or things; data are counts, measurements, and observations made on people, objects, and things…Data do not passively exist. Data must be generated" (Thomas 1976: 7). In this way, Thomas is telling us that "data" are not the physical entities themselves, but rather a construct that derives from what we observe or measure from specific empirical units (artifacts, things, objects, material remains, or cultural expressions).

Processual archaeology further expanded on this idea by stating: "Archaeologists produce data from facts of contemporary observations on artifacts" (Binford 1987: 392). This is in line with what Dunnell proposed at the time about data being a construction made in the present.

This also applies in the case of a 3D model of an artifact, where the digitalization process creates a virtual substitute, a result of modeling based on a dataset, which can include measurements, images, or a combination of both. If this model is 3D-printed, a replica is created, which can be studied as if it were an entity, but with certain limitations since the material used is different from the original, and the resolution of its details may vary compared to the reproduced piece, depending on the digital technology used. In conclusion, the data is not the printed replica itself but the information that can be obtained from analyzing such a reproduction.

However, while material evidence and data arise from observation, they are also the result of interpretation (Chippendale 2000; Chapman and Wylie 2016). When we make an observation, we must use some unit that involves content, scale, and definition (Ramenovsky and Steffen 1998). These units are of an ideational nature, whether descriptive or theoretical (Dunnell 1971; O'Brien and Lyman 2002). In archaeological practice, we observe and measure certain properties of the material elements we study, commonly referred to as "artifacts." Then, we quantify them using analytical units, which allow us to establish patterns based on contextual temporal and spatial relationships.

At the same time, the properties we observe and measure, along with the categories we use to organize and classify these observations and measurements, are driven by our own interests and the questions we have posed based on the problems to be solved. The point of discussion is to determine to what extent these operational categories can truly be projected onto their original makers or creators (Dunnell 1971: 130). This reinforces the idea that the generation of data is a present-day event.

A more updated approach to this topic is presented by some contemporary authors, for whom the term "data" is closely associated with "evidence" (Chapman and Wylie 2016). G. Lucas states that: "Evidence in archaeology typically comprises the data and patterns in data derived from the physical remains of the past" (Lucas 2015: 320). In this sense, data provides the necessary evidence that supports the argumentation in science and its rhetoric (Rosenberg 2013; Borgman 2015).

In addition to the above, the category "data" also includes handwritten records and analog and digital images, such as excavation plans and profiles, location maps, field and laboratory photos, databases, spreadsheets, unpublished technical reports, among other documentation formats and synthesis of analysis results. All this contextual information, along with the material remains themselves, is an integral and inseparable part of what is called the "archaeological record" (Fowler and Givens 1995). This constitutes what the Argentina's Sistema de Ciencia, Tecnología e Innovación understands as "primary data" (Law 26.899, its regulatory resolution No. 753, and the DACyTAr Platform). Public policies for scientific and technological production require that all this documentary material, even if unpublished, be in an institutional repository and available for public access in open access within a maximum period established by the Ley Nacional de Repositorios Digitales, although justified exceptions may exist.

In the last two decades, the use of digitization technologies applied to archaeology (Boast and Biehl 2011; Richards 2017; Kansa et al. 2020; Richards et al. 2021) and cultural heritage (Biehl and Prescott 2013; Kremers 2020) has allowed the storage and sharing of vast volumes of information. In fact, as some authors argue, we are currently in the era of Big Data (Borgman 2015; Gattiglia 2015), referring to the ability to search and store large datasets (Boyd and Crawford 2012) and what is currently known as interoperability (Borgman 2015). However, in many cases, there is a lack of critical analysis regarding the process of acquisition, construction, attribution, and use of this "digital materiality" (Miller and Horst 2012;

Isaac 2015; Anderson and Geismar 2017; Geismar and Knox 2021).

The creation of digital platforms and repositories, as well as the development of social networks, has brought awareness of the significance of open access, gaining enormous prominence and relevance in contemporary archaeology. In this context, important initiatives have emerged over the last 20 years, several of which stand out. The ARIADNEplus project (Meghini et al. 2017; Richards and Niccolucci 2019; Geser et al. 2022) is a mega-network comprised of a community of researchers from various institutions in Europe and other countries, including Argentina. Its aim is to develop an electronic infrastructure that allows interconnection to preserve and share archaeological information on various topics. Another notable initiative is The Archaeological Data Record (tDAR) (McManamon et al. 2010; Watts 2011; Witze 2019), an international digital repository whose goal is to preserve and provide access to digital archaeological data, supported by the organization Digital Antiquity hosted at Arizona State University and involving several other universities. Another significant project is OPENCONTEXT (Kansa et al. 2011; Kansa et al. 2014; Kansa et al. 2020), a virtual open-access platform available on the web that allows the publication of documents, field notes, journals, images, maps, vocabularies, typologies, and archaeological artifact and ecofact data relevant to specific projects. It creates a unique identifier for each uploaded digital data, making it findable and freely downloadable.

In Argentina, the creation of the Repositorio Digital Suquía by the Instituto de Antropología of Córdoba (IDACOR), CONICET- Universidad Nacional de Córdoba (Izeta and Cattáneo 2016; Izeta and Cattáneo 2019; Izeta and Cattáneo 2021; Izeta et al. 2021) has been pioneering. The repository is built upon archaeological, ethnographic, and folkloric collections that are part of the heritage assets of the Reserve of the Museo de Antropologías at the Facultad de Filosofía y Humanidades of the Universidad Nacional de Córdoba (UNC). Over time, it has also incorporated bibliographic resources, grey literature (e.g., unpublished reports), and various types of digitized documentary archives. Additionally, this virtual space serves as the hosting platform for the Bibliografía Arqueológica Argentina (BIB ARQ ARG), which collects metadata from other repositories in the country.

Another highly significant initiative for the archaeological community at the national level was the creation of the Red de Arqueología Digital de la Argentina (RADAR) in 2018, inspired by the experience developed by Suquía-IDACOR. RADAR is a practice network that involves various institutions and organizations from Argentina (Izeta and Cattáneo 2021). In 2018, the first meeting took place under the auspices of the Ministerio de Ciencia, Tecnología, e Innovación (MINCYT), and later, with the support of a seed fund from the Fundación Williams and Potenciar Comunidades within the Laboratorio de Innovación Cultural y Científica program, a roundtable was organized at the 20th Congreso Nacional de Arqueología Argentina in Córdoba in 2019, followed by a training workshop that same year. With the pandemic, the meetings transitioned to virtual platforms, and efforts were made to reach consensus on protocols for digitization and management of digital data. The mission of RADAR is to compile, agree upon, and disseminate criteria for the digitization, organization, and management of information that can be housed in an institutional open-access repository. This stimulated different institutions and projects to begin working on digitization, and in some cases, it led to the development of repositories within the framework of a larger institutional infrastructure.

