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Perceptions of Digital Libraries with Indigenous Knowledge: An Exploratory Study

Debra Lynn Capponi
dcapponi@yahoo.com

To the Graduate Council:

I am submitting herewith a thesis written by Debra Lynn Capponi entitled "Perceptions of Digital Libraries with Indigenous Knowledge: An Exploratory Study." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Information Sciences.

Bharat Mehra, Major Professor

We have read this thesis and recommend its acceptance:

Suzie Allard, Peiling Wang

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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PERCEPTIONS OF DIGITAL LIBRARIES WITH INDIGENOUS KNOWLEDGE: AN EXPLORATORY STUDY

A Thesis Presented for
the Master of Science
Degree
The University of Tennessee, Knoxville

Debra Lynn Capponi
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Abstract

Interest in indigenous knowledge (IK) research has grown since the 1980s, and more recently the topic has drawn attention in information sciences research. At the same time, the evolution of electronic information and communication technologies (ICTs), most notably development of the Internet, has profoundly influenced information sciences research. This study explores perceptions of community members involved in the creation, development, and use of digital libraries with indigenous knowledge materials. Research methods used in data collection include a quantitative survey distributed to community members involved in the creation, development, and use of digital libraries with indigenous knowledge materials and qualitative analysis of the research process. The study proposes a framework of guidelines to conduct future research on digital libraries with indigenous knowledge that includes: acknowledging the reality of the community involved in creating, developing, and using digital libraries with indigenous knowledge materials; developing appropriate research methods for this community; and identifying specific actions for such research.

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CHAPTER 1. INTRODUCTION

Recent social sciences and humanities literature challenges a prevalent viewpoint from the 1970s that suggests cultural-linguistic diversity must be sacrificed for economic progress. These challenges cite examples where non-local, 20th Century technologies imposed on developing areas have failed to improve, and often have worsened, the economic condition of the rural poor living in these areas, in addition to deteriorating the social fabric of their communities (*e.g.*, Nettle 2000, pg. 155-156; Schoenhoff 1993). In response to the recognized failings of many development efforts that have displaced traditional practices, especially in the context of current debates about sustainability and the environment, interest in indigenous knowledge research has grown since the 1980s, and more recently has emerged as a topic of information sciences research (*e.g.*, Nakata and Langton, 2005; Sukula, 2006; Sen 2005).

At the same time, the evolution of electronic information and communication technologies (ICTs), most notably development of the Internet, has influenced information sciences research. Jane Hunter (2005) reflects the increasing interest in the intersection of these two research foci, as she recognizes "an urgent need to study and evaluate existing IK [indigenous knowledge] projects that employ ICTs to determine the optimum procedures and technologies" (p. 107). Digital libraries containing indigenous knowledge (IK) provide one appropriate subject for such a study by offering insight into the potential role of ICTs in preserving and perpetuating IK. This study explored current perceptions of digital libraries that include indigenous knowledge materials (hereafter "IKDLs") to develop a framework of guidelines for researching IKDLs.

1.1 Problem Statement

IK is usually associated with knowledge transmitted successfully through multiple generations without need of the kind of tangible recordings (in print or other media) typically housed in libraries, archives, and museums. IK is also usually characterized as lying outside of (or excluded from) contemporary, formal school settings (*e.g.*, Battiste, 2005). However, circumstances have interrupted the continuity and dissemination of IK in many places. Formal educational institutions and/or development projects initiated from outside of the indigenous communities they affect often displace traditional practices tied to knowledge transmission and can create a cultural gap. Yupik Elder Paul John/Kangrilnguq expresses consequences of this disconnection in *Nutemllput—Our Very Own* (an AKRSI/Alaska Federation of Natives/ANKN-produced video available on the Alaska Native Knowledge Network Web site): "Our children and grandchildren, who only know the Western culture, seem to be lost. They hear and see our way of life but, because they go to school, they're confused" (AKRSI, 1998; at minute 2:50, English subtitles by Cecilia Martz).

This break in the traditional transmission of knowledge gives rise to at least two conditions for which an information sciences perspective is appropriate in IK research:

1. Evidence that outside technologies or practices may not be as effective as the local practices they displace surfaces *after* displacement, when IK is already in danger of disappearing and requires intentional preservation.
2. The rise in interest in IK often has not accompanied regard for the context or authenticity of the knowledge or for the rights of the communities that have developed and maintained it.

Both preservation and management of information, including issues related to provenance and intellectual property rights, fit within the roles that libraries have served traditionally as institutions of cultural memory (even though historically libraries tend to be associated with limited segments of the world's cultures). The term "preservation" within libraries, including digital libraries, is used most often in the archival sense referring to preserving documents or information objects. However, it can also be used to refer to the broader, less tangible notion of knowledge preservation.

The role of ICTs in both the preservation and appropriation of IK is significant. ICTs represent a proverbial double-edged sword for indigenous communities (and others). On one side, ICTs have posed a threat to the survival of indigenous traditions. Globalization, directed mainly by ICT-proficient and -provisioned cultures, continues to encroach remote indigenous communities and to affect communities that already have experienced a history of unequal trade with non-indigenous groups. Lester and Koehler (2007) cite the United Nations Educational, Scientific, and Cultural Organisation (UNESCO)'s goal to protect "fragile cultures" threatened by the influx of information from outside influences (p. 284); and the UNESCO publication, *UNESCO and Indigenous Peoples: Partnership to Promote Cultural Diversity* (2004), refers to "indigenous traditions, which are generally recognized as a fragile treasure currently under threat from the effects of rapid globalization" (p.10). This "fragility" in large part represents the fact that indigenous communities lie on the deprived side of the digital divide. Håkansson and Deer (2007) list obstacles to indigenous peoples' participation in our "Information Society" dominated by ICTs, including insufficient infrastructure, equipment, proficiency in languages prevalent in the use of ICTs, computer literacy, and training resources (p. 1-2).

These technical obstacles and the limited participation by indigenous communities in our "digital world" can translate into other social and economic vulnerabilities. ICTs not only have the capacity to inundate indigenous communities with outside influences, but they also provide non-indigenous users access to IK. A June 2008 *WIPO Magazine* (of the World Intellectual Property Organization) article opens with the statement: "Indigenous cultures the world round have seen their ritual ceremonies, music, symbols and creative arts imitated, reworked, copied and sold without acknowledgement or authorization, and often without respect for their cultural and religious significance" (Wendland and Van Weelde, paragraph 1). Other literature reports the misappropriation of traditional scientific knowledge, such as instances of "biopiracy," where, for example, companies have applied for and received patents on uses of medicinal plants that have been known to indigenous communities for generations (*e.g.*, Venkataraman and Swarna Latha, 2008). This kind of exploitation does not depend on the use of ICTs, but digital technologies facilitate duplication, alteration, and redistribution of digital items easily and/or quickly, and often less perceptibly than analog items (*e.g.*, Lester and Koehler, 2007, p. 205). Many indigenous communities are sensitive to the vulnerabilities of digitizing information due to a history of dispossession and the prevalence of Western perspectives and values among the agencies that fund and develop ICTs (*e.g.*, Digital Collectives, 2001).

Despite these concerns, ICTs also offer opportunities for preserving and protecting IK. Håkansson and Deer (2007) note that "[a]cess to knowledge through ICTs, and particularly through the Internet, could play an important role for reducing poverty among Indigenous Peoples and improving their education and health situations" (p.2). They also recognize that indigenous communities (and many non-indigenous groups) understand the importance of

indigenous peoples' contributions to the global information society, which should, consequently, also involve them in high-level decision-making and policy-making processes, especially those that affect them. Worcman (2002) expresses a similar vision of the far-reaching potential of ICTs to serve underrepresented populations, including indigenous people. Though she cautions that overcoming the sociopolitical and technological challenges associated with digitizing indigenous resources will be difficult, she suggests that doing so can result in a more democratic and inclusive (and therefore more effective) understanding of what knowledge is.

Wendland and Van Weelde (2008, paragraph 3) look at the use of ICTs more specifically and pragmatically than Worcman, stating that:

> New digital technologies offer a practical means to document, record and digitize expressions of traditional cultures. Such means respond to the strong desire in indigenous communities to preserve, revitalize and promote their cultural heritage, and to pass it on to succeeding generations.

Not only can digital technologies and the Internet lead to greater visibility and awareness of indigenous communities in a global environment, but the flexibility and availability of multimedia formats hold promise for capturing IK, which is often based on oral tradition and experience rather than on linear text.

Hunter (2005) and Stevens (2007, citing Hunter) also focus on practical uses of ICTs in IK projects. They describe examples to demonstrate "the potential of applying innovative technologies to recording, sharing and utilising IK" (Hunter, 2005, p. 97). Hunter discusses "virtual repatriation," which can provide indigenous communities access to their own cultural objects that are currently held by institutions around the world. Virtual repatriation may offer

solutions for communities that do not (at this time) have the resources to address the complexities and expense associated with the return of a physical object to its homeland, especially if its homeland (or residents of it) has become more dispersed than when the object was removed. Hunter (2005) references work being done at the Smithsonian's National Museum of the American Indian (NMAI) to describe virtual repatriation using innovative 2D and 3D scanning technologies, and procedures that direct workflow for these projects (p. 95ff). Both Hunter (2005) and Stevens (2007) provide examples of the use of advanced geographic information technologies to help document indigenous communities' knowledge of their traditional land. Hunter (2005) also provides an example of digital libraries of traditional medicine, highlighting India's Traditional Knowledge Digital Library, which was developed to combat the kind of biopiracy referred to above. The bulk of Hunter's article, however, is devoted to describing the IKM (Indigenous Knowledge Management) software system developed by DSTC (Distributed Systems Technology CRC) in collaboration with the NMAI, and "designed as a low-cost, simple robust system to enable Indigenous communities to manage their own digital collections within local Indigenous knowledge bases" (p. 100).

The IKM system's goal—to enable indigenous communities to manage their own digital collections—points to the heart of the debate regarding the challenges and opportunities of applying ICTs to IK. Most of the literature reviewed for this research articulates the importance of indigenous communities retaining control of their own knowledge in the digital realm. The rationale for creating an IKDL must come from the indigenous community's perspective. Worcman (2002) poses important questions to address when considering *why* IK digitization projects are undertaken:

> Will digitizing the culture or history of these collective entities in fact include the communities in the process of formation and diffusion of their knowledge? Or will the digitization process simply reproduce the western conception of storing in "museums and libraries" what those in the west deem to have cultural value? . . . It is undeniable that when the oral traditions of a community without a written language are recorded, that community's history will be preserved. But preserved for whom? (paragraph 11)

The Digital Collectives in Indigenous Cultures and Communities meeting held in Hilo, Hawaii, in 2001 “brought together a representative group of about 35 invitees to discuss needs, challenges, and opportunities in research, development, and application of digital collectives … in indigenous cultures and communities” (Digital Collectives, 2001, p.2). The report of the meeting includes several references to the role that indigenous people must play in any plan to introduce ICT-based projects into their communities. For example, the Information Technology Needs section explicitly states that “[c]ommunities must have ownership of their culture. Communities are the guardians of their cultural values, . . . They must also have knowledgeable IT people in their communities,” and that “Indigenous peoples, traditional leadership, and elders are absolutely central to any information technology plan” (Digital Collectives, 2001, p. 5). The report ends with a Questions and Implications section that begins: “Only indigenous people can consider their cultural values and decide what is appropriately instantiated in digital media. Only they can determine the degree to which they will participate in information technologies” (Digital Collectives, 2001, p. 10). One of the biggest challenges identified by attendees was how to finance and implement projects while retaining cultural integrity. The report calls on funding agencies to support “successful” projects by addressing these questions:

> How can they recognize success? How can they be as flexible as possible, yet follow the guidelines of their institutions on how and when to disperse funds? How can they avoid instilling the Western style and values on indigenous communities? (Digital Collectives, 2001, p.10)

The Hilo meeting report and review of information sciences literature concerning IK (*e.*g., Toong Tjiek, 2006; Sukula, 2006; Hunter, 2005; York, 2002) demonstrates the emergence of IKDLs. They also identify many challenges that must be met in order for these projects to maintain cultural integrity and achieve success. However, specific theories and procedures suggesting how to meet these challenges (beyond descriptive examples) are less prevalent in the literature, and formal evaluations to identify "successful" digital indigenous projects are lacking all together.

How does one identify a successful IKDL? The literature suggests that success must be determined according to the indigenous communities involved, but how is this done, especially given that most ICTs are developed and evaluated according to "non-indigenous" standards? The challenges and opportunities cited in the literature provide a start. They demonstrate that, though each indigenous community is unique with its own needs and goals, there are some similar or overarching concerns and expectations among indigenous populations regarding the application of ICTs to their own knowledge, such as concerns about misappropriation and mechanisms for ensuring community leadership in planning. The report of the Digital Collectives meeting (2001) states: "The conclusion of the Hilo attendees is that a *global approach* is critical in considering information technology in indigenous communities" (p. 10, emphasis added) and identifies "digital library builders" among the groups specifically called on to define the "grand vision" for

the approach.

Developing best practices—the “grand vision” and “global approach” cited at the Hilo conference—for IKDLs requires an understanding of existing IKDLs. This study explored the experiences and perceptions of community members involved in the creation, development, and use of IKDLs. The study assumed that there is a diverse community involved in IKDLs, but one with common interests, such as the interests identified at the Hilo conference (Digital Collectives, 2001).

1.2 Research Question

This research proposes a framework of guidelines for researching IKDLs by addressing the following research question: What can be understood from the experiences and perceptions of community members involved in the creation, development, and use of digital libraries with indigenous knowledge materials? This includes the community members’ perceptions of the involvement of information professionals in activities related to the creation, development, and use of IKDLs.

1.3 Research Methods

This study employed both quantitative and qualitative methods to address the research questions. An anonymous online questionnaire (Appendix B) gathered feedback regarding participants’ experiences and perceptions of IKDLs and their perceptions of activities information professionals should pursue related to IKDLs. Issues encountered while the research was being conducted influenced the direction of the research and warranted qualitative analysis

of the research process itself. Analysis of the research process provided insights to understand the outcome of the research, including low response to the survey. Reflection on the research process offered guidelines for conducting similar studies. Analysis of the survey and research process led to the development of a framework for researching IKDLs.

1.4 Research Significance

Webster's (2005) annotated bibliography demonstrates development within information sciences literature (dating as early as the 1930s) from a focus on information services (or lack of services) for indigenous populations to a wider focus including the need for greater representation of indigenous perspectives and knowledge in libraries and archives. However, published studies about how to meet the need for greater indigenous representation, and how to recognize when it is met, are still wanting. This gap suggested that the information sciences need more information to guide research on representations of indigenous knowledge in libraries, including IKDLs.

Literature cited in earlier sections of this document points to interest in applying ICTs to the communication and preservation of IK. Other indicators of this interest include the emergence of IKDLs (such as the National Library of Australia's *Mura Gadi* gateway (at www.nla.gov.au/apps/muragadi) and the NMAI's *Indigenous Geography* project (at www.indigenousgeography.si.edu/)), and conferences like the 2003 International Conference on Asian Digital Libraries, "Digital Libraries: Technology and Management of Indigenous Knowledge for Global Access." However, the literature currently lacks surveys or systematic approaches to describe and/or evaluate IKDLs beyond descriptions of individual projects. A

framework of guidelines for researching IKDLs can help attain a more comprehensive view of IKDLs and to understand how effective they are and can be.

This study investigated perceptions of IKDLs by focusing on criteria that relate specifically to the characteristics of IK. The survey aimed to collect data that would help guide future research and work toward the desired "global vision" expressed at the Hilo conference (Digital Collectives, 2001), a vision that identifies best practices for designing and developing digital libraries that serve the indigenous communities whose knowledge is being digitized.

1.5 Research Limitations

The research was exploratory, with the goal of providing a broad view of IKDLs to help guide future, more in-depth research. The survey was designed to collect data from a sample of the community involved in the creation, development and use of IKDLs and analyze it for trends that could be tested in future studies. The small sample provided ideas to consider for future research, but the data collected is not generalizable beyond the sample.

Qualitative analysis is limited to the research process for this particular study but offers insights that may apply to other research on IKDLs or other studies of IK.

1.6 Research Vocabulary

Digital library–For the purposes of this research, "digital library" assumes an inclusive, conceptual meaning rather than identifies specific technical requirements. Though it adopts a broad view of the term, this research defines "digital library" as meeting the following criteria:

- It is a self-identified (that is, named) organization that supports the creation and preservation of a collection or collections of digital materials, and provides access to them.
- Its content is distributed through an electronic network, though not necessarily through the Internet.

Section 2.1, Digital Libraries, discusses the wide variety of concepts and projects referred to as digital libraries, and elaborates the perspective informing use of the term for this research.

Indigenous knowledge (IK)–The definition of IK for the purposes of this research draws heavily from Schoenhoff (1993, p. 10). IK is the shared customs (including language), experience, information artifacts and technology of a local community that has evolved in a particular environment or ecology. Section 2.2, Indigenous Knowledge, elaborates the distinction between IK and other kinds of knowledge for the purposes of this research.

IKDL—This acronym stands for "indigenous knowledge digital libraries," which, for this research, refers to a digital library that includes indigenous knowledge materials. IKDLs may include non-indigenous materials, but part of an IKDL is dedicated to indigenous knowledge that fits the definition above.

IKDL community members—"IKDL community members" (envisioned by this research) refers to professionals involved in the creation, development, and/or use of digital libraries that include indigenous knowledge materials. The use of "professionals" in this definition reflects the groups

surveyed for this research, whose members could include staff of libraries, museums, and cultural centers; teachers and professors; archivists; and digital library developers. The specific groups invited to participate in this study are described in Section 3.2.4: The Context of Study: Research Participants, and represent only a small sample of IKDL community members (that are assumed by this research); the boundaries defining IKDL members would be impractical or impossible to determine.

CHAPTER 2. THEORETICAL FRAMEWORK

Though the development of digital technologies, most notably the Internet, has spurred much discussion about their impact, there is little debate that the proliferation of electronic data has changed how people think about the way information is communicated, retrieved, and stored and organized, and how people interact with it (*e.g.*, Chu 2003). While practitioners grapple with the growth in production of and demand for "instant" information, the possibilities of providing large audiences in distant locations access to a variety of content and services continue to be explored and expanded, and the effects of Web 2.0, which has blurred the line between producers and users of information, continues to be analyzed (*e.g.*, Lester and Koehler 2007, p.101; Krannich 2004/2007).

Indigenous communities, like others, are affected by digital technologies, but their role as participants in the digital information environment proportionately has been limited or passive due to the obstacles listed by Håkansson and Deer (2007), cited above, including lack of infrastructure and computer literacy. This research acknowledges the importance of the emergence of IKDLs and their study based on the literature cited in the previous Chapter. This research also shares the perspective expressed by Worcman (2007), that IKDLs should serve the social values of the indigenous communities rather than satisfy academic purposes. (Worcman (2007) notes that the former democratizes knowledge while the latter results in repeat of the same kind of appropriation of culture that has occurred with indigenous physical property.)

2.1 Characteristics of Digital Libraries

Digital libraries inhabit the confluence of both the concerns and the promise associated with the rapid evolution of electronic ICTs: They address the complexities of our information landscape by employing many of the same ICTs that have contributed to the complexity. Much has been written about the lack of a definitive understanding of "digital library" and the consequences and challenges for researchers resulting from myriad uses of the term. Borgman (1999) identifies differences between research-oriented and practice-oriented definitions, suggesting that most researchers define digital libraries in terms of databases with content and a technical infrastructure that focus on the information needs of a specific user community. Practitioners, however, tend to hold a broader view of digital libraries as institutions or services that provide the resources (including staff) necessary to support use of digital content and may serve more than one community.

In the decade since Borgman's article, definitions for digital libraries have continued to be offered. However, there is still no consensus on a single meaning of the term. Researchers generally take care to define their use of it. The Digital Library Federation (DLF)'s (2004) current working definition for "digital library" is the same 1998 definition quoted in Borgman's article (and attributed to D.J. Waters), which aligns with the broader "practitioner" definition:

> Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities.

DLF elaborates the context of this definition, stating, "it is meant here mainly to suggest that there is a set of attributes that gives coherence to the concept of digital libraries. These attributes include functions of collection, organization, preservation, access and economy" (DLF, 2004). Though intentionally comprehensive, DLF's definition, and most others, exclude the World Wide Web from being a digital library because the World Wide Web lacks formal standards by which to identify the organization, selection, or integrity of content or any specific user community or purpose.

When focusing on the digital library from Borgman's practitioner perspective, rather than the more technically focused researcher perspective, digital libraries might be conceived in terms of three important components to consider when proposing a digital library: purpose, boundaries, and nature of items. (These components were adopted from a digital library course lecture.[1]) A digital library should have a recognized purpose, such as education, resource sharing, or increasing access.

A digital library's boundaries determine the content based on audience and priorities, so boundaries are closely tied to purpose. Boundaries and audience include issues of access, with policies regarding, for example, whether collections are restricted to certain individuals based on membership or subscription; which language(s) will be used for access and retrieval, and which are represented in the content; and guidelines for the conservation of digital objects.

The nature of the items refers to whether the digital library includes digitized analog items, born-digital items, third-party data resources, and/or Internet access to networked

[1] These refer to the three "Questions for DL Creation" presented by Dr. Suzie Allard during the March 10, 2009, class meeting of IS565: Digital Libraries [online DE]: What is the purpose of the DL? What are the boundaries of the collection? What is the nature of your items?

information. These item types appear in DLF's list of proposed documentation on library practices in developing digital library collections (Greenstein, 2004). A digital library could include a combination of types, and in the case of IKDLs is likely to include digitized analog items or born-digital items. Born-digital items have no analog equivalent and point to technological possibilities offered within digital libraries, not only by providing a non-linear structure through which data can be disseminated or accessed, but also providing opportunities for multimedia resources (including sound and images) and user interactivity with resources.

One more important characteristic of digital libraries distinguishing them from traditional libraries is the interface. As Cool (2000) states, "digital libraries require new forms of information retrieval systems to effectively assist users to find the information they need in multimedia, heterogeneous collections that they are interacting with at a distance" (pg. 63). The interface, according to Buttenfield (1999), is a significant disadvantage compared to a traditional library with a reference librarian who can "sense, respond to, and interact with a user's elation, confusion, or frustration" (pg. 42).

2.2 Characteristics of Indigenous Knowledge

The term "indigenous knowledge" presumes a distinction from other kinds of knowledge. M. Nakata, Byrne, V. Nakata, and Gardiner (2005); Stevens (2007); Nwagwu (2007) and others have identified differences between IK and the information that libraries traditionally preserve and organize. *Table 1* summarizes and synthesizes their ideas by contrasting general characteristics of IK with "Global" knowledge. "Global" knowledge in this context refers to the widely recognized system of knowledge (supported by ICTs) that currently emphasizes Western

Table 1: Indigenous knowledge compared to "Global" knowledge

Indigenous knowledge	"Global" knowledge
• Often based on oral tradition—language, memory, and traditions	• Documented—written or recorded authority
• Community "ownership"—transcends an individual lifetime	• Individual(s) ownership
• Often misrepresented as historical or past rather than contemporary and evolving	• Often misrepresented as a current "evolution," replacing oral traditions
• Belonging to dispersed, constrained communities (local or regional)	• Belonging to global, subsuming community
• Holistic	• Discrete, specialized
• Multiple unique forms	• Single, widely acknowledged system

and Eurasian perspectives and information management techniques or organizational practices. The characteristics of "Indigenous knowledge" in *Table 1* do not apply in every situation; the term is used to refer to knowledge systems of widely varied communities from widely varied ecological and cultural settings.

José Martinez Cobo (1993), Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities, notes "[i]t may also be seen that subjective elements (self-identification and acceptance) are gaining ground as important criteria for definition" [of indigenous] (p. 5). This element of self-identification, where an individual recognizes belonging to a group, and the group recognizes and accepts the individual, can be extended to suggest that indigenous people also recognize IK that is "theirs," or that belongs to their group, which is related to the community "ownership" identified under "Indigenous knowledge" in *Table 1*.

2.3 Digital Libraries with Indigenous Knowledge Collections

Assessing the effectiveness of a digital library requires some mechanism for understanding it in comparable terms. Given the difficulties in establishing a single definition for the term “digital library,” this is a complex undertaking. Cool (2000) suggests a first step toward evaluating digital libraries is to look at the different types of existing digital libraries (pg. 64). She develops a typology that mirrors “traditional” (physical rather than virtual) libraries and includes national, state, public, and academic digital libraries. She also adds the growing number of “special libraries” as a type of digital library and suggests a separate typology for this vast “special library” category based on sponsorship or affiliation, such as digital libraries affiliated with government agencies. IKDLs would likely be grouped in Cool’s “special libraries” type, but they could be categorized according to criteria other than sponsorship or affiliation, such as purpose, intended audience, geographic region, or extent of coverage (in terms of size and scope). Any decision regarding how to categorize digital libraries will shape perceptions of the libraries by suggesting *a priori* classifications.

This research explored the use of different typologies and reviewed the merits and practicalities of each. The review revealed that the special characteristics of IK do not fit well within discrete boundaries (as is perhaps true for many sources of information), and present some other challenges as well. These issues are addressed more fully in the next chapter’s discussion of the process of selecting the research methods used in this study.

CHAPTER 3. METHODOLOGY

This exploratory study aimed to provide a basis for further research of IKDLs to address a perceived gap in studies of IKDLs in information sciences literature. This study employed quantitative and qualitative research methods to collect data about IKDL community members' experiences and perceptions of IKDLs and their perceptions of information professionals' involvement in IKDLs.