That is the case of IA:Digital (http://repositorio.filo.uba.ar/handle/filodigital/1833), the repository of the Instituto de Arqueología (IA), which is part of Filo:Digital (http://repositorio.filo.uba.ar/), the institutional repository of the Facultad de Filosofía y Letras at the Universidad de Buenos Aires (UBA). ArqueoLab-UBA and the Instituto de las Culturas (IDECU) are also part of Filo:Digital (http://repositorio.filo.uba.ar/handle/filodigital/12111), and the latter is part of the Repositorio Institucional of the CONICET (https://ri.conicet.gov.ar/). Other institutions that have participated in RADAR include the Instituto de Investigaciones en Ciencias Sociales y Humanidades (ICSOH) in Salta, the Instituto de Investigaciones Arqueológicas y Paleontológicas (INCUAPA), and the Laboratorio de Antropología del Centro Austral de Investigaciones Científicas (CADIC), which channel their production through the CONICET Institutional Repository. Additionally, the Museo de la Patagonia, the Museo de La Plata, the Museo Etnográfico "J. B. Ambrosetti", and the San Rafael Museo de Historia Natural received funding from the Fundación Bunge and Born, Fundación Williams, and CONICET to digitize their collections, as part of a special call for museums.

While all of the above is extremely positive, there are those who have contributed a somewhat more critical view regarding the level of advancement of digitalization in archaeology on a global scale, mainly concerning the creation and management of digital data (e.g., Faniel et al. 2018; Richards et al. 2021). In these works, the focus is on all that still needs to be done to ensure that scientific production and all associated data are truly available in open access, that good practices are followed, and that this can be sustained in the long term, which requires a significant investment in technological infrastructure and personnel with expertise in digital matters.

What are data for Indigenous peoples?

In this section, we have relied on authors who are Indigenous academics and have written about the

topic of "Indigenous data" and characterized how Indigenous peoples themselves organize knowledge. Drawing on their voices highlights the tension triggered by the concept of "data" originating in Western science and reflects the ongoing discussion within Indigenous communities on this matter (Duarte et al. 2020), leading to their own definition of "Indigenous data."

In that line, Rainie et al. (2019) characterize "Indigenous data" as follows: "Indigenous data is defined here as data in a wide variety of formats inclusive of digital data and data as knowledge and information. It encompasses data, information, and knowledge about Indigenous individuals, collectives, entities, lifeways, cultures, lands, and resources." (Rainie et al. 2019: 301). This definition lists the different social and cultural aspects that are considered data while also considering the types of mediums in which they are stored (e.g., digital). Additionally, it includes traditional knowledge that is transmitted orally, preserved in memory, and kept alive through practices (Geary et al. 2013; Kukutai and Taylor 2016).

According to the source of information, Indigenous data is categorized into three classes: information about natural resources and territories (land, water, geology, etc.), data as individuals (legal, health, social, etc.), and information as Indigenous peoples or nations (traditions, knowledge, oral history, etc.) (Figueroa Rodríguez 2021; Global Indigenous Data Alliance, GIDA, 2023). As expressed by the Global Indigenous Data Alliance, initiated by Indigenous nations and peoples from Canada, Australia, New Zealand, and the United States, and now including countries from Latin America.

However, the category "data" is considered ambiguous (Duarte et al. 2020) since it includes information from, about, and on indigenous people. Furthermore, part of this information may have been obtained by the government, private entities, or researchers, with or without their consent, or directly without their knowledge. Nevertheless, this does not negate the fact that "Indigenous Peoples have always been data collectors and knowledge holders" (GIDA 2023).

The International Labour Organization (ILO) Convention 169, ratified by Argentina through Law 24.071 in 2001, provides a legal framework for recognizing Indigenous rights, including the protection of their cultural practices and values. The United Nations Declaration on the Rights of Indigenous Peoples (2007) contributes to the interpretation of this normative framework. This declaration urges respect for traditional knowledge and practices and the "right to maintain, protect, and develop past, present, and future manifestations of their cultures, such as archaeological and historical sites, artifacts, designs, ceremonies, technologies, visual and performing arts, and literature." (UNDRIP 2008: Article 11). Additionally, Indigenous peoples have the right "to maintain, control, protect, and develop their intellectual property over their cultural heritage, traditional knowledge, and traditional cultural expressions." (UNDRIP 2008: Article 31.1).

The expression "Indigenous data" cannot be seen or considered disconnected from its governance and sovereignty, quite the opposite (Taulipi-Corpuz et al. 2016; Tsosie et al. 2021; GIDA 2023). The concept of governance implies having control over Indigenous information or knowledge, which constitutes a step towards sovereignty (Rainie et al. 2017; Murillo 2018; Caroll et al. 2020). This translates into the preservation and use of this data through the development of principles, mechanisms, and protocols specific to its management (Hudson et al. 2020; Snipp 2016; Tsosie et al. 2021). This leads to self-determination and autonomous decision-making: "IDS [Indigenous Data Sovereignty] is the right of Indigenous peoples to control the collection, governance, ownership, and application of data about their people, lifeways, land, and resources" (Ruckstuhl 2022: 4). In this situated context, sovereignty must be understood in Indigenous terms, from their own epistemology and ontology (Moreton-Robinson 2021).

The term "Indigenous data" acquires its meaning when seen in the context of the conceptual framework offered by Indigenous Knowledge Organization (IKO) systems (Duarte et al. 2020; Littletree et al. 2020). Unlike Western logic, Indigenous Knowledge Organization systems focus on the concepts of relationality and holism, and their belonging to a specific people or nation (Smith 2012). They represent a way of knowing that encompasses different types of expressions. These systems revolve around the concepts of reciprocity, responsibility, and mutual respect (Duarte y Belarde-Lewis 2015; Duarte et al. 2020; Little Tree et al. 2020). This contrasts with non-Indigenous knowledge systems (Duarte y Belarde-Lewis 2015; Janke 2018; Little Tree et al. 2020; Duarte et al. 2020; Katerere et al. 2020; Shava 2020).

This has also led to the development of other initiatives, such as Local Contexts (localcontexts.org), a global project that provides Indigenous communities with tools to exercise authority over their heritage and data, based on principles of intellectual property and data sovereignty. Its goal is to collaborate with knowledge restitution processes, enabling Indigenous peoples to gain control over how their data is collected, managed, disseminated, made accessible, and used (Liggins et al. 2021). An offshoot of this has been the creation of Traditional Knowledge Labels (TK labels), which aim to establish different levels of access similar to Creative Commons (CC) licenses, but defined and created by Indigenous communities themselves based on their own legal framework. This may involve access restrictions

based on ethnic identity, gender, age of the user, or the time of year when the record can be viewed (Anderson and Christen 2013; Christen 2015; Montenegro 2019).

What principles regulate data management?

The management of data repositories is governed by specific principles associated with the compliance of guidelines (e.g., OpenAIRE, SNRD), protocols (e.g., OAI-PMH), and also guiding principles like the FAIR principles, which are considered synonymous with good practices (Wilkinson et al. 2016; Nicholson et al. 2023). However, in all these instances, the focus is primarily on the "digital object" (i.e., "data") and the standards that should be followed for its generation, organization, description, publication, and dissemination, without necessarily reflecting on the process of forming these digital collections (Anderson and Montenegro 2017; Christen and Anderson 2019).

On one hand, the science and technology system of our country promotes the use of the FAIR principles, which stands for Findable, Accessible, Interoperable, and Reusable (DACyTAr 2020). These principles promote that data should be discoverable, accessible, structured in a way that allows for integration and analysis, and available for reuse. Their origin and importance have been discussed by various authors (Wilkinson et al. 2016), and it is evident that they are grounded within the ethical parameters of Western science.