3.1 Selecting Research Methods

Reference to IKDL community members implies the assumption that there is an IKDL community with some level of cohesion or consistency in terms of interests. This assumption helped determine this study's research questions and research methods. More than one research method was considered and integrated during the process of clarifying the research topic and developing research questions, and while conducting the actual research. Considering research methods was a part of this study's research process and played a role in shaping its outcome. The methods considered included: documentary analysis of IKDLs, case study of an IKDL, qualitative interviews, and quantitative survey. Selecting which methods to employ among those considered involved an assessment of the benefits and limitations of each according to the goal of the research. Sections 3.1.1 through 3.1.5 discuss the perceived benefits and limitations that led to selection of the methods used for this study.

The goal of the research was to provide an overview of IKDLs that could serve as a starting point for further research. With this goal in mind, the researcher determined that the

study's method(s) should: 1) collect data that helps fill the gap in IKDL research between descriptions of individual IKDL projects and theory; 2) draw on the knowledge of IKDL community members to minimize the researcher's biases and limited awareness of existing IKDLs; and 3) support a project of appropriate scope for a master's thesis. Both qualitative and quantitative methods can be applied that fit these parameters. Qualitative methods can collect the kind of rich data usually associated with exploratory research, data that can lead to discovery of important unknown or unanticipated phenomena related to the research topic. Quantitative data can reveal general trends that can provide a starting point for more in-depth research (when the researcher has determined already the kind of data or phenomena she is interested in studying about the topic based on, for example, review of the literature, experience, or other information).

3.1.1 Documentary Analysis of IKDLs

Punch (2005) notes that social science studies sometimes rely solely on analysis of documentary data (p. 184). Documentary analysis of IKDLs was the first method considered for this study and had practical appeal. Many IKDLs are available online, each providing different sources of documentary data that may include: the content of the collections, usage reports and statistics, and administrative information (such as mission statements and staff roles). Much of this data and could be analyzed from a home computer. Also, this method would not require locating research participants or getting IRB approval. However, it would require establishing categories for comparing the IKDLs, and no such categories appear in the literature. Attempts to establish categories for this study proved unsatisfactory. IKDLs do not fit categories established for other types of digital libraries or libraries in general, in part due to holistic nature of IK, which straddles multiple disciplines, but also due to the complex status of IK when placed in a

"global knowledge" context (depicted in *Table 1*): Perceptions of what constitutes a "reliable" source of information from the "global knowledge" perspective often do not (or should not) apply to IK. The non-traditional boundaries that define reliable producers or verifiable sources of IK information create additional challenges for categorizing, evaluating, and even locating IKDLs. Ultimately, this method seemed to highlight the researcher's biases and would limit the study to IKDLs the research already was aware of, as there would be little input from other sources to determine which IKDLs were analyzed and how they were categorized for analysis.

3.1.2 Case study of an IKDL

Case study of a specific IKDL represented another potential research method. A case study can provide in-depth insights regarding one IKDL that may be tested for broader applicability in others. However, while case study can gain details about one example, it sacrifices a broad view encompassing several examples. Also, no appropriate subject for a case study existed near the researcher, presenting scheduling and travel considerations, as case study would require time spent "on site" with developers, administrators, and (hopefully) users of the IKDL, as well as sufficient time learning about the IKDL.

3.1.3 Qualitative Interviews

Semi-structured interviews were also considered for collecting data from IKDL community members. The researcher and her advisor determined 12 to 15 interviews representing around five IKDLs would provide sufficient data for a productive analysis of IKDLs. This method raised concerns similar to some already mentioned, such as how to identify and contact appropriate participants to interview. Selection of participants from IKDLs would be

limited to IKDLs that the researcher was aware of (most located in distant places, including "favored" examples in Australia and Alaska).

3.1.4 Quantitative Survey

A quantitative survey also was considered. Though quantitative surveys cannot provide the depth and detail about the research topic that in-depth interviews and case studies can provide, they can provide more breadth. Surveys can help to collect feedback from a large group of participants and reveal general areas of interest in the research topic that could be explored in greater detail in the future, which would provide the kind of starting point this research aimed to provide.

3.1.5 The Final Selected Research Methods

The study ultimately relied on the survey method described below in Section 3.2 and qualitative analysis of the research process described in Section 3.3. The decision to use these methods stems from the assumption that IKDL community members exist and that the survey would reach members who would complete it. The decision to conduct a survey also reflected the researcher's strong desire to access the knowledge and experience of many IKDL community members. As mentioned, this study was exploratory and addressed a perceived gap in the literature on IKDLs, and the researcher sought a method that gathered input of others to see if it corresponded with her interpretation of the (limited) literature.

As the research unfolded, assumptions shifted, which led to qualitative analysis and the researcher's personal reflections on the research process. Specifically, assumptions about IKDL

community members changed to accommodate issues that arose about who is and is not a part of the community, as is discussed in Chapters 5 and 6.

3.2 Quantitative Research: Descriptive Survey

Quantitative research uses some form of measurement to "give data a numerical structure" (Punch, 2005, p. 24). The survey developed for this research was designed to collect data from IKDL community members regarding their experiences and perceptions of IKDLs and their perceptions of information professionals' involvement in activities related to IKDLs.

3.2.1 Developing the Survey

The survey focused on six criteria that acknowledge special characteristics of IK. These criteria provided the structure or basis of the survey questionnaire; the data collected described the IKDL members' experiences and perceptions of IKDLs and perceptions of information professionals' activities related to IKDLs according the to the six criteria. The questionnaire also was designed to test for possible relationships between:

1. Participants' experiences and their perceptions of the adequacy of IKDLs according to the criteria;
2. Participants' experiences and their perceptions of potential activities for information professionals related to IKDLs. (This relationship, of course, also was based on the criteria identified in this research and any assumptions the criteria imply.); and
3. Perceptions of the digital libraries (#1) and perceptions of the activities for information professionals (#2).

The six criteria established for this research derived from existing documents and guidelines pertaining to the unique characteristics of IK from an information sciences' perspective. Though these documents do not focus specifically or exclusively on IKDLs, they do suggest principles for the appropriate care of IK materials. This section introduces the criteria and four core documents that influenced their development.

Australia has been a leader in information sciences research involving IK. The Aboriginal and Torres Strait Islander Library and Information Resources Network (ATSILIRN) published Protocols for Libraries, Archives and Information Services in 1995 (updated in 2005). The protocols emphasize the need to include indigenous perspectives within library and archival collections, but they focus most attention on the need for libraries and archives to interact with and serve Aboriginal and Torres Strait Islander people. Providing indigenous people access to information, including and especially information about them, and recruiting indigenous people to work in cultural institutions, are key themes in these protocols.

The *Protocols for Native American Archival Materials* (First Circle Archivists, 2007) acknowledge drawing language and ideas directly from the ATSILIRN protocols, and the influence of the ATSILIRN work is evident. The Native American protocols, however, were developed in the context of NAGPRA (the Native American Graves Protection and Repatriation Act, 1990) and concentrate on identifying "culturally responsive care and use of American Indian archival material held by non-tribal organizations" and improving and developing relationships between indigenous communities and the non-tribal institutions holding such material. The protocols follow a format in which each point includes guidelines for both: 1) archives and libraries, and 2) indigenous communities.

The *Digital Collective in Indigenous Cultures and Communities Meeting Report* (2001) records an international meeting of indigenous people, information professionals, and other interested groups (such as funding agencies) to consider the impact of digital technologies on indigenous communities, including opportunities to build indigenous "virtual institutions of memory" that are lacking in the physical world. The report covers three core issues: 1) the technical infrastructure needs of indigenous communities; 2) cultural preservation, including preservation of cultural integrity; and 3) networking to support a unified "indigenous perspective" to address common issues.

The ALA (American Library Association) Office for Information Technology Policy released *DRAFT: Librarianship and Traditional Cultural Expressions: Nurturing Understanding and Respect* (dated March 29, 2009) for comments in preparation for ALA review at the annual conference in July 2009 (currently in Revised Version 7.0, dated 13 January 2010). The document intends to represent "librarian principles concerning the management and protection of traditional cultural expressions" and addresses many of the same themes covered in the documents cited above, such as social context, responsible stewardship, and collaboration. These broad principles—the draft document is a concise four pages—express non-binding responsibilities for both information professionals and local or indigenous communities, and they tie the principles to library values "to provide access to materials without sacrificing individual liberty or respect for cultural differences" (ALA OITP, 2010). To date, the continued revisions have not resulted in consensus among different ALA subgroups or ALA endorsement.

All the documents identified above have the potential to inform the design and maintenance of IKDLs. They suggest the following questions (which have been compiled and paraphrased) to consider when developing or evaluating IK collections.

1. *To what degree are members of the indigenous community involved in the development of IKDLs?*

This is crucial for any IKDL. Community leaders must play key roles in determining how IK is represented in digital libraries rather than serve only as informants for non-indigenous compilers and producers of digital content.

2. *Is there an established community-authentication process?*[2]

This question relates to the first in that it assumes the indigenous community whose knowledge is being documented in the IKDL recognizes a process or procedures by which to authorize or verify the information included in it. This is important and challenging because most IK does not fit the Western notion of individual(s) intellectual property rights. It is shared knowledge. Also, because IK is more holistic and context-dependent, it requires a means for trimming it to fit within the boundaries of a digital library. There is need for agreement on how to make discrete parts from a boundless whole.

3. *Does the collection guard against misappropriation of the IK?*

Concerns about the ease with which digital content, particularly content available through the Internet, can be plagiarized, altered, and/or removed from context are not unique to

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[2] The term "community-based authentication method" is used in the Community Needs section of the Digital Collectives in Indigenous Cultures and Communities Meeting Report (2001) in discussing how projects undertaken by a community need to understand and honor intellectual property rights.

indigenous materials, but many indigenous communities are especially aware of and concerned about misappropriation of cultural knowledge as many have historically experienced the negative consequences of an imbalance in the trade of cultural knowledge and resources.

4. *Does the collection demonstrate sensitivity in representing potentially offensive or upsetting material?*

This question addresses two related concerns: one associated with technology, and the other associated with making historical information available. In some communities, images and audio of, or direct references to, deceased ancestors can be traumatic or upsetting to people in that community. Collections recording the wisdom of indigenous community members that are made widely available on the Internet or in other digital collections that may be accessed for casual browsing should take care in how they present these recordings, images, and texts. For example, the home page of the Ara Irititja Project (of SA, Australia) displays the following alert in both the Ananngu language and English (English version): "Be Careful! Ara Irititja contains pictures and voices of Pintjantjatjara and Yankunytjatjara people who have passed away" (Ara Irtitja, 2007).

The second concern raised in this question acknowledges the reality surrounding much of the historical information about indigenous people, which was recorded by non-indigenous people, principally uninvited colonizers. Though this historical information can be informative and valuable for indigenous people seeking to learn more about ancestors and their culture, depictions of indigenous people in these histories are often inaccurate and inappropriate or offensive (stemming from superficial concepts like "the noble savage" and worse).

5. *Does the collection allow for special access to special content, such as password-protected access to sacred or secret knowledge?*

This attribute is explicit in the documents listed above. It is necessary to prevent widespread access to information that has the potential to make a community vulnerable. Communities should control access to sacred or secret information, digital or otherwise.

6. *Does the collection accommodate indigenous perspectives through alternative formats and access methods?*

As with any collection, developers of digital libraries should consider the search styles and perspectives of the intended users. Any indigenous collection should accommodate the perspectives of the indigenous people who provide the content for the collection, even if there are cases where the community is not the primary intended audience. An obvious reason for this is that consideration of indigenous perspectives is necessary in any representation of IK that aims for accuracy. This condition also relates to a situation mentioned in the fourth question regarding inappropriate depictions of indigenous people in historical documents: Indigenous people need to be able to access information published about them (and, in an ideal world, would be consciously involved in producing the information).

From the perspective of this research, these six questions represent six criteria that should be addressed in IKDLs.

The questionnaire (Appendix B) developed for the survey reflected the criteria and comprised primarily scaled response questions but also included optional open-ended questions that gave participants the opportunity to provide more detailed feedback. It also collected demographic data and asked participants to identify a digital library with IK.

The questionnaire comprised three main parts. The first part asked participants to identify an IKDL and describe their use of it, and then asked participants to gauge the adequacy of the library according to each of the six criteria. Questions in the first part of the questionnaire focused on gathering data about perceptions of the adequacy of existing IKDLs and are oriented toward recording perceptions of the current state of the digital libraries.

The second part of the questionnaire asked participants to gauge the importance of potential activities for information professionals to pursue related to the six criteria. These questions focused on gathering data about perceptions regarding activities for information professionals as they relate to IKDLs in general, or as a theoretical concept, rather than as a specific, existing digital library. Questions in the second part of the questionnaire record current perceptions but also include a future orientation in that they are perceptions reflecting possibilities or ideals.

The final part of the questionnaire asked for background data (such as education and ethnic identity) to provide context and a sense of the participants' experiences.

3.2.2 Administering the Survey

Collecting the data through survey required Institutional Review Board (IRB) approval. According to the IRB-approved protocol for this research, participants accessed an online packet comprising: 1) a consent form, which informed participants of their rights, procedures to ensure confidentiality, and the purpose of the study (Appendix A); and 2) the questionnaire (Appendix B). The survey was built and administered on the University of Tennessee-Knoxville survey server using SPSS's mrInterview Web survey tool.