On the other hand, the CARE principles (Control, Authority, Responsibility, Ethics), promoted by the Global Indigenous Data Alliance (GIDA 2023), aim to assert authority to control, exercise responsibility within an ethical framework, and seek its utilization for collective benefit. In Spanish, the acronym for these principles is CREA (Control, Responsabilidad, Ética, Autoridad). These principles originate from a collective of Indigenous peoples, and their objective is to uphold Indigenous rights concerning their data and protect their traditional knowledge systems (Traditional Knowledge, TK) (Caroll et al. 2021).

While the FAIR principles focus on the management and use of data, the CARE-CREA principles emphasize the role of people and the purpose they serve in the governance and self-determination of Indigenous peoples. Despite this juxtaposition, both sets of principles are complementary (Carroll et al. 2020), and there is a growing consensus in academia that they should be employed together (Gupta et al. 2023; Nicholson et al. 2023).

This has brought on the need for a reflective approach in the formation of digital archives (Anderson and Geismar 2017; Christen and Anderson 2019; Geismar and Knox 2021). This issue is closely related to the concept of "attribution" recently developed critically and thoughtfully by various authors, such as Anderson and Christen (2019), Christen and Anderson (2019), and Pavis and Wallace (2020), among others, who highlight how Indigenous rights to their history, practices, way of life, and materiality, both present and past, have been ignored within the context of colonization. These rights include copyright over all aspects related to their memory in a broad sense, as well as rights to access and self-management of that digitized knowledge.

This led to the development of Content Management Systems (CMS), such as the open-access digital platform Mukurtu (mukurtu.org), which empowers Indigenous communities and enables self-management and control of access to that digital materiality (Christen 2015, Christen et al. 2017). In this system, Indigenous communities themselves define three fundamental components: which communities control what is shared, which categories of digital objects will be used, and which cultural protocols determine the accessibility and visibility of the records stored there. In addition, to achieve this, it has been necessary to put into action not only other complementary principles (e.g., CARE or CREA) but also new license labels (e.g., Christen 2015; Liggins et al. 2021) such as the Traditional Knowledge Labels (TKL) that arise from Local Contexts, a project related to the development initiative of the Mukurtu platform.

There have also been discussions about the possibilities that arise when participatory and collaborative digital projects are developed (Gubrium and Harper 2013). In Pampa and Patagonia, there are three cases that illustrate the collective co-production of knowledge on a digital basis. On one hand, the design of signage with augmented reality technology as part of the management plan for an archaeological site, Cerro de Los Viejos in the province of La Pampa, was carried out by the Dirección de Patrimonio de la Secretaría de Cultura of the province with the participation of neighboring localities and Ranquel and Mapuche communities in the province (Roca 2020 and 2021). On the other hand, a script was jointly developed with the Tehuelche, Mapuche, and Mapuche-Tehuelche communities of Santa Cruz for an Interpretation Center in Los Antiguos, based on the collective compilation of born-digital or digitized material (texts, images, audios) contributed by the Indigenous leaders themselves and the researchers involved in the project on the archaeology and history of the Indigenous peoples in the Los Antiguos area, Santa Cruz (Figuerero Torres and Mengoni Goñalons 2021, 2022). Finally, community photo albums were created with the Tehuelche communities of Camusu Aike and Kopolke in Santa Cruz, containing digitized images of their ancestors stored in official archives and other sources. For this purpose, the Orígenes application was designed for use on Android devices, complemented with narratives (oral and written) and genealogies (Lublin et al. 2023).

ISSN 1852-060X (impreso) / ISSN 1852-4826 (electrónico)

In these collaborative knowledge production processes, several situations emerged. On one hand, Indigenous participation allowed shared digital information (e.g., texts, images, audios) to highlight different meanings, distinct from those that Western science might provide. On the other hand, Indigenous communities had the power to manage and choose which aspects of their culture to emphasize. Lastly, the shared knowledge in digital format that remains for future use also clarifies the authorial attributions that correspond and the control exerted over what is presented in the platforms or applications developed. All these projects aim to contribute to the recovery of different aspects of culture, the construction of autochthonous narratives, legitimizing their claims, and restoring segments of the memory of these peoples. In this sense, the digital realm shifts from being a means of content preservation and management to one of constructing new knowledge, using the necessary technological tools and new concepts and protocols for working collaboratively.

Who holds governance over data?

In the science and technology system of Argentina, governance over data is exercised by individuals or entities that have the authority to restrict open access to data and/or productions. This is referred to as "rights of exclusion" for things that cannot be freely accessible due to specific restrictions or embargoes. These may include preserving confidentiality, protecting individuals' privacy, adhering to consent terms, as well as managing security or other risks, which must be duly justified (CONICET 2021).

These principles do not include exclusion based on the recognition of copyright by other individuals who may not necessarily be the scientists involved, although in the metadata (e.g., Dublin Core), there is a field for author/creator, apart from licenses (e.g., Creative Commons), which defines the parameters within which the material can be used.

As a result of a meeting on intellectual property held at the Polo Científico of Argentina, a book is published (Terlizzi and Zukerfeld 2022) addressing knowledge promotion policies and intellectual property rights. In one of its chapters, the concept of "cognitive appropriation" is developed to refer to "the social relationship by which ownership of knowledge, whose development was fully or primarily financed by national public institutions, falls to other actors" (Zukerfeld et al. 2022: 216). This may include the reproduction, reinterpretation, adaptation, and reinvention of knowledge within the context of cultural or educational activities. It is also clear that the State's perspective highlighted in the book aims to protect its rights over the outcomes of all research financed with public funds, which could lead to patents.

However, according to the same authors, the concept of "appropriation" can also be applied in cases where "knowledge produced by a set of peripheral social actors (scientists, technologists, workers, internet users, indigenous peoples, etc.) is exploited or appropriated by firms located in central regions through various mechanisms, among which intellectual property rights stand out" (Zukerfeld et al. 2022: 229). The mention of "indigenous peoples" raises the issue of the rights these actors have over their knowledge, wisdom, practices, and material belongings. This calls for further reflection.

Thus, in the SNRD of Argentina, the figure of author/creator is understood as the "responsible for the content of the resource." This raises a reflection about the attribution that should be recognized to the maker of a digital "material object" (artifact) or an oral statement that has been recorded and/or transcribed in digital format, whose social actor is an unknown but ultimately indigenous ancestor or a contemporary indigenous individual. A case that illustrates this is the war songs of the Passamaquoddy, recorded on wax cylinders in the 19th century by an anthropologist, and whose author was recently identified. As a result, the record was recataloged, and digitized copies were delivered to the community of origin (Passamaquoddy People 2020).

In several countries, this has marked a turning point in many institutions (e.g., Library of Congress, Smithsonian Institution, Pitt-Rivers Museum) that have started to review the cataloging systems of their archival materials or museum collections (e.g., Van Broekhoven 2018; Turner 2020). These systems have been challenged by the indigenous communities themselves, who are driving or actively participating in the process of recovering and repatriating cultural expressions that were taken during colonial times, 19th-century collecting, or later periods.

Here, we can introduce the concept of "digital return" developed by Anderson and Christen (2013) and Bell et al. (2013). This idea is in line with what Murillo (2018: 578) suggests when stating: "Digital remediation creates opportunities for bringing artifacts back to social life, so to speak, through circulation and reinterpretation." This paradigm shift is associated with the idea of decolonizing attribution (Anderson and Christen 2019). Consequently, all archival materials, museum collections, and institutional resources should be managed under a model of collaborative curation with the communities of origin (Christen 2018).

While digital return is of a different nature than physical restitution, both actions are forms of repair. They occur in a context where rights over physical or analog materials, born-digital and/or digitized (such as texts, photos, recordings, artifacts, etc.), held by institutions, are recognized. These materials were acquired through various means (e.g., purchase, exchange, custody during transit with permission, or becoming part of permanent

collections after the original researcher's passing). An example of this is the restitution of a historical ceremonial headdress to a Tlingit community, accompanied by its 3D reconstruction for use in current ceremonies (Hollinger 2022).

How can we humanize our practice?

Western scientific knowledge, resulting from modernity and the subsequent emergence of nation-states with colonial roots, has been challenged by marginalized indigenous communities who assert their own ways of constructing and organizing their knowledge and practices (e.g., Curtoni 2022, Jofré and Gómez 2022). In general, indigenous peoples express distrust in science based on their negative experiences with scientists, academics, and enthusiasts who have appropriated their belongings, narratives, and knowledge without their genuine consent or explicit agreement (Smith 2012; Tuck and Yang 2012; Ayala Rocabado 2017; Ruckstuhl 2022).

There are two aspects to consider in understanding this situation. On one hand, the objectification to which indigenous peoples and their culture have been subjected. On the other hand, the datafication of knowledge (Ruckstuhl 2022), as we have seen earlier. Objectification has had consequences at different levels. For example, it has impacted the cataloging in museums and institutions that hold collections of cultural artifacts (Lonetree 2012; Christen 2018; Geismar 2018; Turner 2020). Pieces from physical or digitized collections that have lost their connection to their true creators, with credit often going to the researcher who collected them (Anderson and Christen 2019). In this sense, researchers' records or museum catalogs are not neutral but are influenced by the historical context in which they are created (Turner 2020).

Furthermore, what archaeologists consider as "objects" of study are, for indigenous peoples, "cultural expressions," "belongings," or directly "memory," highlighting ontological differences in how scientific knowledge and indigenous knowledge are structured and organized. The way archaeologists refer to these materials objectifies them and, in this process, dehumanizes these expressions and belongings. In this sense, it is worth reflecting on intellectual property and copyright (Torsen and Anderson 2010; Anderson 2015; Anderson and Geismar 2017), which impact the governance and sovereignty of knowledge, practices, and belongings that hold cultural value and, in many cases, can be sensitive from the perspective of indigenous communities (Kukutai and Taylor 2016).

Open science is a significant advancement and an opportunity for other sectors of society to access primary information and the results of scientific analyses. However, it is also true that, in many cases, the "data" that scientists find informative and use to support their arguments may be something sensitive for indigenous communities within the context of their beliefs or worldview. In fact, any information produced by archaeologists about the indigenous past can potentially be considered "indigenous data," and of which they are unaware in most cases. The initiative by researchers and institutions to provide indigenous communities with information about what they have in their permanent collections would be an opportunity to initiate dialogues and foster more participatory work with these communities (Colwell-Chanthaphonh and Ferguson 2008; Laluk et al. 2022).

This happens with human remains from graves, their personal belongings, and other cultural expressions that hold sacred value for indigenous communities. Within this context, the way in which scientists handle and manipulate these material remains during their study, regardless of their nature, should be respectful, as they represent memory and ancestors, among other expressions, for indigenous communities. The same applies to digitized information about these remains. However, currently, we lack general protocols specifically addressing this issue, apart from the preventive conservation standards and the personal sensitivity of the researcher (e.g., Tsosie et al. 2021).

Faced with this situation, science in general, and archaeology in particular, should initiate dialogues with indigenous communities and collaboratively negotiate different ways to provide access and facilitate governance over digitally born or digitized information that is of significance for the history and culture of indigenous peoples. In this context, governance would involve determining what can be made openly accessible and what should not, according to the wishes of the indigenous communities and the guidelines they establish in each case (Lovett et al. 2019; Fox 2020).

This would help indigenous communities to reconnect with their material past in cases where such a connection does not currently exist, and to give it meaning within the framework of their worldview, based on their traditional knowledge, beliefs, and cosmology. This reconnection should be centered on their own logic and their system of knowledge organization, which may not necessarily coincide or harmonize with the perspectives of scientists, who have their own agenda of interests and benefits.

A step in this direction could be to work collaboratively (e.g., Atalay 2012; McNanny and Rowe 2015; Rappaport 2018; Rodríguez 2019; Roca 2020 and 2021; Figuerero Torres and Mengoni Goñalons 2021 and 2022; Laluk et al. 2022) focused on the concepts of dialogue and reciprocity. This would involve being willing to break away from the asymmetry and concept of authority that many of us have been trained in within academia. The idea of co-theorizing, co-creating, and co-producing are ways to expand the horizons of scientific disciplines and

put the results of our research projects at the service of others, taking actions that are truly reparative for indigenous communities. This gives us the opportunity to open ourselves to other logics, understand and address their demands, and engage in a professional practice that is more just and open to continuous reflection and self-criticism.

Working from a collaborative perspective in archaeology, centered on dialogue with indigenous communities, provides the opportunity to negotiate consensually different ways to grant access and facilitate governance over digital data related to the history and culture of indigenous peoples. This is a way to acknowledge their rights and contribute to the process of cultural recovery and visibility that many indigenous communities are currently engaged in.

Buenos Aires, July 28th, 2023

Acknowledgments

This work was carried out within the framework of the project "Arqueología e historia de los pueblos originarios del área de Los Antiguos, Santa Cruz, Patagonia Argentina," based at the Instituto de Arqueología, FFyL, UBA. It was funded by UBACYT 20020170100032BA: "Territorios, materialidad y memoria en el área de Los Antiguos, Santa Cruz, Patagonia." directed by G.L. Mengoni Goñalons and UBACYT 20020190100173BA0: "Conflictos ideológicos, epistemológicos y ontológicos entre pueblos indígenas, académicos y estados. Reflexiones desde etnografías comprometidas-colaborativas, políticas interculturales y humanidades digitales" directed by M.E. Rodríguez.

Several of the reflections and ideas presented here have been enriched through dialogue with indigenous leaders from the communities of Santa Cruz and with some colleagues, especially Marcela Alaniz, Erika Engler, Celia Rañil, Mariela Rodríguez, Jorge Rogel, and the RADAR group. We thank the DACyTAr team for their clarifying contributions. To Andrés Izeta for inviting us to participate in this volume and for trusting in us. The Spanish translations of the English-cited texts were generated using ChatGPT and verified by us. We also express gratitude to the anonymous reviewers for their comments and suggestions.

Translated using ChatGTP and revised by the authors

Bibliografía

Actis, G., y Carlino, L. (2017). *Plan de Gestión de Datos en CONICET: Análisis, experiencia y desafíos*. 215-231. http://sedici.unlp.edu.ar/handle/10915/63588

Anderson, J., y Christen, K. (2013). 'Chuck a Copyright on it': Dilemmas of Digital Return and the Possibilities for Traditional Knowledge Licenses and Labels. *Museum Anthropology Review*, *7*(1-2), Article 1-2.