A combination of self-selected and snowball sampling techniques were used to locate participants. Invitations to participate in the research included a link to the online survey and were distributed through discussion lists and email (as specified in Section 3.2.4, below). The invitations encouraged sharing the survey information and link with other potential participants. This kind of nonprobability sampling was appropriate for the following reasons:

1. The research was exploratory. It intended to gain insights suggesting avenues for further research rather than provide sophisticated statistical analysis of a topic already established and documented through other research.
2. The specialized nature of the topic suggested a specialized, relatively small target population, but one that covers a wide geographic area and range of disciplines; potential participants were scattered through a complex of networks that would be difficult or impractical for the researcher to access to contact participants individually.

The research procedures adopted in this study included the following: Each posted or emailed announcement and invitation to participate included a link to the anonymous survey. The first announcement identified one of the discussion lists by name and represented it as the pool of potential participants. However, after the announcement was posted, a posted response to the announcement raised concerns to the discussion list regarding the use of the survey. Procedures for conducting the survey were modified to address these concerns. These modifications were:

1. The researcher removed the name of the discussion list from the informed consent statement.

2. The researcher sent a portable document format (.pdf) document with the text of the questionnaire to the discussion list to allow members to view the questionnaire easily and at their leisure before accessing the online survey.
3. The researcher extended the potential pool of participants by sending announcements/invitations to participate to additional organizations (described above in Section 3.2.4).

(These modifications did not contradict the IRB-approved protocol.) A response was posted to the discussion list to make potential participants aware of these modifications and to reemphasize that the survey supported exploratory, independent research that would be recorded in a master's thesis.

3.2.3 Data Analysis

Mathews (2007) lists among the uses of a descriptive survey: explaining characteristics of a population, and testing for possible relationships in the data (p. 62). The survey developed for this study collected data to describe perceptions of the population with knowledge about the creation, development, and/or use of IKDLs (IKDL community members). Responses were analyzed for trends in the perceptions. This simple analysis counted the frequency of scaled responses for each question and weighted the responses to calculate perceived importance.

The survey also was designed to test for possible relationships. The six criteria established for the research represented variables, allowing the possibility to reveal potential links between:

1. Participants' experiences and characteristics and their perceptions of the adequacy with which the digital libraries they identified addressed each criterion.

2. Participants' experiences and characteristics and perceptions of activities of information professionals to pursue in addressing each criterion.
3. Participants' perceptions of the adequacy of the digital libraries, according to the criteria (#1 above) and their perceptions of the activities of information professionals, according to the criteria (#2 above).

The established criteria, in theory, also allowed the possibility to reveal potential relationships between perceptions of the criteria themselves. For example, were digital libraries perceived as being adequate according to one criterion, such as guarding against misappropriation of IK, also perceived as adequate according to other criteria? Or: Did strengths in one area correlate with weaknesses in another? However, the low response to the survey did not provide enough data to reveal correlations.

3.2.4 The Context of the Study: Research Participants

Following the IRB-approved protocol and through the design of the online survey, participants remained anonymous. Participants were solicited through discussion lists and direct email. The announcement and invitation to participate was posted to the discussion lists of the American Indian Library Association (260 subscribers) and to the Interinstitutional Consortium for Indigenous Knowledge (428 subscribers), which is a Pennsylvania State University-sponsored network that is part of a global network of IK resource centers. The researcher subscribes to both discussion lists and communicated with the discussion list administrators prior to posting the announcement of the research but did not communicate with the other subscribers beforehand and was did not post regularly to either list.

The announcement/invitation also was emailed to contacts of organizations demonstrating experience with IKDLs, including: the Alaska Native Knowledge Network headquartered at the University of Alaska, Fairbanks; a Native American digital collection of the University Libraries at the University of Washington; a joint online project of the University of Utah and the Utah Department of Community and Culture; the Library of Congress's American Folklife Center's digital assets department; an independent group of tribal members that has published tribal culture and history books and maintains a IKDL hosted by NativeWeb (which is an international nonprofit organization that promotes indigenous issues and resources through telecommunications); another independent organization affiliated with NativeWeb that partners with tribes and indigenous groups and maintains an IKDL; a Native American archivists organization; and North Carolina's Exploring Cultural Heritage Online (ECHO) project. Dissemination of the announcement targeted potential participants in the United States, but the survey was not limited specifically to participants within the United States.

3.3 Qualitative Research: Reflection on the Research Process

Observations during the research process, especially low response to the survey, influenced the direction of the research and warranted qualitative analysis of the research process. Denzin and Lincoln (2005) offer a "generic definition" of qualitative research in which "qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" (p. 3). In this case, the study itself unfolded in such a way that it became a phenomenon worth interpreting to make sense of its outcome.

While quantitative research measures things (amounts, intensity, frequency, etc.), "[q]ualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry" (Denzin and Lincoln, 2005, p.10). Qualitative research acknowledges that research itself will shape understanding of the subject of study. It therefore focuses attention on the wide range of data sources that can be examined to try to better understand the complex relationships involved in social phenomena being studied.

Qualitative research can accommodate several perspectives and methods. Grounded theory works well with the qualitative aim of studying things in their natural settings, especially when they are unanticipated or emerge in unanticipated ways, as in the case of this research process. Rather than using deductive methods to test hypotheses derived from a general theory, grounded theory represents an inductive approach that "begins with observations and then proposes patterns, themes, or common categories" (Babbie, p. 283). Grounded theory relies on multiple sources of data (hopefully many different observations) from which to glean patterns or themes that provide a richer understanding of the subject of study. A variety of methods can be used to gather the data.

Analysis of this particular research process examined data including general feedback regarding the research and announcement of the survey; feedback provided through the survey questionnaire, especially in open-ended responses; and perceived response patterns. These observations represented indicators that were extrapolated and expanded by including other indicators drawn from the researcher's personal experiences while conducting the study and reviewing the literature, and reflection on the nature of the research topic and goal of this

particular study. This “from the ground up” analysis revealed three themes that not only provide insights for understanding the outcome of this particular study, but also represent important considerations for other studies. The research process itself became grounds for analysis and reflection that offered guidelines for conducting similar research.

Self-reflection and reflection on research, which is often associated with practitioner research such as conducted by educators and social workers (*e.g.*, Herr and Anderson, 2005, Fook and Askeland, 2007), can be applied in studies like this one. The researcher’s critical reflection on research and research assumptions, and on personal experiences within the social context of the study (Fook and Askeland, 2007) can provide understanding of an experience that has implications for the researcher’s future work and may have implications for other researchers. In this case, the researcher’s experience during this particular research process is described to provide insights for conducting other similar research.

CHAPTER 4. QUANTITATIVE ANALYSIS OF THE ONLINE SURVEY

Quantitative analysis was based on 13 completed survey questionnaires. The limited response to the survey did not provide sufficient data to reveal correlations in the data or generalize findings. However, the analysis did reveal trends within the sample that can be extended to other studies for further testing. Response to the survey also provided insights on how to conduct similar studies in the future. (Analysis of the study's qualitative research follows in Chapter 5). Two general observations based on the survey results were:

1. Participants as a group reported uncertainty about the digital libraries they use in terms of the six criteria established for this research.
2. Participants demonstrated more certainty about the theoretical activities of information professionals in terms of the six criteria.

4.1 Participants Profile: Use of IKDLs

Participants were contacted though discussion lists and email as described in Section 3.2.2 and 3.2.4. The first part of the questionnaire asked participants about their use and perceptions of an existing IKDL. The first question asked them to identify an IKDL that they use or had used, and the second composite question asked them to characterize their use of that digital library. The only parameters guiding participants' selection of an IKDL were the broad definitions for "indigenous knowledge" and "digital library" provided in Chapter 1.

As might be predicted, the digital libraries identified by participants varied in content, purpose and intended audience. They included IKDLs developed and maintained by an

international nonprofit organization, university systems, and an independent group of tribal members, and they often also represented collaborations. Some had a geographical focus, such as the state of Utah. Others had a thematic focus, such as educational resources or legal information.

The reported roles that the participants assume while using the digital libraries also varied. Participants were asked to identify the different roles they assumed while using the IKDL, which could include non-professional roles (such as "student" and/or "seeker of information for personal use"). Responses generally suggested that the participants use IKDLs while performing tasks for their own purposes more often than helping others fulfill information needs. *Figure 1* depicts the breakdown of the reported roles participants assume when using the IKDL they identified. When asked to indicate how frequently they use the digital library while assuming specific roles listed in the questionnaire, nine of the 13 participants identified "researcher," and seven of those nine indicated they used the digital library as a researcher *at least* once a month. All but two of the participants said they used the digital library as a "seeker of information for personal use." Conversely, nine of the participants indicated they never use the digital library as a librarian or library assistant, and those who did used it in this role once a month or less frequently. However, two roles identified in the open-ended response to Question 2 were: "referring others to it as a source of information" and "curriculum coordinator," roles that help "referring others to it as a source of information" and "curriculum coordinator," roles that help fulfill others' information needs. Five participants indicated that they have used the library as a teacher, and five indicated that they used it as a student. Two additional roles identified in open- ended responses were "Consultant for Tribes" and "Networking" which could involve

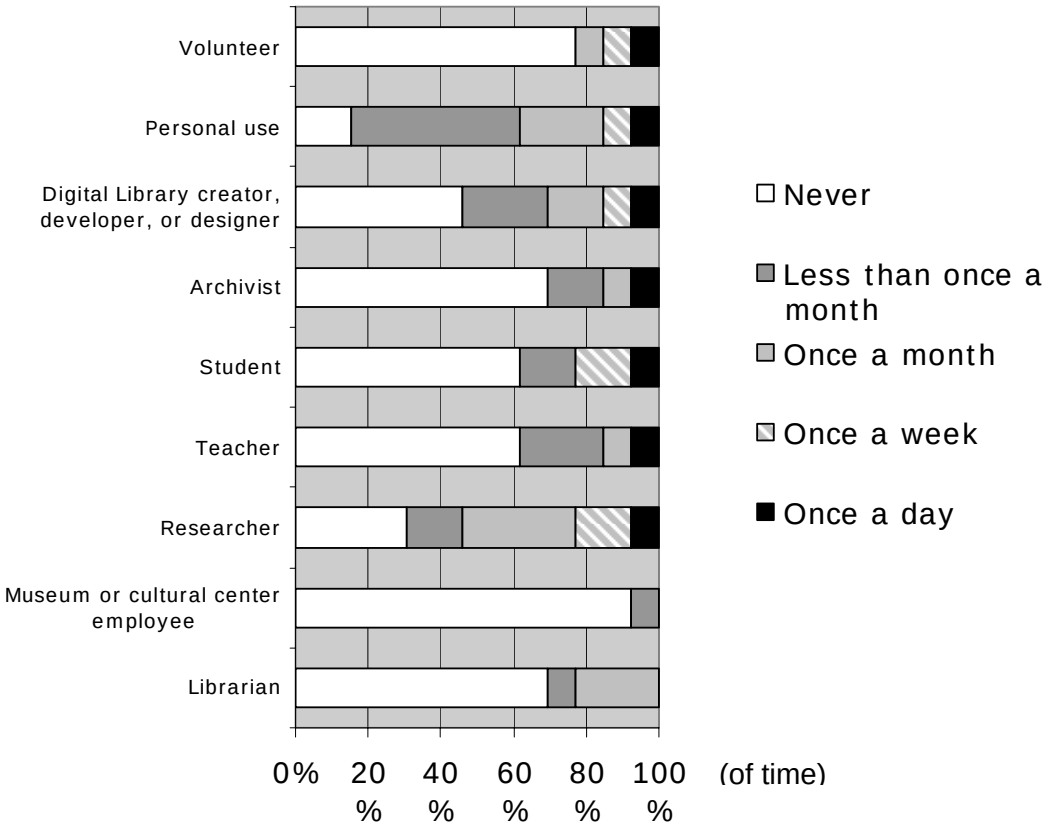

Figure 1: Breakdown of roles participants assume when using IKDL

fulfilling others' information needs. Another role with moderately frequent use (with seven of the 13 participants identifying it) was "Digital library, creator, developer, or designer," a role that covers its own area in serving both the participant's purposes and, presumably, the information needs of others.

4.2 Perceptions of IKDLs

Questions 3 and 4 asked participants about their perceptions of the IKDL they identified in Question 1. Question 3 asked participants to indicate their level of agreement with statements concerning their reasons for using the digital library (such as "quality of content" and

"convenient access") using scaled responses ranging from "strongly disagree" to "strongly agree" or "not sure" if they did not have sufficient information to respond using the scale. Question 4 asked participants to indicate their level of agreement with six statements using the same scaled responses or "not sure" if they did not have sufficient information to respond using the scale. Each statement in Question 4 asked about adequacy of the digital library according to one of the six criteria established for this research. *Table 2* shows the distribution of the 13 responses for each question.

4.2.1 Findings

When asked to gauge their reasons for using the IKDLs, "convenient access" was selected most often as a strong reason among the choices presented. The other choices (which related to the digital library's content matching their needs, the quality of content meeting their expectations, and reasonable costs associated with using the digital library) also were strong reasons for some of the participants. However, one participant specifically disagreed that content matching need was a reason for using the digital library, and two participants disagreed that quality of content meeting expectations was a reason for use.

4.2.2 Analysis

Participants' as a group reported uncertainty about how the digital libraries they use address the special characteristics of IK according to the six criteria established for this research. *Table 2* shows the high incidence (33.3%) of "not sure" responses to the six statements presented to gauge adequacy of the digital libraries according to the criteria. Also, though each of the

Table 2: Distribution of responses to statements about adequacy of IKDLs

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	Not Sure
Indigenous community leaders have adequate involvement in developing the digital library's indigenous knowledge content.	1	1	0	5	1	5
The digital library identifies how it authenticates its indigenous knowledge.	1	3	2	3	1	3
The digital library adequately guards against misappropriation of its indigenous knowledge.	1	2	3	2	0	5
The digital library adequately addresses potentially insensitive content (*e.g.*, images of people who are deceased, or inaccurate historical portrayals of indigenous people).	1	0	2	3	1	6
The digital library adequately protects sacred materials.	1	0	1	5	1	5
Indigenous users can easily search, browse, locate, and use their community's indigenous knowledge materials in the digital library.	1	1	0	4	5	2
Totals:	6 (7.7%)	7 (9.0%)	8 (10.3%)	22 (28.2%)	9 (11.5%)	26 (33.3%)

participants selected the digital library that he or she focused on to respond to the statements, less than 40% of the responses indicated that the digital libraries adequately addressed the six criteria (measured by recording “agree” or “strongly agree” with the statements). This may have indicated that the statements did not reflect priorities or relevant criteria from the perspective of the participants. However, the participants’ perceptions of the theoretical activities for information professionals to pursue according to the same six criteria (discussed below in Section 4.3) suggested that the criteria are relevant to the participants. The high percentage of “not sure” responses may indicate that there is an information gap when it comes to awareness within the information sciences of the issues addressed by the criteria, and there is need for more research of IKDLs.

4.3 Community’s Perceptions of Information Professionals’ Involvement in IKDLs

The second part of the survey asked participants about their perceptions of activities for information professionals to pursue related to IKDLs. The survey presented 27 different activities divided into six categories that represented the six criteria. For example, the activity, “Provide technical assistance to indigenous community leaders who are developing digital libraries with indigenous knowledge” (in Question 5) addressed the criterion recognizing the need for indigenous involvement in development of IKDLs. The participants were asked to indicate how important it is for information professionals to pursue each activity using scaled responses ranging from “very unimportant” to “very important” or “not sure” if they did not have sufficient information to respond using the scale.

4.3.1 Findings

Figure 2 illustrates the breakdown of responses gauging the importance of activities presented in the survey (grouped according to the six criteria but not identifying the specific activities). Activities related to all six criteria received responses suggesting that the criteria are important to information professionals according to the participants, though some individual activities were not important or as important as others, and some criteria had more activities deemed important than others.

To get a better sense of perceptions of the individual activities, responses were weighted and scored. For example, each response indicating an activity was "very important" for information professionals to pursue was assigned a score of five, "important" scored four, "neither unimportant or important" or "not sure" scored three, and down. Adding the scores for all the responses to each activity resulted in a total score for the activity. Following this formula, total scores for the 27 activities ranged from 47 to 64. The five "most important" activities (*i.e.*, garnering the highest scores) for information professionals to pursue, according to the responses, were:

1. Provide technical assistance to indigenous community leaders who are developing digital libraries with indigenous knowledge. [total score: 64]
2. Ensure sources of indigenous knowledge in digital libraries are attributed appropriately. [total score: 64]
3. Provide training for indigenous communities in strategies to protect intellectual property rights. [total score: 64]

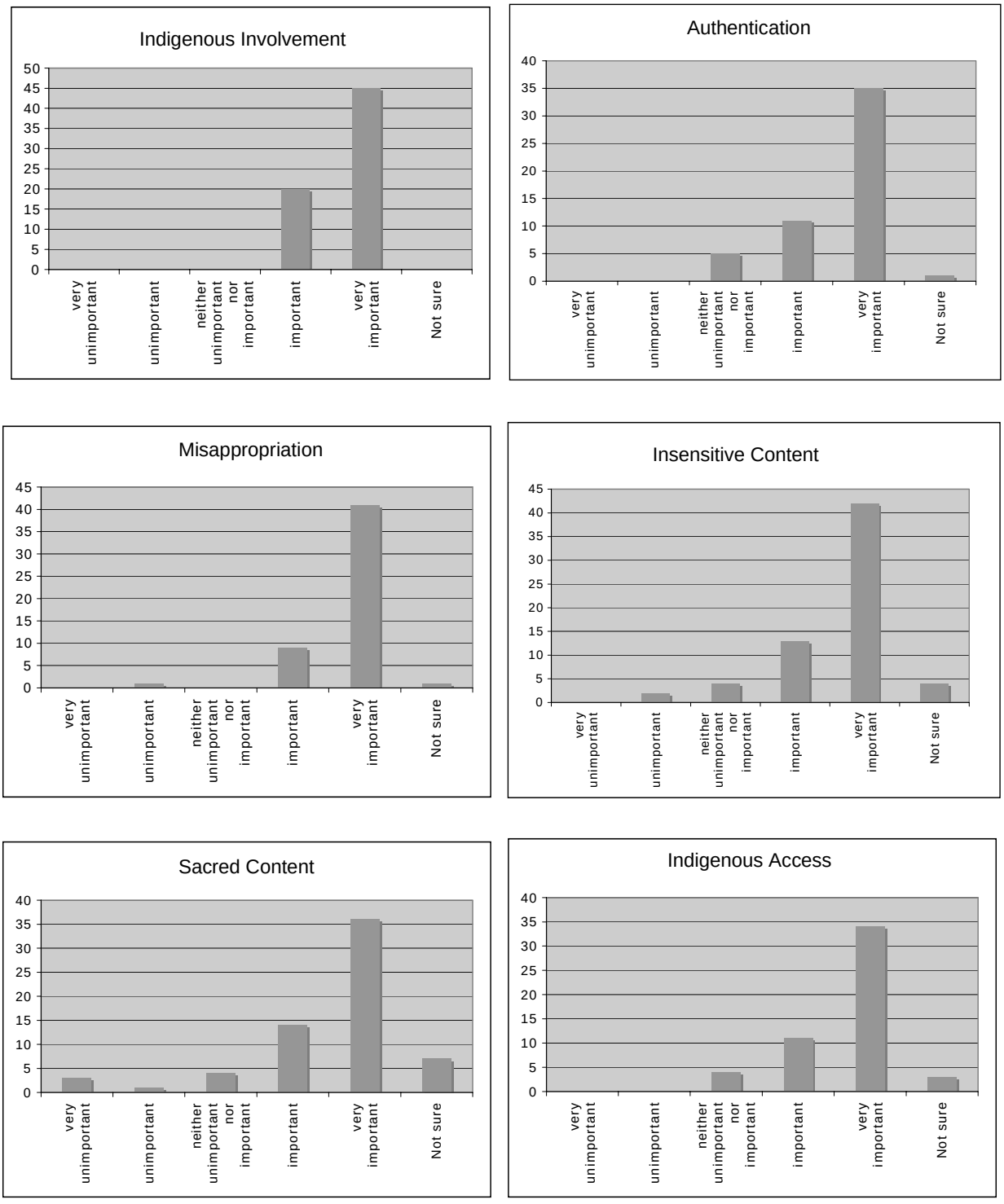

Figure 2: Perceptions of activities related to six criteria involving IKDLs

4. Establish and promote policies to protect intellectual property rights of indigenous communities whose knowledge is represented in digital libraries. [total score: 63]
5. Educate indigenous community leaders about how digital libraries are being used to record and disseminate indigenous knowledge. [total score: 62]

Participants also showed unity in their perceptions of these five activities; all indicated that they were either "very important" or "important," with no neutral or "not sure" responses.

4.3.2 Analysis

The "top five" activities calculated from survey responses to questions regarding activities of information professionals fell into three of the six categories representing the six criteria established for this research: Activities 1 and 5 address the involvement of the indigenous community in developing IKDLs; Activity 2 addresses the authentication of IK in digital libraries; and Activities 3 and 4 address ways to protect intellectual property rights of indigenous communities and guard against misappropriation of IK.

Open-ended responses also suggested that these three criteria should represent priorities for information professionals involved with IKDLs. In response to the option to list additional activities that information professionals should pursue regarding involvement of indigenous community leaders in IKDLs (Question 5), one participant wrote: "Actually listen to indigenous peoples[’] issues about digital content and LISTEN!" Another advised:

> *Share information about funding opportunities for digital library development, and standards. Engage in discussions with not only community leaders but other members about the goals of such projects, and issues of culturally sensitive material.*

A third acknowledged a broader context (beyond IKDLs) and suggested information specialists: “Support activism for indigenous knowledge and advocate for indigenous knowledge in the way indigenous community leaders prefer.”

Participants also specifcally recommended engaging indigenous communities in efforts to protect indigenous communities’ intellectual property rights and authenticating IK. One participant suggested, “Establish procedures and methodologies for restriction of use or withdrawal of materials w/ indigenous community does not wish to be there!” (open-ended response to Question 7). Another comment stressed the importance of communication: “Develop strong relationships with tribal leaders to make discussions and decisions around these topics more comfortable, and allow open discussion” (open-ended response to Question 6).

Activities associated with the three criteria not represented by the “top five” activities also seemed important to the participants, but perhaps not as important for information professionals to pursue. In some cases, lower priorities reflected participants’ perceptions that others would be better suited than information professionals to perform the activity. There was a sense that indigenous communities should perform most activities and make decisions related to the protection of sacred material. One participant’s personal experience suggested that, “Most tribes will not share [with a particular digital library] information that they do not want to be accessible to those outside the tribe” (open-ended response to Question 9). And another noted that decisions about removing or including potentially insensitive content or sacred material in digital libraries should be the responsibility of the indigenous communities rather than information professionals (open-ended responses to Questions 8 and 9).

4.4 Implications for Research

While participants as a group showed some uncertainty about how the IKDLs that they use address the six criteria established for this research (see *Table 2*), they showed more certainty in their perceptions of the six criteria when they were related to activities information professionals should pursue (see *Figure 2)*. "Not sure" represented only 4.6% of the 13 participants' responses to all of the activities presented in the second part of the survey. This was low compared to 33.3% "not sure" responses in the first part of the survey, which asked about an existing digital library's methods for handling the characteristics of IK according to the six criteria. Additionally, comments contributed through the optional open-ended questions in the second part of the survey revealed that three of the 16 "not sure" responses reflected the participant's perception that the activities should be performed by members of the indigenous community rather than information professionals. These qualified "not sure" responses represent conscious decisions about the activities rather than indecision due to lack of information or uncertainty about importance.

It is important to note that the survey did not define "information professional." Some participants may have interpreted the term more broadly than others. However, regardless of whether they interpreted "information professional" narrowly or broadly, participants seemed to indicate that, at least theoretically, the six criteria are relevant to information professionals involved with IKDLs, particularly the need for indigenous community leadership in the development of IKDLs and to protect indigenous communities' intellectual property rights.

Generally, participants of this research were unaware of the ways existing digital libraries currently address the issues represented by the criteria. This may indicate need for qualitative

research, such as interviews and case studies, to develop an understanding of IKDLs within the field before proceeding to trying to quantify data (as translating topics that are not well understood or defined into entities that can be measured is difficult).

Though the analysis of this study's findings are not generalizable to IKDL community members, the findings coupled with the low response to the survey suggest it would be worthwhile to explore the need to increase general awareness within the information sciences of IKDLs and issues confronting them. Toward this end, the criteria proposed for this research could be tested in other studies.

CHAPTER 5. QUALITATIVE ANALYSIS OF THE RESEARCH PROCESS

Analysis of the research process provided insights to better understand the outcome of this study and offer guidance for future studies of IKDLs. This chapter discusses three themes that emerged during the analysis regarding the nature of IK as a research topic and then discusses implications for conducting research that involves IKDLs.

5.1 Themes

Three themes that emerged during analysis of the research process involved: 1) the recondite nature of IK research within the information sciences; 2) the scope and boundaries of this project, which focused on the bridge between individual case study and the theoretical work of leading thinkers; and 3) connotations of the term “indigenous.” Though the themes overlap, they can be introduced individually. This section identifies indicators of the themes that were recognized during data collection and extrapolates and expands them by relating them to the rest of the research process, including the literature review and the researcher’s personal experience and reflections of the process.

5.1.1 Complex Nature of Indigenous Research within the Information Sciences

The literature reviewed in this study has suggested already that IK (and the complex issues surrounding its preservation) has emerged relatively recently as a research topic in information sciences. When the announcement of the research and invitation to participate in the survey was posted, some reactions also suggested that the research represents a topic of growing

interest within the field, but not necessarily a well documented one yet; two representatives from organizations advocating IK preservation contacted the researcher directly to suggest that she share findings with their organizations. Another response to the announcement, though chiefly expressing concerns about the survey (discussed below), also acknowledged the timeliness of the research topic, citing the current debates taking place through ALA to establish a policy regarding traditional cultural expressions and libraries. (The ALA Office for Information Technology Policy's document, *Librarianship and Traditional Cultural Expressions: Nurturing Understanding and Respect* (currently in its seventh draft) has been referred to already in this study.)