Anderson, J., y Christen, K. (2019). Decolonizing attribution: Traditions of exclusion. *Journal of Radical Librarianship*, *5*, 113-152.

Anderson, J. E. (2015). Indigenous knowledge and intellectual property rights. En *International Encyclopedia of the Social & Behavioral Sciences* (pp. 769-778). Elsevier. https://linkinghub.elsevier.com/retrieve/pii/B9780080970868640783

Anderson, J. L., y Geismar, H. (Eds.). (2017). *The Routledge Companion to Cultural Property*. Routledge. https://doi.org/10.4324/9781315641034

Anderson, J., y Montenegro, M. (2017). Collaborative encounters in digital cultural property. En J. Anderson y H. Geismar (Eds.), *The Routledge Companion to Cultural Property* (pp. 431-451). Routledge. https://doi.org/10.4324/9781315641034

Atalay, S. (2012). *Community-based archaeology: Research with, by, and for indigenous and local communities*. University of California Press.

Ayala Rocabado, P. (2017). Arqueología y Pueblos Indígenas: Los casos Aymara, Atacameño, Mapuche y Rapa Nui. *Boletín de la Sociedad Chilena de Arqueología*, *47*, 69-92.

Bell, J. A., Christen, K., y Turin, M. (2013). Introduction: After the Return. *Museum Anthropology Review*, *7*(1-2), 1-21. https://scholarworks.iu.edu/journals/index.php/mar/article/view/3184

Benardou, A., Champion, E., Dallas, C., y Hughes, L. M. (Eds.). (2018). *Cultural heritage infrastructures in digital humanities*. Routledge, Taylor & Francis Group.

Bezuidenhout, L. M., Leonelli, S., Kelly, A. H., y Rappert, B. (2017). Beyond the digital divide: Towards a situated approach to open data. *Science and Public Policy*, *44*(4), 464-475. https://doi.org/10.1093/scipol/scw036

Biehl, P. F., y Prescott, C. (Eds.). (2013). *Heritage in the Context of Globalization: Europe and the Americas*. Springer.

Binford, L. R. (1987). Data, Relativism and Archaeological Science. *Man*, *22*(3), 391. https://doi.org/10.2307/2802497

Boast, R., & Biehl. (2011). Archaeological knowledge production and dissemination in the digital age. En E. C. Kansa, S. W. Kansa, y E. Watrall (Eds.), *Archaeology 2.0: New Approaches to Communication and Collaboration* (pp. 119-155). UCLA Costen Digital Archaeology Series.

Borgman, C. L. (2015). *Big Data, Little Data, No Data: Scholarship in the Networked World*. The MIT Press.

Boyd, D., y Crawford, K. (2012). Critical questions for Big Data: Provocations for a cultural, technological, and scholarly phenomenon. *Information, Communication & Society*, *15*(5), 662-679. https://doi.org/10.1080/1369118X.2012.678878

Carroll, S. R., Garba, I., Figueroa-Rodríguez, O. L., Holbrook, J., Lovett, R., Materechera, S., Parsons, M., Raseroka, K., Rodriguez-Lonebear, D., Rowe, R., Sara, R., Walker, J. D., Anderson, J., y Hudson, M. (2020). The CARE principles for indigenous data governance. *Data Science Journal*, *19*, 43. https://doi.org/10.5334/dsj-2020-043

Chapman, R., & Wylie, A. (2016). *Evidential reasoning in archaeology*. Bloomsbury.

Chippindale, C. (2000). Capta and Data: On the True Nature of Archaeological Information. *American Antiquity*, *65*(4), 605-612. https://doi.org/10.2307/2694418

Christen, K. (2015). Tribal Archives, Traditional Knowledge, and Local Contexts: Why the "s" Matters. *Journal of Western Archives*, *6*(1), 1-21. https://doi.org/10.26077/78d5-47cf

Christen, K. (2018). Relationships, Not records. Digital heritage and the ethics of sharing indigenous knowledge online. En J. Sayers (Ed.), *The Routledge Companion to Media Studies and Digital Humanities* (pp. 403-412). Routledge.

Christen, K., y Anderson, J. (2019). Toward slow archives. *Archival Science*, *19*(2), 87-116. https://doi.org/10.1007/s10502-019-09307-x

Christen, K., Merrill, A., y Wynne, M. (2017). A Community of Relations: Mukurtu Hubs and Spokes. *D-Lib Magazine*, *23*(5/6). https://doi.org/10.1045/may2017-christen

Colwell-Chanthaphonh, C., y Ferguson, T. J. (Eds.). (2008). *Collaboration in archaeological practice: Engaging descendant communities*. AltaMira Press.

CONICET. (2021). *Políticas del Repositorio Institucional CONICET Digital. Versión 2.0*. (pp. 1-25) [Resolución 2325/2021 APN-Conicet]. CONICET. https://ri.conicet.gov.ar/wp/wp-content/uploads/2021/12/RD-2325-21-con-Politicas-del-RI-CONICET-Digital.pdf

Curtoni, R. P. (2016). Multivocalidad, geopolíticas y patrimonio. Prácticas situadas entre los rankulches del centro de Argentina Patrimonio y Multivocalidad. Teoría, práctica y experiencias en torno a la construcción del conocimiento en Patrimonio. En C. Gianotti García, D. Barreiro Martínez, y B. Vienni Baptista (Eds.), *Patrimonio y multivocalidad: Teoría, práctica y experiencias en torno a la construcción del conocimiento en patrimonio* (pp. 115-124). CSIC, Universidad de la República.

DACyTAr. (2020). *DACyTAr—Portal de datos de primarios en acceso abierto de la ciencia y Técnología Argentina del Sistema Nacional de Repositorios Digitales (SNRD)*. DACyTAr Portal. https://dacytar.mincyt.gob.ar/

Del Río Riande, G. (2022). Humanidades Digitales o las Humanidades en la intersección de lo digital, lo público, lo mínimo y lo abierto. *Publicaciones de la Asociación Argentina de Humanidades Digitales*, *3*, e038. https://doi.org/10.24215/27187470e038

DNUDPI. (2008). *Declaración de las Naciones Unidas sobre los derechos de los pueblos indígenas*. Naciones Unidas. https://www.un.org/esa/socdev/unpfii/documents/DRIPS_es.pdf

Drucker, J. (2011). Humanities Approaches to Graphical Display. *Digital Humanities Quarterly*, *5*(1). https://doi.org/2555208513

Duarte, M. E., y Belarde-Lewis, M. (2015). Imagining: Creating spaces for indigenous ontologies. *Cataloging & Classification Quarterly*, *53*(5-6), 677-702. https://doi.org/10.1080/01639374.2015.1018396

Duarte, M. E., Vigil-Hayes, M., Littletree, S., y Belarde-Lewis, M. (2020). 'Of course, data can never fully represent reality': Assessing the Relationship between Indigenous Data and IK, TEK, and TK. *Human Biology Open Access Pre-Prints*, 163.