Though there is evidence of growing interest in the topic, the research design assumed that issues surrounding IK are not widely recognized within the field in the United States. A deliberate decision was made to try to locate participants familiar with issues surrounding IK preservation and likely to have knowledge of an IKDL or IKDLs (that is, IKDL community members). One concern expressed in response to announcement of the survey was that the research topic was too complex to address through a survey, even within the targeted population. Indeed the issues surrounding IK are complex. However, the comment also may suggest that these issues are not yet widely recognized in a cohesive way within the networks that have provided leadership in this research area. Among the many topics being addressed by groups representing and serving the information needs of indigenous communities, the issues addressed in the survey may not yet represent a focus that reaches beyond a small number of scholars and practitioners within these wider networks. For example, one non-participant indicated unawareness of an IKDL as a reason for nonparticipation.

Like other areas of study within the profession, scholars and practitioners work to improve understanding of complex issues surrounding IKDLs and ways to address the issues, but, unlike some other areas of study, it seems that IK research has not yet gained prominence within the field generally in the United States. One survey participant advised in the final open-ended question (which asked for additional observations about IKDLs): "Look to Australia and Canada."

Most information professionals in the United States, regardless of their areas of specialization, acknowledge some familiarity with issues related to, for example, cataloging, collection development, and even more-recent topics like Web 2.0. These topics are covered in library and information studies programs across the nation. Far fewer information professionals seem to be familiar with information sciences' work involving IK. Another suggestion from the survey cites a lack of formal guidance for addressing IK issues, proposing: "Actually come up w/ working documents for IK and IKO [indigenous knowledge organizations]" (open-ended response to Question 6).

The temptation to categorize "indigenous knowledge" as a specialized subject area within librarianship, similar to music or science librarianship, or as representing a niche in the information sciences profession at large, similar to archives or tribal libraries, may lead one to conclude that issues related to IK do not represent a "mega-topic" like cataloging or Web 2.0. However, IK research cuts across all disciplines including law, science, art, and the social sciences. Despite limited response to the survey, the digital libraries identified by participants represent a wide variety of subjects, including law, agriculture, history, education, and development. And documents like *Protocols for Native American Archival Materials*

demonstrate ho IK issues affect multiple "niches" within the field of information sciences, including museums, archives, and libraries.

IK research seems to be at a stage within the information sciences between the point where leaders have recognized its importance and are spreading the word and the point where it is established as a self-evident area of inquiry within the field. As suggested in the introduction to this study, there is evidence that the profession will continue to become more aware of issues surrounding IK. Programs like Knowledge River at the School of Information Resources and Library Science at the University of Arizona,[3] established in 2001, and the already-cited current efforts to develop a policy regarding traditional cultural expressions and libraries reflect growing interest in IK within information sciences. Also, organizations like the International Federation of Library Association's (IFLA's) recently formed Special Interest Group on Indigenous Matters and the World Intellectual Property Organization's Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore promote the importance of IK on a global scale. These programs and projects will help IK issues become more familiar at the local level where they are not yet familiar as efforts to address them become more connected and visible within the field.

5.1.2 Scope and Boundaries of the Research Topic

The research was designed to address a perceived gap in research regarding IKDLs. The gap appeared between case studies (which others have done and which remains an important area

[3] Knowledge River is a program designed to prepare information professionals to serve and represent Latino and Native American communities, with understanding of community cultures and languages.

for research) and theoretical work of leading thinkers in IK research. The fact that representatives from two IK organizations expressed interest in the findings suggests others also perceive need for this kind of research.

However, the low response to the survey raised questions about whether collecting data using a survey was a good choice for this topic. Trying to capture data that represented perceptions somewhere between a "group leadership" perspective and an individual perspective proved an elusive and perhaps confusing target. For example, after the survey was posted to an organization's discussion list, a potential participant expressed concern about using the name of the organization to endorse the findings of the survey, which was not the intent. The survey hoped to gather data reflecting the perceptions of members (as a population familiar with issues surrounding IK and likely to be familiar with an IKDL) rather than a consensus or "official perception" that represented the group.

The goal to provide a broad view of IKDLs actually necessitated incorporating a narrow as well as broad focus into the research design, which is explained in part by an apparent paradox in application of the term "indigenous knowledge." For researchers (in the information sciences and other disciplines), "indigenous knowledge" is used to represent a single concept, but it embodies multiple unique knowledge systems that cannot be transferred to other contexts. The survey was designed to bridge the single concept and composite reality by looking at how specific instances (perceptions of IKDLs) related to overarching or common concerns about representations of IK, which have been identified by other scholars and practitioners. The IKDL community members assumed to exist by this study were also assumed to represent diverse communities that make up the composite reality.

Rather than focus on a single knowledge system as a case study or elaborate theoretical work of others, this research was exploratory, seeking to provide a snapshot of the current state of IKDLs according to the perceptions of a self-selected sample of IKDL community members. This assumed small and dispersed community could include a wide range of expertise, including scholars and developers who have specialized knowledge regarding an IKDL or IKDLs, but also those who focus more on local IK. The makeup of the IKDL community members becomes even more complex when political aspects of IK surface, as is discussed in the next section.

5.1.3 Caution Associated with the Term "Indigenous"

This research acknowledged power relations implied by the term "indigenous" as part of its theoretical framework; it explicitly adopted the perspective that IK projects must serve first and foremost the indigenous communities whose knowledge is recorded according to their values and needs rather than serve primarily outside communities, such as academia. This section will discuss how the political connotations of the term also influenced how the research process unfolded, specifically, how political connotations may influence perceptions of what IK is and who is qualified to talk about it.

Ellen and Harris (2000) consider the political and moral connotations inextricably linked to the word "indigenous" and what indigenous identity signifies in terms of establishing rights and protecting interests that have been abused. They suggest: "Given its conflicting, ambiguous and strong moral load, 'indigenous' might seem the least useful way to describe a particular kind of knowledge" (pg. 3). Not only does the term "indigenous knowledge" lack clarity or universal understanding, but it also can evoke strong feelings. Ellen and Harris (2000) also remark that the similar but usually not synonymous term "local" is more neutral (pg.3), suggesting perhaps that

"local knowledge" does not elicit the same kind of emotional response as "indigenous knowledge." The term "local" is more clearly associated with a place while "indigenous" has additional meanings related to identity.[4] Indigenous identity raises complex questions about, among other things, relationships and authority. This characteristic of indigenous identity was reemphasized through the research process.

A practical example of the complex issues surrounding indigenous identity (that did not directly relate to the outcome of this research) surfaced in the survey responses. The legal status of indigenous communities in the United States adds another layer to indigenous identity. One participant noted:

> *It is very important that law librarians have a basic understanding of federally-recognized tribes as there are many groups out there that are posing as Tribal entities, but they may have no connection to real Native Nations.* (Open-ended response to Question 7)

This response was made within the context of a digital library including tribal law materials, but it highlights the distinction between federally recognized tribes and other groups (including state-recognized tribes), which can be a contentious.

A more direct indication of the how political connotations of "indigenous knowledge" tied to this research is demonstrated in a response to the announcement of the survey. The

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[4] "Local" can acquire significance in terms of identity within a specific local community, but it does not reach the scale or political depth that "indigenous" does. For example, being "urban indigenous" has a completely different meaning than being "a local" in an urban setting. In urban environments, "indigenous" transcends place and becomes associated primarily with identity (characterized by *separation* from a place) while "local" remains firmly rooted in place.

response expressed wariness of the research topic due to the history of research conducted in indigenous communities and due to lack of knowledge about the researcher and the specific purpose of the research. This response also expressed concern that the research might use the discussion list's name to endorse the opinions of an "unidentified sample" of the list and suggested that the request for survey participants on the discussion list could "compromise and limit the valuable input" of the organization. On one level, this seems contradictory; the request sought the input of members. However, surveying a group is different than asking the group to formulate a position or comment that represents the group. The misinterpretation of the purpose of the survey drew attention to this distinction. It also drew attention to questions like: Who has authority to speak about this topic? And what are the consequences if others speak about it?

The research survey strategy was to reach IKDL community members, that is, professionals with knowledge of the challenges facing indigenous knowledge and of an IKDL or IKDLs. Like the concern cited about an "unidentified sample" of members, the research strategy implies that there are people who are qualified—or at least more qualified—to talk about IKDLs, despite the fact that many IKDLs are accessible to anyone with Internet access. This seems reasonable; a researcher interested in learning about legal databases would likely survey attorneys rather than veterinarians, for example. However, the researcher also may survey a general population if the databases are intended for general use. This recalls earlier discussion in this study about the purpose of IKDLs and whom they serve. Who are "experts" of IKDLs? Are they members of indigenous communities whose knowledge is recorded in them? Or are they information professionals serving indigenous communities? Or designers of IKDLs? Or IK scholars? Any and all could be considered experts. To add to the complexity of who is an expert

of IKDLs, the statement that “many IKDLs are accessible to anyone with Internet access” actually excludes many indigenous communities. One survey participant emphasized this point:

> *[This assumes] that digital libraries are accessible by indigenous communities - which is not true at all. I could point you to U.S. Tribal communities which have no library and even some which have no power or phone lines to Tribal buildings and residences. There IS still a digital divide and it continues.* (Open-ended response to Question 9)

These political connotations of the “indigenous knowledge” that raise potentially contentious issues about authority and identity help explain the lack of definitive understanding of the term, and this lack of definition has a more straightforward consequence for research. Chapter 1 defined “digital library” and “indigenous knowledge” for the purposes of this study using general, inclusive definitions that were intended, in part, to avoid unnecessary limits on feedback. In theory, broad definitions would allow participants to interpret “digital library” and “indigenous knowledge” more freely. However, the definitions may have caused confusion. In essence, they passed the responsibility for defining (as well as identifying) an IKDL to the survey participants.

5.2 Implications for Research

Qualitative analysis of the research process illuminated issues that help understand the low response to the survey. Some of these issues involved details about the way the survey was administered and reflect documented observations concerning survey response rates, such as the benefits of pre-notifying potential participants and follow-up contact. The fact that these observations have been documented does not diminish their importance to this research, and they

deserve at least a summary discussion, which is provided in Section 5.2.1. Other issues concerned the nature of the research topic and represent important considerations for similar research and are discussed in Section 5.2.2.

5.2.1 Previously Documented Observations Concerning Survey Response Rates

Several studies have focused on explaining why survey participants choose to participate in surveys and/or why nonparticipants choose not to participate. Observations made in past studies can be applied to this study. This section provides a brief summary.

O'Rourke (1999) offers an overview of methods found to increase response rates to surveys. Though the overview does not apply specifically to Web surveys, he cites evidence indicating that pre-notifying potential participants and requesting a commitment ahead of time can increase participation. Before distributing the survey for this study, the researcher had attended only one meeting of a group contacted to participate in the survey and notified only a few potential participants of the purpose of the survey. Given the concerns expressed after distribution of the survey about its purpose and about the motives of the researcher, formal pre-notification and a gauge of willingness to participate seems likely to have benefited this study.

O'Rourke also notes that follow-up is essential. Follow-up for anonymous surveys, such as this study's survey, cannot be direct, but can be done. The protocol for conducting this study included follow-up in the form of posting a second announcement and invitation to participate to the discussion lists on which it was announced. Monitoring the status of completed surveys showed that surveys were completed soon after the second announcements were posted, but the number of surveys completed was too small to indicate the follow-up made a difference, and

there was no way to verify that the follow-up announcements in fact precipitated the completion of additional surveys.

This study did not follow-up with those contacted directly through email (as opposed to contacted through a post on an email discussion list). However, direct email did appear to be an effective method for soliciting response. Question 1 asked participants to identify an IKDL, and IKDLs associated with the organizations contacted directly by email accounted for 46% of the IKDLs identified by participants. Though this representation in the survey results is not conclusive evidence,[5] it suggests that contacting potential participants directly through email attracted a higher percentage of participation (but of course from a much smaller number of potential participants) than posting announcements to discussion lists.

Other researchers (*e.g.*, Montez, 2003; and Bosnjak *et.al.*, 2005) focus on psychological factors that influence nonresponse rather than on the mechanics of administering surveys, and their psychological or behavioral models seemed to fit in the context of the themes that emerged in analysis of this study's research process, as is discussed in the next section.

5.2.2 Observations Concerning This Particular Research

This research did not attempt to neutralize the power relations implicit in the research topic; these were core to the research. However, the research process, particularly data collection, added a dimension to this aspect of the topic. The themes that emerged through

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[5] The high percentage of digital libraries associated with organizations contacted through direct email (as opposed to email through a discussion list) may be coincidental; that is, the respondent who supplied the name of the digital library may not come from the organization contacted directly through email. Or the high percentage may reflect that the email more effectively targeted the potential pool of respondents.

analysis of the research process provide a framework for demonstrating how the topic may have influenced potential participants' decisions to participate or not participate in the study.