Dunnell, R. C. (1971). Sabloff and Smith's "The Importance of Both Analytic and Taxonomic Classification in the Type-Variety System". *American Antiquity*, *36*(1), 115-118. https://doi.org/10.2307/278029

Faniel, I. M., Austin, A., Kansa, E., Kansa, S. W., France, P., Jacobs, J., Boytner, R., y Yakel, E. (2018). Beyond the Archive: Bridging Data Creation and Reuse in Archaeology. *Advances in Archaeological Practice*, *6*(2), 105-116. https://doi.org/10.1017/aap.2018.2

Figuerero Torres, M. J., y Mengoni Goñalons, G. L. (2021). Consulta y participación indígena para un Centro de Interpretación en Los Antiguos, Santa Cruz. En *Actas XII Congreso Argentino de Antropología Social (CAAS)* (pp. 1-15). Universidad Nacional de La Plata; http://sedici.unlp.edu.ar/handle/10915/133847. http://repositorio.filo.uba.ar/handle/filodigital/15219

Figuerero Torres, M. J., y Mengoni Goñalons, G. L. (2022). Trabajo colaborativo con las comunidades originarias de la provincia de Santa Cruz: Reflexiones a propósito de la creación de un "centro de interpretación" en Los Antiguos, Patagonia. En *Memorias del VI Congreso Asociación Latinoamericana de Antropología: Vol. VII* (pp. 371-380). ALA. http://repositorio.filo.uba.ar/handle/filodigital/15387

Figueroa Rodríguez, O. L. (2021, julio 1). *Gobernanza de datos indígenas: Principios FAIR y CARE* [Text]. CEPAL. https://www.cepal.org/es/notas/gobernanza-datos-indigenas-principios-fair-care

Floridi, L. (2012). Big Data and Their Epistemological Challenge. *Philosophy & Technology*, *25*(4), 435-437. https://doi.org/10.1007/s13347-012-0093-4

Fowler, D. D., y Givens, D. R. (1995). The Records of Archaeology. En S. Silverman y N. Parezo (Eds.), *Preserving the Anthropological Record* (2.ª ed.). Wenner-Gren Foundation for Anthropological Research. https://copar.umd.edu/wp-content/uploads/2019/08/par9_fowler_givens.pdf

Fox, K. (2020). The Illusion of Inclusion—The "All of Us" Research Program and Indigenous Peoples' DNA. *New England Journal of Medicine*, *383*(5), 411-413. https://doi.org/10.1056/NEJMp1915987

Furner, J. (2016). "Data": The data. En M. Kelly y J. Bielby (Eds.), *Information Cultures in the Digital Age* (pp. 287-306). Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-14681-8_17

Gattiglia, G. (2015). Think big about data: Archaeology and the Big Data challenge. *Archäologische Informationen*, *38*, 113-124. https://doi.org/10.11588/AI.2015.1.26155

Geary, J., Jardine, C. G., Guebert, J., y Bubela, T. (2013). Access and benefits sharing of genetic resources and associated traditional knowledge in northern Canada: Understanding the legal environment and creating effective research agreements. *International Journal of Circumpolar Health*, *72*(1), 21351. https://doi.org/10.3402/ijch.v72i0.21351

Geismar, H. (2018). *Museum Object Lessons for the Digital Age*. UCL Press. https://doi.org/10.14324/111.9781787352810

Geismar, H., y Knox, H. (Eds.). (2021). *Digital Anthropology* (2nd. Ed.). Routledge.

Geser, G., Richards, J. D., Massara, F., y Wright, H. (2022). Data Management Policies and Practices of Digital Archaeological Repositories. *Internet Archaeology*, *59*. https://doi.org/10.11141/ia.59.2

GIDA. (2023, enero 23). *Global Indigenous Data Alliance Promoting Indigenous Control of Indigenous Data*. Global Indigenous Data Alliance. https://www.gida-global.org/history-of-indigenous-data-sovereignty

Gillies, V., y Aldred, P. (2005). The ethics of intention: Research as a political tool. En M. Mauthner, M. Birch, J. Jessop, y T. Miller (Eds.), *Ethics in qualitative research* (2.ª ed., pp. 32-52). SAGE.

Gitelman, L. (Ed.). (2013). «Raw data» is an oxymor*on*. MIT Press.

Gubrium, A., y Harper, K. (2013). *Participatory visual and digital methods*. Left Coast Press.

Gupta, N., Martindale, A., Supernant, K., y Elvidge, M. (2023). The CARE Principles and the Reuse, Sharing, and Curation of Indigenous Data in Canadian Archaeology. *Advances in Archaeological Practice*, *11*(1), 76-89. https://doi.org/10.1017/aap.2022.33

Haraway, D. J. (1991). *Ciencia, cyborgs, y mujeres la reinvención de la naturaleza*. Ediciones Cátedra.

Hollinger, R. E. (2022). 3D Digital Replication: Emerging Cultural Domain for Native American Communities. En I. Krupnik (Ed.), *Handbook of North American Indians, Volume 1: Introduction* (pp. 182-195). Open Monographs. https://doi.org/10.5479/si.21262173

Hudson, M., Garrison, N. A., Sterling, R., Caron, N. R.,

Fox, K., Yracheta, J., Anderson, J., Wilcox, P., Arbour, L., Brown, A., Taualii, M., Kukutai, T., Haring, R., Te Aika, B., Baynam, G. S., Dearden, P. K., Chagné, D., Malhi, R. S., Garba, I., … Carroll, S. R. (2020). Rights, interests and expectations: Indigenous perspectives on unrestricted access to genomic data. *Nature Reviews Genetics*, *21*(6), 377-384. https://doi.org/10.1038/s41576-020-0228-x

Isaac, G. (2015). Perclusive alliances: Digital 3-D, museums, and the reconciling of culturally diverse knowledges. *Current Anthropology*, *56*(S12), S286-S296. https://doi.org/10.1086/683296

Izeta, A. D., y Cattáneo, R. (2016). ¿Es posible una arqueología digital en Argentina? Un acercamiento desde la práctica. En *Humanidades Digitales: Construcciones locales en contextos globales* (pp. 1-11). Asociación Argentina de Humanidades Digitales. https://www.aacademica.org/aahd2016/15

Izeta, A. D., y Cattáneo, R. (2019). Archaeological digital repositories: Fostering networks from the Global South. En J. D. Richards & F. Niccolucci (Eds.), *The Ariadne impact* (Vol. 58, pp. 163-174). Archeolingua.

Izeta, A. D., y Cattáneo, R. (2021). Digital archiving for archaeology: The state of the art in Argentina. *Internet Archaeology*. https://doi.org/10.11141/ia.58.1

Izeta, A., Prado, I., y Cattáneo, R. (2021). Sentando las bases para una Arqueología Digital en Argentina. El rol de las infraestructuras digitales para la investigación. *Intersecciones en Antropología*, *22*(1). https://doi.org/10.37176/iea.22.1.2021.595

Janke, T. (2018). *Indigenous knowledge: Issues for protection and management* (Australia). Innovation and Science, IP Australia & the Department of Industry. https://apo.org.au/node/182206

Jofré, I. C., y Gómez, N. C. (2022). El regreso de nuestros/as ancestros/as al territorio: Reflexiones sobre los archivos de la demanda warpe desde la mirada de sus protagonistas. En I. C. Jofré (Ed.), *Cartografía de conflictos en territorios indígenas del Cuyum: Región de Cuyo, Argentina* (pp. 451-506). Editorial UNSJ.