Porter and Whitcomb (2003) reported a high number of participant drop-outs after viewing just the first page of a survey, and they surmise part of the high drop-out is low salience of the survey from the potential participant's perspective. For this study, it appears that only about 20% of the already low number of potential participants that clicked on the hyperlink to the survey actually completed the survey. (The accuracy of the percentage is not known because individuals could access the link repeatedly anonymously.) The high number of drop-outs for this study's survey may reflect a lack of salience, caused by ineffective dissemination of the survey to the appropriate audience. However it also could indicate a hesitancy to address the research topic. As mentioned in discussion of the difficulties defining "indigenous," the survey passed the responsibility for defining and identifying an IKDL to the participants. Without specific guidelines or definitions, participants may not have been comfortable with this responsibility (especially in a virtual environment in which the researcher was not present to provide context). The concerns expressed in a response to the survey announcement and the current debate surrounding ALA's efforts to develop policy regarding librarianship and traditional cultural expressions demonstrates how contentious issues surrounding IK can be. Addressing these issues requires some confidence on the part of the survey participant. If the potential participant does not have a clear opinion regarding these issues and a positive view of the worth of the survey, it is easier to decide not to participate than to participate.

This interpretation seems to fit a model proposed by Bosnjak, Tuten, and Werner (2005). They apply an extended Planned-Behavior Approach (extended because they add "moral

obligation" to the original theory's three considerations that determine behavioral intention) to "predict and explain (non)response to Web-based surveys" (p.494). Their planned-behavior model assumes that people take into account four types of considerations (including moral obligation) when they decide to act (in this case, to complete a survey). The other three considerations are: "attitude" based on beliefs regarding consequences of the action; "subjective norm" (similar to "peer pressure"); and "perceived behavioral control." Perceived behavioral control can involve factors including: assuming one will (or will not) have the necessary resources to participate in the survey; and feeling capable of answering questions pertaining to the survey topic, for example, for this research, a clear understanding of the term "indigenous knowledge" and sufficient familiarity with concepts related to IKDLs.

The scope and boundaries of the research focused on the gap between theoretical work and descriptions of individual efforts. To bridge these two ends of the spectrum, the research design relied on broad-based survey and sought participants with some knowledge of the challenges facing IK preservation. As mentioned earlier, this included a wide variety of potential participants, including scholars, developers, educators, and local practitioners. It may seem self-evident or unimportant, but the use of an anonymous electronic survey assumed that the survey would be disseminated where it would reach these IKDL community members *and also* assumed that potential participants would be able identify themselves as IKDL community members. Given the lack of standard definitions and the apparent "intermediate" stage of awareness of IK research within information sciences (cited in Section 5.1.2), this assumption not straightforward. Montez (2003) refers to Cialdini's "social validation" principle, one of six principles explaining decisions to participate or not participate in a survey. She reports on the

reasons given by college deans for not participating in a Web survey, and she identifies five categories of reasons. The third category related to the social validation principle and included responses from former deans who had received the invitation to participate but decided not to because they were no longer deans. Social validation, as described by Montez, holds that participants are willing to participate to the degree that "similar others" will participate. Participants' must see themselves as one of the "similar others" targeted by the survey. They also must see "similar others" as also participating in the survey. The fact that concerns about the survey were posted to a discussion list could have influenced the list's subscribers who were deciding whether or not to participate.

This analysis of the research process suggests that limited awareness of IKDLs and the political issues surrounding IK make broad-based surveys aimed at providing a general overview of current perceptions of IKDLs impractical at this time. However, the feedback collected from participants did point to opportunities to research of IKDLs in a way that would provide a view of the current status of IKDLs currently lacking in the literature and describes these opportunities in Chapter 6.

CHAPTER 6. A FRAMEWORK OF GUIDELINES FOR FUTURE RESEARCH

Both quantitative and qualitative analyses of this study contributed to the development of a framework for research of IKDLs. The framework is intended to facilitate the collection and analysis of rich data that improves understanding of IKDLs: It addresses the current status of the IKDL community and suggests research methods that correspond with the community's needs as perceived by this research. The framework also highlights the value of this study's exploratory findings that should be kept in mind during future research. The hope is that the framework will be used to advance efforts toward understanding and evaluating IKDLs as well as determining best practices for information professionals' involved in the creation, development, and/or use of IKDLs.

6.1 Acknowledging the Reality of the IKDL Community

Chapter 5 discussed how the researcher's understanding of IKDL community members evolved during the course of this study. IKDL community members, as identified by this study, are not as numerous and/or cohesive as assumed at the outset of this study. However, there seems to be awareness of and interest in IKDLs within networks interested in IK that can build into a recognized IKDL community. Building such a community requires giving attention to the nature of the loose or unrecognized community that does exist and to perceptions regarding its composition.

6.1.1 The Nature of the Community: Building a Network

The literature review and response to this study's survey suggest that IKDLs lack visibility in the U.S., though there are IKDLs within the U.S., including many of the IKDLs identified participants of this research. (The response to the survey that advised "Look to Australia and Canada" speaks to the need for greater attention to IKDLs in the U.S.)

Though this study's survey sample was too small to generalize, the diversity of IKDLs identified by participants, and the generosity the participants and nonparticipants showed in contributing thoughts and experiences in the optional open-ended questions in the survey and through email, suggest that there are IKDL community members (though not recognized as such) with valuable insights to share.

The themes presented in Chapter 5 discussed ambiguities surrounding the terms "indigenous knowledge" and, by extension, surrounding IKDLs. Also, the high incidence of "not sure" responses to questions about the adequacy of existing IKDLs suggests a need for more qualitative research to advance discussion of IKDLs and improve understanding of them. Potential research participants may be interested and involved in IKDLs and willing to contribute to research about them. However, the low level of exposure IKDLs and IKDL research has received in the literature limits opportunities for understanding of IKDLs, and potential participants may be uncomfortable with the rigid structure of quantitative methods such as the mostly fixed-response questionnaire developed for this research.

6.1.2 Awareness of Insider-Outsider Roles

Chapter 5 analyzed the power relations implicit in the term “indigenous” in the context of this study. The political connotations of “indigenous” create an insider-outsider dichotomy that further complicates identifying IKDL community members and raises issues of trust when research involves IK. Chapter 5 discusses the possibility that some potential participants did not identify themselves as representing the population for whom the questionnaire was intended, and a posted response to announcement of the survey demonstrated that the researcher was perceived an “outsider,” by at the very least one person (but likely many more). The dispersed nature of the IKDL community (as described by this study) suggests challenges in establishing personal connections, but the sensitive history of research in indigenous communities requires personal contact to try to minimize the perception of “insiders” and “outsiders” when researching IKDLs. It may involve identifying key people in the community and developing champions and community leaders who can vouch for the research and researcher and market the research to IKDL community members.

6.2 Developing Appropriate Research Methods

Section 6.1 (and Chapter 5) suggests the need for more qualitative research to advance discussion of IKDLs, hopefully leading to greater understanding and visibility of IKDLs within the information sciences. Greater visibility of IKDLs can also help build a more connected and cohesive IKDL community. The framework developed from this research recommends the following methods and techniques.

6.2.1 Developing Qualitative Strategies

In-depth, unstructured or semi-structured interviews can provide thick, descriptive data from which to start formulating a formal understanding of IKDLs and IKDL community members. However, locating informants for such interviews may require preliminary steps. As was mentioned in Chapter 3's description of selecting research methods, the research conducted a survey to gather input from others to minimize the researcher's biases and limited exposure to different IKDLs. The process of identifying participants for interviews would reflect the same constraint. However, snowballing and convenience sampling may lead to productive contacts. Future studies should also consider the following recommendations in locating participants:

1. *Invest in a face-to-face introduction to the research project.*

The dispersed nature of the IKDL community envisioned in this research can make this a significant investment. A face-to-face introduction could be held at a conference (such as the National Tribal Archives, Libraries, and Museums Conference), perhaps as a session or simply as a meeting agenda item. A session could be useful in determining general interest in the research topic and identifying those interested in it. A face-to-face introduction allows the researcher to introduce himself or herself as well as the research to help build trust with potential research participants. It also provides an opportunity for people interested in the topic to commit to help the research, by agreeing to participate and/or help recruit participants by publicly supporting the research.

2. *Find an in(sider)*

This relates to the first recommendation. Researchers should seek partnerships with communities interested in IKDLs and leaders of those communities. Leaders can help establish

trust and perform a lead role in initiating interviews (or other types of qualitative research, such as case study, mentioned in the next section).

3. Go step by step

Many different groups could be considered experts or interested in IKDLs, including indigenous communities who are responsible for IK represented in digital libraries, librarians who serve indigenous communities, digital library developers who create digital libraries with IK, and others. Specific boundaries defining research participants can help the researcher form an effective interview strategy to reach potential participants and will help potential participants identify themselves as being part of the target group. An extended study can connect the perspectives of several groups. For example, a face-to-face session with librarians who serve indigenous communities could result in a list of recommended IKDLs. The session could be followed with in-depth interviews with willing participants from the session to elaborate the attributes of the identified IKDLs, which could then be followed with in-depth interviews with the developers of the identified IKDLs.

4. Contact participants directly through email.

Individuals interested in IKDLs are dispersed, making the use of ICTs in conducting research attractive. For this study, emailing potential participants directly seemed to be more effective than soliciting response through discussion lists. (See Chapter 5.) Direct email contact could be particularly effective for research with a well-defined target population. This study hoped to encourage potential respondents to participate by minimizing the time and effort required to complete the survey; it included mostly scaled-response and multiple-choice questions. However, concerns expressed about over-simplifying a complex topic, the detailed

feedback gathered through the optional open-ended questions from those who did participate in the survey, and the apparent success of direct emails to targeted individuals suggest that in-depth email interviews may hold promise for this research topic: Interested individuals demonstrated that they were willing to take time to share their insights. Meho (2006) discusses the potential of in-depth email interviews for information sciences research.

6.2.2 Applying Quantitative Surveys

After collecting and documenting qualitative data through strategies like those described in the previous section, quantitative surveys may be used to gather information from a larger pool of participants. However, these surveys should focus on specific, narrow topics within IKDL research. For example, one survey could be designed specifically for developers of IKDLs to collect data regarding challenges presented by IKDLs from the digital library developers' point of view.

6.2.3 Identifying Case Studies

Simply stated, there need to be more case studies of IKDLs. Case studies go beyond basic descriptions of IKDL projects, studying the IKDL from multiple directions and ideally through an extended period of time. And the case studies need to be published and accessible. This will raise awareness of IKDLs and hopefully build or strengthen a network for addressing common concerns among IKDLs.

6.3 Findings Keepers

As an exploratory study, this study collected some research items that do not fit neatly in the study's analysis but that do have value and are worth further investigation. This section highlights some findings in hopes that they offer inspiration and perspective to future studies.

6.3.1 Listen to the Community's Voices

Participants' contributions to this study gave voice to important insights and perspectives that need to be heard. Statements like the following taken from responses to the open-ended questions in the survey reflect a need to communicate these insights and perspectives, and also suggest a degree of frustration about not being heard:

- *Actually listen to indigenous peoples' issues about digital content and LISTEN!*
- *Engage in discussion with not only community leaders but other members about the goals of such projects, and issues of culturally sensitive material.*
- *Support activism for indigenous knowledge and advocate for indigenous knowledge in the way indigenous community leaders prefer.*
- *There IS still a digital divide and it continues.*

6.3.2 Develop Understanding of Research Criteria

Though analysis of this study's quantitative data was limited to trends characterizing the sample rather than a broader population, the findings indicating a need to increase awareness about the criteria (developed for this study) in the context of existing IKDLs seem worth

extending to further testing to keep a focus on understanding how IKDLs address the special attributes of IK.

6.3.3 Share Community Funding Opportunities for Digital Library Development with the IKDL Community

Another possibility for fruitful research stems from a suggestion contributed by a survey respondent to share funding opportunities for digital library development with indigenous communities. Not only does promoting these opportunities raise awareness within the communities about digital libraries and their potential for communicating IK, but it also can provide an avenue for tracking good ideas originating in indigenous communities that are awarded grants. Follow-up with IKDLs that have received funds could result in sharing what worked and what did not from the indigenous community's perspective.

6.4 Conclusion

The framework outlined in this Chapter derived from analysis the research process and survey that comprised this study. The analysis provided a better understanding current awareness of IKDLs and of IKDL community members, who can contribute the kind of rich data that will advance discussion and raise awareness about IKDLs. It is hoped that this study inspires further research of IKDLs, including research of the methods IKDLs employ to address the special attributes of IK. This study proposed six criteria for identifying and, hopefully in the future, assessing the way IKDLs address the attributes of IK, that could be used and tested in future studies. However, the main contribution of this study to the field is the proposed framework for

future research. It encapsulates the experiences and lessons of this research and offers them to help guide similar studies involving IK.

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APPENDIXES

Appendix A: Informed Consent Statement

Perceptions of Digital Libraries with Indigenous Knowledge

Introduction: You are invited to participate in research to gather feedback about digital libraries that include indigenous knowledge materials, and about the role information professionals should assume in addressing the special attributes of indigenous knowledge represented in digital libraries. This research is being conducted for a master's thesis. You must be 18 years old or older to participate.

Information about participants' involvement in the study: As a participant in this study, you will be asked to complete an online questionnaire to share your perceptions of a digital library (that you identify) that includes representations of indigenous knowledge, and about the role information professionals should assume in addressing the attributes of indigenous knowledge in digital libraries. The amount of time required to complete the questionnaire is estimated to be 20 minutes.

Risks: There are minimal anticipated risks for you to participate. You will respond to a questionnaire that is available through any computer with a connection to the Internet.

Confidentiality: The Internet is not a secure medium. However, the researcher will make reasonable efforts to protect participants' privacy. The online questionnaire does not collect personal information that identifies individuals. It also does not collect information, such as IP addresses, that can be linked to individual computers. Note that data analysis and sharing findings in oral or written reports will indicate that the questionnaire was distributed to, and data collected from, members of the American Indian Library Association.

Benefits: This research will collect data about the perceived use and adequacy of digital libraries with indigenous knowledge, and of perceived role(s) information professionals should assume in addressing the attributes of indigenous knowledge in digital libraries. The goal of the survey is to provide direction for establishing methods to evaluate digital libraries with indigenous knowledge and identify best practices. Also, to encourage participation, the PI will contribute $2 for every completed questionnaire, up to $100, to the AILA scholarship fund.

Contact Information: If you have questions about the study or the procedures, you may contact the researcher, Debra Capponi, M.S. candidate, School of Information Sciences, University of Tennessee-Knoxville, at 706-867-8570. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

Participation: Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty. If you withdraw from the study before data collection is completed, the survey

will not collect your data. Clicking through the survey questionnaire to complete it constitutes your consent to participate.

Click on the “next” button to begin.

Appendix B: Questionnaire

Information Professionals' Perceptions of Digital Libraries
With Indigenous Knowledge

Definitions:

This research adopts the following definitions:

1. Digital Library—A digital library meets the following criteria:

- A digital library is a self-identified (that is, named) entity that supports the creation and preservation of a collection or collections of digital materials, and provides access to them.
- Content of a digital library is distributed through an electronic network, though not necessarily through the Internet.

2. Indigenous Knowledge—Indigenous knowledge refers to the shared customs (including language), experience, information artifacts and technology of a local community that has evolved in a particular environment or ecology.

1. According to the above definitions of digital library and indigenous knowledge, please list one digital library that you are familiar with that includes indigenous knowledge. Questions on Screen 1, Screen 2, and Screen 3 will refer to the particular digital library that you list here: _____

2. **The following question refers to the digital library you identified on Screen 1**. Please Indicate how often you use the digital library while assuming the following roles:

	Never	Less than once a month	Once a month	Once a week	Once a day
Librarian or library assistant					
Museum or cultural center employee					
Researcher					
Teacher (k-12, college/university)					
Student					
Archivist					

Digital library creator, developer, or designer					
Seeker of information for personal use					
Volunteer					
(Optional) List other role(s) you perform while using the digital library. How frequently do you use the digital library in these other roles you have identified?					

3. **The following question refers to the digital library you identified on Screen 1**. Please indicate the degree to which you disagree or agree with the following statements:

	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree	Not Sure
The digital library's content matches my needs.						
The quality of the digital library's content meets my expectations.						
Costs associated with using the digital library are reasonable.						
Access to the digital library is convenient.						
(Optional) Identify other aspects that influence your use of the digital library:						

4. **The following question refers to the digital library you identified on Screen 1**. Please indicate the degree to which you disagree or agree with the following statements:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	Not Sure
Indigenous community leaders have adequate involvement in developing the digital library's indigenous knowledge content.						
The digital library identifies how it authenticates its indigenous knowledge.						
The digital library adequately guards against misappropriation of its indigenous knowledge.						
The digital library adequately addresses potentially insensitive content (*e.g.*, images of people who are deceased, or inaccurate historical portrayals of indigenous people).						
The digital library adequately protects sacred materials.						
Indigenous users can easily search, browse, locate, and use their community's indigenous knowledge materials in the digital library.						
(Optional) For those statements where you agreed or strongly agreed, list methods the digital library uses to accomplish the identified tasks:						

5. [This question and questions on the remaining screens *do not* refer specifically to the digital library you identified in Screen 1.] Please indicate how important it is for ***information professionals*** to pursue the following activities related digital libraries with indigenous knowledge:

	Very Unimportant	Unimportant	Neither Unimportant nor Important	Important	Very Important	Not sure
INITIATE projects that involve indigenous community leaders in development of digital libraries with indigenous knowledge.						
FACILITATE participation of indigenous community leaders in existing digital libraries with indigenous knowledge.						
PROVIDE technical assistance to indigenous community leaders who are developing digital libraries with indigenous knowledge.						
EDUCATE indigenous community leaders about how digital libraries are being used to record and disseminate indigenous knowledge.						

EVALUATE the extent to which indigenous community leaders are involved in development of digital libraries with indigenous knowledge.						
(Optional) List additional activities information professionals should pursue regarding involvement of indigenous community leaders in digital libraries with indigenous knowledge:						

6. Please indicate how important it is for ***information professionals*** to pursue the following activities related to digital libraries with indigenous knowledge:

	Very Unimportant	Unimportant	Neither Unimportant nor Important	Important	Very Important	Not Sure
ESTABLISH AND PROMOTE GUIDELINES for authentication of indigenous knowledge in digital libraries.						
EDUCATE leaders about community-authentication processes for digital libraries with indigenous knowledge.						
ENSURE sources of indigenous knowledge in digital libraries are attributed appropriately.						

EVALUATE the ways digital libraries with indigenous knowledge authenticate content.						
(Optional) List additional activities information professionals should pursue regarding authentication of digital libraries with indigenous knowledge:						

7. Please indicate how important it is for ***information professionals*** to pursue the following activities related to digital libraries with indigenous knowledge:

	Very Unimportant	Unimportant	Neither Unimportant nor Important	Important	Very Important	Not sure
ESTABLISH AND PROMOTE POLICIES to protect intellectual property rights of indigenous communities whose knowledge is represented in digital libraries.						
EDUCATE the public about intellectual property rights of indigenous communities whose knowledge is represented in digital libraries.						

PROVIDE TRAINING for indigenous communities in strategies to protect intellectual property rights.						
EVALUATE the ways digital libraries with indigenous knowledge guard against misappropriation of content.						
(Optional) List additional activities information professionals should pursue regarding misappropriation of materials in digital libraries with indigenous knowledge:						

8. For this question, examples of potentially insensitive content may include images of deceased people or inaccurate historical portrayals of indigenous people. Please indicate how important it is for ***information professionals*** to pursue the following activities related to digital libraries with indigenous knowledge materials:

	Very Unimportant	Unimportant	Neither Unimportant nor Important	Important	Very Important	Not Sure
ESTABLISH AND PROMOTE GUIDELINES to address potentially insensitive content in digital libraries with indigenous knowledge.						

EDUCATE users about potentially insensitive content in digital libraries with indigenous knowledge.						
ACKNOWLEDGE and provide context for potentially insensitive content in digital libraries with indigenous knowledge.						
EVALUATE the ways digital libraries address potentially insensitive content.						
PREVENT inclusion of potentially insensitive content from digital libraries with indigenous knowledge.						
(Optional) List additional activities information professionals should pursue regarding insensitive content in digital libraries with indigenous knowledge:						

9. Please indicate how important it is for ***information professionals*** to pursue the following activities related to digital libraries with indigenous knowledge:

	Very Unimportant	Unimportant	Neither Unimportant nor Important	Important	Very Important	Not Sure
ESTABLISH AND PROMOTE GUIDELINES to protect sacred indigenous knowledge in digital libraries.						
MONITOR ACCESS to sacred indigenous knowledge in digital libraries.						
DESIGN digital libraries that allow community control of access to sacred indigenous knowledge.						
EVALUATE the ways digital libraries protect sacred indigenous knowledge.						
PREVENT inclusion of sacred indigenous knowledge in digital libraries.						
(Optional) List additional activities information professionals should pursue regarding sacred materials in digital libraries with indigenous knowledge:						

10. Please indicate how important it is for ***information professionals*** to pursue the following activities related to digital libraries with indigenous knowledge:

	Very Unimportant	Unimportant	Neither Unimportant nor Important	Important	Very Important	Not Sure
ESTABLISH AND PROMOTE GUIDELINES that ensure indigenous users can search, browse, locate, and use their community's indigenous knowledge in digital libraries.						
PROVIDE TRAINING for indigenous users to search, browse, locate and use their community's indigenous knowledge in digital libraries.						
INCLUDE indigenous users when evaluating interfaces for digital libraries with indigenous knowledge.						
DESIGN digital libraries that allow indigenous users to add items and descriptions to indigenous knowledge content.						
(Optional) List additional activities information professionals should pursue regarding the access of indigenous communities' to their indigenous knowledge in digital libraries:						

11. (Optional) Share additional observations about digital libraries with indigenous knowledge, or the names of additional digital libraries with indigenous knowledge materials:

12. What is your ethnic identity? Check all choices that apply.
    - o American Indian or Alaska Native
    - o Asian
    - o Black or African American
    - o Native Hawaiian or other Pacific Islander
    - o White or Caucasian
    - o Other (identify) _____
    - o Prefer not to say

13. What is your gender? _____

14. Which age group do you belong to?
    - o 18-25 years
    - o 26-35 years
    - o 36-45 years
    - o 46-55 years
    - o More than 55 years
    - o Prefer not to say

15. What is the highest level of formal education you have completed?
    - o Grade 12 or less, no diploma
    - o High school/GED
    - o Some college, no degree
    - o Associate's and/or technical degree
    - o Bachelor's degree
    - o Master's degree
    - o Doctoral and/or Professional (MD, JD) degree
    - o Prefer not to say

Thank you for taking time to contribute to this research!

Appendix C: Email Announcement of Survey

Subject: Opportunity to contribute to academic research

Dear [discussion list].

Greetings. I am a master's candidate in the School of Information Sciences at the University of Tennessee-Knoxville, and I'm conducting exploratory, independent research for my master's thesis on digital libraries that include indigenous knowledge materials. As a follower of this list, I'm sure many of you have thoughts to share on this important topic.

You are invited to contribute to this research through an anonymous online survey about perceptions of these libraries and of the role of information professionals in addressing the attributes of indigenous knowledge materials in digital libraries.

The survey is estimated to take about 20 minutes to complete and is available at http://survey.utk.edu/mrIWeb/mrIWeb.dll?I.Project=AILA.

(A request to participate in this survey has been posted to other lists. Please excuse cross-posting if you have seen it before. Thank you.)

Please don't hesitate to share this announcement and link with colleagues who may be interested.

Also, please don't hesitate to contact me if you have questions or other feedback concerning the survey. I look forward to sharing findings.

Best regards,
Debra
Debra Capponi [contact information, including email and telephone number]

Appendix D: Questionnaire Questions and Corresponding Variable Names

Question number	Variable name
1	digital_library_id
2	use_role_frequency: librarian, museum, researcher, teacher, student, archivist, dl_creator, personal, volunteer, use_role_frequency_other
3	use_reasons
4	adequacy_rating: adequacy_input, adequacy_auth, adequacy_misapp, adequacy_sensitivity, adequacy_sacred, adequacy_access, adequacy_other
5	IProle_input_rating: input_initiate, input_facilitate, input_assist, input_educate, input_assess, input_other
6	IProle_authenticate_rating: auth_guidelines, auth_educate, auth_citations, auth_assess, IProle_auth_other
7	IProle_misappropriation_rating: misapp_guidelines, misapp_educate, misapp_train, misapp_assess, IProle_misapp_other
8	IProle_sensitivity_rating:

	sens_guidelines, sens_educate, sens_explain, sens_assess, sens_removal, IProle_sens_other
9	IProle_sacred_rating: sacred_guidelines, sacred_monitor, sacred_design, sacred_assess, sacred_removal, IProle_sacred_other
10	IProle_access: access_guidelines, access_train, access_assess, access_tags, access_design, IProle_access_other
11	open_question
12	ethnicity
13	gender
14	age
15	education

VITA

Debra Lynn Capponi earned a Bachelor of Arts degree in English from the University of Virginia in 1990. She studied sociocultural anthropology at Arizona State University, where she worked as a research assistant /ethnographer in a metropolitan high school. From 1998 to 2000, she worked as a library assistant in information services at a shared-use library (serving the public and community high school) in Scottsdale, Arizona. From 2000-2008, she served as the information specialist for Chestatee Regional Library in north Georgia, where she currently lives. Her experiences working in libraries inspired her to pursue a master's degree, and she enrolled in the University of Tennessee-Knoxville's School of Information Sciences' program in 2007. She aspires to continue her public library career, focusing on establishing partnerships with community groups.