Kansa, E. C., Kansa, S. W., y Arbuckle, B. (2014). Publishing and Pushing: Mixing Models for Communicating Research Data in Archaeology. *International Journal of Digital Curation*, *9*(1), 57-70. https://doi.org/10.2218/ijdc.v9i1.301

Kansa, E. C., Kansa, S. W., y Watrall, E. (Eds.). (2011). *Archaeology 2.0: New approaches to communication and collaboration*. Cotsen Institute of Archaeology Press.

Kansa, S. W., Atici, L., Kansa, E. C., y Meadow, R. H. (2020). Archaeological Analysis in the Information Age: Guidelines for Maximizing the Reach, Comprehensiveness, and Longevity of Data. *Advances in Archaeological Practice*, *8*(1), 40-52. https://doi.org/10.1017/aap.2019.36

Katerere, D. R., Applequist, W., Aboyade, O. M., y Togo, C. (2020). En D. R. Katerere, W. Applequist, O. M. Aboyade, y C. Togo (Eds.), *Traditional and Indigenous Knowledge for the Modern Era: A Natural and Applied Science Perspective*. CRC Press. https://www.taylorfrancis.com/books/9781351981798

Kitchin, R. (2014). *The Data Revolution: Big Data, Open Data, Data Infrastructures & their Consequences*. SAGE Publications.

Kremers, H. (Ed.). (2020). *Digital Cultural Heritage*. Springer.

Kukutai, T., y Taylor, J. (2016). Data sovereignty for indigenous peoples: Current practice and future needs. En T. Kukutai y J. Taylor (Eds.), *Indigenous Data Sovereignty* (pp. 1-22). ANU Press. DOI: 10.22459/CAEPR38.11.2016

Laluk, N. C., Montgomery, L. M., Tsosie, R., McCleave, C., Miron, R., Carroll, S. R., Aguilar, J., Thompson, A. B. W., Nelson, P., Sunseri, J., Trujillo, I., DeAntoni, G. M., Castro, G., y Schneider, T. D. (2022). Archaeology and social justice in Native America. *American Antiquity*, *87*(4), 864-864. https://doi.org/10.1017/aaq.2022.89

Liggins, L., Hudson, M., y Anderson, J. (2021). Creating space for indigenous perspectives on access and benefit- sharing: Encouraging researcher use of the Local Contexts Notices. *Molecular Ecology*, *30*(11), 2477-2482. https://doi.org/10.1111/mec.15918

Littletree, S., Belarde-Lewis, M., y Duarte, M. (2020). Centering relationality: A conceptual model to advance indigenous knowledge organization practices. *Knowledge Organization*, *47*(5), 410-426. https://doi.org/10.5771/0943-7444-2020-5-410

Lonetree, A. (2012). *Decolonizing museums: Representing native America in national and tribal museums*. University of North Carolina Press.

Lord, P., Macdonald, A., Lyon, L., y Giaretta, D. (2004). From Data Deluge to Data Curation. *Proceedings of the UK e-science All Hands meeting*, *67*, 371-375.

Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., y Walker, J. (2019). Good Data Practices for Indigenous Data Sovereignty and Governance. En A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data*. Institute of Network Cultures.

Lublin, G., Robinson, S., y Rodríguez, M. E. (2023). El codiseño de la aplicación Orígenes como forma de resistencia: Un proyecto para "reconectar a las personas y sanar antiguas heridas". En *Patagonia literaria X - Resistencias poético-políticas desde el Sur*. INOLAS.

Lucas, G. (2015). Evidence of what? On the possibilities of archaeological interpretation. En R. Chapman y A. Wylie (Eds.), *Material evidence: Learning from archaeological practice* (pp. 311-323). Routledge.

Luka, M. E., y Millette, M. (2018). (Re)framing Big Data: Activating Situated Knowledges and a Feminist Ethics of Care in Social Media Research. *Social Media + Society*, *4*(2), 1-10. https://doi.org/10.1177/2056305118768297

Markham, A. N. (2013). Undermining 'data': A critical examination of a core term in scientific inquiry. *First Monday*, *18*(10). https://doi.org/10.5210/fm.v18i10.4868

Mayer-Schönberger, y Cukier, K. (2013). *Big Data: A Revolution that will Transform how we Live, Work, and Think*. Houghton Mifflin Harcourt.

McAnany, P. A., y Rowe, S. M. (2015). Re-visiting the field: Collaborative archaeology as paradigm shift. *Journal of Field Archaeology*, *40*(5), 499-507. https://doi.org/10.1179/2042458215Y.0000000007

McManamon, F. P., Kintigh, K. W., y Brin, A. (2010). Digital Antiquity and the Digital Archaeological Record (tDAR): Broadening Access and Ensuring Long-Term Preservation for Digital Archaeological Data. *Center for the Study of Architecture CSA Newsletter*, *XXIII*(2), Electronic document.

Meghini, C., Scopigno, R., Richards, J., Wright, H., Geser, G., Cuy, S., Fihn, J., Fanini, B., Hollander, H., Niccolucci, F., Felicetti, A., Ronzino, P., Nurra, F., Papatheodorou, C., Gavrilis, D., Theodoridou, M., Doerr, M., Tudhope, D., Binding, C., y Vlachidis, A. (2017). ARIADNE: A Research Infrastructure for Archaeology. *Journal on Computing and Cultural Heritage*, *10*(3), 1-27. https://doi.org/10.1145/3064527

Miller, D., y Horst, H. A. (Eds.). (2012). *Digital Anthropology*. Berg.

Montenegro, M. (2019). Subverting the universality of metadata standards: The TK labels as a tool to promote Indigenous data sovereignty. *Journal of Documentation*, *75*(4), 731-749. https://doi.org/10.1108/JD-08-2018-0124

Moreton-Robinson, A. (2021). Incommensurable sovereignties. Indigenous ontology matters. En B. Hokowhitu, A. Moreton-Robinson, L. T. Smith, Andersen, & S. Larkin (Eds.), *Routledge handbook of critical indigenous studies* (pp. 257-268). Routledge.

Murillo, L. F. R. (2018). What Does "Open Data" Mean for Ethnographic Research?: Multimodal Anthropologies. *American Anthropologist*, *120*(3), 577-582. https://doi.org/10.1111/aman.13088

Nicholson, C., Kansa, S., Gupta, N., y Fernandez, R. (2023). Will It ever be FAIR?: Making archaeological data findable, accessible, interoperable, and reusable. *Advances in Archaeological Practice*, *11*(1), 63-75. https://doi.org/10.1017/aap.2022.40

O'Brien, M. J., y Lee Lyman, R. (2002). The epistemological nature of archaeological units. *Anthropological Theory*, *2*(1), 37-56. https://doi.org/10.1177/1463499602002001287

Passamaquoddy People. (2020). *Our Grandfathers Voices—Wax Cylinder Project*. Passamaquoddy Peoples' Knowledge Portal. https://passamaquoddypeople.com/collection/our-grandfathers-voices-wax-cylinder-project

Pavis, M., y Wallace, A. (2020). *SCuLE Response for the EMRIP Report on repatriation of ceremonial objects and human remains under the UN Declaration on the Rights of Indigenous Peoples*. https://doi.org/10.5281/ZENODO.3760293

Raine, S. R., Rodriguez-Lonebear, D., y Martinez, A. (2017). *Policy Brief (Version 2): Data Governance for Native Nation Rebuilding*. Native Nations Institute. https://nnigovernance.arizona.edu/policy-brief-data-governance-native-nation-

rebuilding

Rainie, S. C., Kukutai, T., Walter, M., Figueroa-Rodríguez, O. L., Walker, J., y Axelsson, P. (2019). Indigenous data sovereignty. En *The State of Open Data. Histories and Horizons*. African Minds and International Development Research Centre.

Ramenofsky, A. F., y Steffen, A. (Eds.). (1998). *Unit issues in archaeology: Measuring time, space, and material*. University of Utah Press.

Rappaport, J. (2018). Más allá de la observación participante: La etnografía colaborativa como innovación teórica. En Xochitl Leyva (Ed.), *Prácticas otras de conocimiento(s): Entre crisis, entre guerras: Vol. Tomo I* (1a edición digital, pp. 323-352). CLACSO: Cooperativa Editorial Retos; PDTG; IWGIA; Talleres Paradigmas Emancipatorios: Proyect Alice; Espejos Extraños, Lecciones Insospechadas; Taller Editorial La Casa del Mago.

Richards, J. D. (2017). Twenty years preserving data: A view from the United Kingdom. *Advances in Archaeological Practice*, *5*(3), 227-237. https://doi.org/10.1017/aap.2017.11

Richards, J. D., Jakobsson, U., Novák, D., Štular, B., y Wright, H. (2021). Digital archiving in archaeology: The state of the art. Introduction. *Internet Archaeology*. https://doi.org/10.11141/ia.58.23

Richards, J. D., y Niccolucci, F. (Eds.). (2019). *The Ariadne impact*. Archeolingua. https://doi.org/10.5281/zenodo.3476712

Roca, I. J. (2020). Caminos del Agua. Tecnología y participación indígena en el sitio arqueológico Cerro de los Viejos. *Proyectos y Experiencias Revista PH*, *101*, 274-283.

Roca, I. J. (2021). Aplicación de realidad aumentada en el sitio arqueológico Cerro de los Viejos, La Pampa, Argentina. *REVISTA INCLUSIONES*, *8*(Núm. Esp.), 112-130.

Rodríguez, M. E. (2019). Los tehuelches ante el deseo patrimonializador. En D. Arellano & L. Ebenau (Eds.), *Antropología y procesos de patrimonialización en el Mercosur* (pp. 45-62). Fundación Facultad de Humanidades y Ciencias Sociales, UNaM.

Rosenberg, D. (2013). Data before the fact. En L. Gitelman (Ed.), «Raw data» is an oxymoron (pp. 15-40). The MIT Press.

Ruckstuhl, K. (2022). Trust in Scholarly Communications and Infrastructure: Indigenous Data Sovereignty. *Frontiers in Research Metrics and Analytics*, *6*, 1-9. https://doi.org/10.3389/frma.2021.752336

Shava, S. (2020). Indigenous/tribal Knowledges – Definition and relevance in the Modern era. En D. R. Katerere, W. Applequist, O. M. Aboyade, y C. Togo (Eds.), *Traditional and Indigenous Knowledge for the Modern Era: A Natural and Applied Science Perspective*. CRC Press. https://www.taylorfrancis.com/books/9781351981798

Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples* (2 Ed). Zed Books.

Snipp, C. M. (2016). What does data sovereignty imply: What does it look like? En T. Kukutai y J. Taylor (Eds.), *Indigenous Data Sovereignty* (pp. 39-56). ANU Press. DOI: 10.22459/CAEPR38.11.2016

Tauli-Corpuz, V. (2016). Preface. En T. Kukutai y J. Taylor (Eds.), *Indigenous Data Sovereignty* (pp. xxi-xxiii). ANU Press. https://doi.org/10.22459/CAEPR38.11.2016

Terlizzi, M. S. y Zukerfeld, M.(2022). *Políticas de promoción del conocimiento y derechos de propiedad intelectual: Experiencias, propuestas y debates para la Argentina*. Centro Interdisciplinario de Estudios en Ciencia, Tecnología e Innovación. http://www.ciecti.org.ar/politicas-de-promocion-del-conocimiento-y-derechos-de-propiedad-intelectual-experiencias-propuestas-y-debates-para-la-argentina/

Thomas, D. H. (1976). *Figuring anthropology: First principles of probability and statistics*. Holt, Rinehart and Winston.

Torsen, M., y Anderson, J. (2010). *Intellectual property and the safeguarding of traditional cultures: Legal issues and practical options for museums* (Libraries and Archives). World Intellectual Property Organization. https://ir.lib.uwo.ca/cgi/viewcontent.cgi?article=1279&context=aprci

Tsosie, K. S., Yracheta, J. M., Kolopenuk, J., y Smith, R. W. A. (2021). Indigenous data sovereignties and data sharing in biological anthropology. *American Journal of Physical Anthropology*, *174*(2), 183-186. https://doi.org/10.1002/ajpa.24184

Tuck, E., y Yang, K. W. (2012). Decolonization is not a metaphor. *Decolonization: Indigeneity,*

Education & Society, *1*(1), Article 1. https://jps.library.utoronto.ca/index.php/des/article/view/18630

Turner, H. (2020). *Cataloguing culture: Legacies of colonialism in museum documentation*. UBC Press.

Van Broekhoven, L. N. (2018). Calibrating relevance at the Pitt Rivers Museum. En J. Pellew y L. Goldman (Eds.), *Dethroning Historical Reputations: Universities, Museums and the Commemoration of Benefactors* (pp. 65-79). Institute of Historical Research, School of Advanced Study, University of London. https://doi.org/10.14296/718.9781909646834

Walter, M., Kukutai, T., Carroll, S. R., y Rodriguez-Lonebear, D. (2021). *Indigenous Data Sovereignty and Policy* (1.ª ed.). Routledge. https://www.taylorfrancis.com/books/9780429273957

Watts, J. (2011). Building tDAR: Review, Reduction, and Ingest of Two Reports Series. *Reports in Digital Archaeology*, *1*, 1-15.

Wilkinson, M. D., Dumontier, M., Aalbersberg, Ij. J., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J.-W., da Silva Santos, L. B., Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., … Mons, B. (2016). The FAIR guiding principles for scientific data management and stewardship. *Scientific Data*, *3*(1), 160018. https://doi.org/10.1038/sdata.2016.18

Witze, A. (2019). Disappearing Digital Data. *The Archaeological Conservancy*. https://www.archaeologicalconservancy.org/spring-2019-preview-disappearing-digital-data/

Zukerfeld, Mariano, Liaudat, S., Britto, F., Pereira, M., y Lerena, O. (2022). El financiamiento es de nosotros, las patentes son ajenas. La apropiación cognitiva de las invenciones del sistema de ciencia, tecnología e innovación de la Argentina. En M. S. Terlizzi y M. Zukerfeld (Eds.), *Políticas de promoción del conocimiento y derechos de propiedad intelectual: Experiencias, propuestas y debates para la Argentina* (pp. 212-237). Centro Interdisciplinario de Estudios en Ciencia, Tecnología e Innovación. http://www.ciecti.org.ar/politicas-de-promocion-del-conocimiento-y-derechos-de-propiedad-intelectual-experiencias-propuestas-y-debates-para-la-argentina/